THOMAS E. MONTGOMERY
COUNTY COUNSEL

DEBORAH A. McCARTHY
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WRITER'S DIRECT NUMBER:
(619) 531-4869
WRITER'S E-MAIL ADDRESS:
James.oday@sdcounty.ca.gov

November 2, 2012

Grant Destache, Chairman
California Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4353

Re: Receiving Water Limitations Language (Provision A) in Draft Regional MS4 Permit

Dear Mr. Destache:

On November 13, 2012, the San Diego Regional Board will hold a workshop on the proposed Regional MS4 Permit. A major policy issue for the Regional Board to consider at the workshop is how the Permit should address compliance with water quality standards in receiving waters. Consistent with the Clean Water Act and prior decisions of the State Board, such compliance for MS4 discharges should be achieved over time, through an adaptive management approach. However, the 9th Circuit Court of Appeal has recently interpreted receiving water limitations language similar to that proposed in Provision A as requiring strict and immediate compliance with water quality standards. To respond to this recent interpretation of similar language, the Regional Board should realign Provision A to reflect the original policy goal of compliance through an adaptive management approach.

The purpose of this letter is to stress that the Regional Board has the discretion to make the policy decision to realign the language of Provision A to reflect the adaptive management approach. For the following key legal reasons, the Regional Board has this authority:

- It is settled law that the Clean Water Act does not require MS4 discharges to strictly comply with water quality standards. (Defenders of Wildlife v. Browner

(9th Circuit) 191 F.3d 1159.) In 1987, when Congress created the MS4 permitting system, it expressly treated MS4 discharges differently than all other MS4 discharges. As Courts have affirmed, Congress unambiguously decided that strict compliance with water quality standards was not required for MS4 discharges.

- The State Board has developed standard receiving water limitations language and has expressly interpreted that language as not requiring strict compliance with water quality standards. (State Board Order 2001-15.) To the contrary, the State Board has explained that "compliance is to be achieved over time, through an iterative approach requiring improved BMPs."

- Other MS4 permits issued by U.S. EPA directly or approved by U.S. EPA have employed the adaptive management approach as the basis for compliance with water quality standards. These permits have not required strict and immediate compliance with water quality standards for MS4 discharges.

Because the Clean Water Act does not demand that MS4 discharges strictly comply with water quality standards, and because the State Board has confirmed that compliance is to be achieved over time through the iterative process, the Regional Board should revise Provision A to realign the language with this policy approach. In light of the unique nature of MS4 discharges, as recognized by Congress, strict and immediate compliance with water quality standards is generally not feasible or appropriate.

Although the State Board has scheduled a November 20, 2012 workshop to discuss the receiving water limitations language, the Regional Board should provide policy direction on this issue now. It is requested that the Regional Board provide direction to staff to revise the language of Provision A to reflect the adaptive management approach as the basis for compliance. It is also requested that the Regional Board provide direction to staff to work with the State Board to support State Board language based on the adaptive management process. Addressing this issue now is particularly important for the Regional Permit because a failure to address the issue will undermine the value and acceptability of the watershed-based approach reflected in the Permit. The innovative approach taken in the Permit may be undermined entirely by the rigid language in Provision A. To support and allow dischargers to embrace the watershed-based approach, Provision A must be realigned with the adaptive management process.

We ask that this letter be provided to the full Board in advance of the workshop. It has been authored and signed below by our office and by counsel on behalf of the City of San Diego and City of Santee.

Very truly yours,

THOMAS E. MONTGOMERY, County Counsel

By J. R. O'Day
James R. O'Day, Senior Deputy

JAN I. GOLDSMITH, City Attorney, City of San Diego

By
Heather Stroud, Deputy City Attorney

CITY OF SANTEE

Shawn Hagerty
BEST BEST & KRIEGER LLP

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Mr. Destache

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Very truly yours,

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By
Heather Stroud, Deputy City Attorney

CITY OF SANTEE

Shawn Hagerty
BEST BEST & KRIEGER LLP

CITY OF
CARLSBAD
Office of the City Manager

www.carlsbadca.gov

November 5, 2012

Honorable Grant Destache, Chair
Honorable Board Members
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123

Re: TENTATIVE ORDER R9-2013-0001 REGIONAL NPDES PERMIT FOR MUNICIPAL SEPARATE STORM SEWER SYSTEMS (MS4s) DRAINING THE WATERSHEDS OF WITHIN THE SAN DIEGO REGION

Dear Chairman Destache and Board Members:

On behalf of the City of Carlsbad (City), please accept the information contained in this letter as formal comment to Tentative Order R9-2013-0001 Regional NPDES permit for Municipal Separate Storm Sewer Systems (MS4s) draining the watersheds within the San Diego Region, in preparation for the Regional Board Member workshop on November 13, 2012.

The City would like to take this opportunity to thank the San Diego Regional Water Quality Control Board (RWQCB) personnel for their progressive approach to stakeholder involvement in drafting the Tentative Order in the past six months. Overall, the focused meetings have been successful and have resulted in an improved permit. However, there are a few areas that warrant further refinement to ensure the permit is implementable, effective at improving water quality where needed, and sustainable from a social, environmental, and economic perspective.

The San Diego Copermittees will be providing verbal comments during the workshop which are supported by the City.

The City is also a Responsible Party in the San Marcos Hydrologic Area (SMHA), and therefore subject to the Bacteria Beaches and Creeks TMDL regulations included in Attachment E of Tentative Order R9-2012-0001. The City of Encinitas, as the lead for the SMHA Responsible Parties has submitted a comment letter on behalf of the Responsible Parties, which is also supported by the City of Carlsbad. We look forward to your thorough review of both sets of comments.

City Hall
1200 Carlsbad Village Drive, Carlsbad, CA 92008-1949 T 760-434-2821 F 760-720-9461

We appreciate the opportunity to work with the Regional Board and stakeholders in the development of regulations to improve water quality in our region. If you have any questions or need further clarification, please do not hesitate to contact Elaine Lukey, Environmental Manager, at (760) 602-7582.

Sincerely,

John Coates

John Coates
Acting City Manager

cc: Ronald Kemp, Assistant City Attorney
Cynthia Haas, Deputy City Manager
David Hauser, Director Property and Environmental Management
Elaine Lukey, Environmental Manager

City of Del Mar

November 5, 2012

Honorable Chairman Grant Destache and Board Members
California Regional Water Quality Control Board
San Diego – Region 9
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

SUBJECT: TENTATIVE ORDER R9-2013-0001 REGIONAL NPDES PERMIT FOR MUNICIPAL SEPARATE STORM SEWER SYSTEMS (MS4S) DRAINING THE WATERSHEDS WITHIN THE SAN DIEGO REGION

Dear Chairman Destache and Board Members:

The City of Del Mar has been pleased with the progressive process used to engage the regional Copermittees and stakeholders in the MS4 Permit reissuance process. RWQCB staff deserves commendation for their efforts to accommodate the Copermittees' written and verbal comments received into the Tentative Order in a quick and timely manner. This effort demonstrates the shared commitment of the RWQCB staff and Copermittees to develop an implementable, cost effective Permit that leads to improvements in water quality conditions. In light of the upcoming Public Workshop on November 13th, 2012 for the NPDES MS4 permit reissuance, the City of Del Mar would like to take the opportunity to address some key issues regarding Tentative Order R9-2013-0001.

In addition to those identified above, the City would like to highlight some of the valued outcomes of the permit reissuance process thus far, namely the Water Quality Improvement Plans (WQIP) as watershed planning documents and the requirement of adaptive management. We also agree with the intended approach for points of compliance with the Permit, as stated by RWQCB staff at the June 27th, 2012 focused meeting with stakeholders. Staff indicated that compliance would be based on the submission of complete Water Quality Improvement Plans (WQIP) and also the implementation and assessment of those WQIPs. Assessment includes adaptation to improve programs and plans to meet the established WQIP goals and ultimately water quality standards.

However, there are areas within the Tentative Order that we feel continue to warrant further consideration. This letter identifies the three primary areas of utmost importance where the process thus far appears to have reached an impasse. For these three topics, the RWQCB staff states that they are either not willing or, contrary to our understanding, not allowed to make further changes. The specific areas include:

I. Receiving Water Limitations language in **Provision A** of the Tentative Order;

II. Expression of Total Maximum Daily Load compliance is **Attachment E** of the Tentative Order, and;

III. Applicability of hydromodificaiton management requirements in **Provision E** of the Tentative Order.

A technical memorandum is attached with details on these topics of concern.

Our recommendations on these three issues are as follows:

I. Provision A Language Should Be Revised

The City urges you to provide direction to your staff to take an active and lead role on this extremely important issue. The new paradigm shift (WQIPs and required adaptive management) in the Tentative Order should be supported by revised state and local policies that encourage complete participation in the WQIP and adaptive management approach. Receiving water limitations language is driven by state and local policy and with a new standard of permitting upon us, the policies should reflect this new paradigm.

II. TMDL Compliance Should Be Consistent

The City of Del Mar urges you to direct staff to correct this apparent conflict between the RWQCB adopted Bacteria TMDL and the compliance requirements of the Tentative Order, Attachment E, Section 6.

III. Hydromodification Management BMPs Should Be Applied To Mitigate Hydromodification Impacts

The City of Del Mar respectfully requests you as RWQCB Members to direct RWQCB staff to include within the permit, the exemptions that were included in the HMP that RWQCB Members approved by Resolution No. R9-2010-0066 in 2010.

In summary, the City of Del Mar respectfully requests that RWQCB Staff and Copermittees work cooperatively on these three issues to find consensus and resolution. We appreciate your attention to our concerns, and we trust that this letter will be entered into the record at the November 13, 2012 meeting.

Sincerely,

Carl Hilliard

Carl Hilliard
Mayor

cc: Del Mar City Council Members

Attachment: Technical Memo of November 1, 2012

City of Del Mar
Memorandum

TO: Scott Huth, City Manager
Kathleen Garcia, Planning and Community Development Director

FROM: Mikhail Ogawa, Clean Water Manager

DATE: November 1, 2012

SUBJECT: San Diego Regional Water Quality Control Board Tentative Order R9-2013-0001

BACKGROUND

The San Diego Regional Water Quality Control Board (RWQCB) issues Municipal Separate Storm Sewer (MS4) permits to the Cities within San Diego County, the County of San Diego, the San Diego County Regional Airport Authority and San Diego Unified Port District (Copermittees). These permits are extensions of the federal Clean Water Act.

In April 2012, the RWQCB staff initiated an informal process by releasing an Administrative Draft of the forthcoming permit. The intent was to engage the Copermittees and stakeholders through focused meetings to allow the opportunity for a dialog to occur. The focused meeting process included five focused meetings, two public workshops, and a workshop sponsored by Orange County Copermittees focused on Hydromodification Management. The process has culminated in the release of a Tentative Order for public review on October 31, 2012. Public comments on the Tentative Order must be submitted by January 11, 2013. In addition, the RWQCB will hold a public workshop as a part of their regularly scheduled Board meeting on November 13th, 2012 to receive input from the public.

Two outcomes of the permit reissuance process thus far include Water Quality Improvement Plans (WQIP) as watershed planning documents and the requirement of adaptive management. The use of WQIPs as planning documents and allowing modifications to MS4 implementation programs, the Tentative Order offers a paradigm shift from previous prescriptive permits that may have led to unfocused programs not directed towards improvements in water quality.

In abridged terms, the WQIPs will be watershed planning documents intended to direct program implementation to focus on the highest of watershed specific water quality issues. The WQIP process requires Copermittees to establish interim and final goals where the objective is to bring MS4 discharges and waterbodies into compliance with water quality standards. The goals must be measureable so that progress towards them can be demonstrated. The WQIPs require schedules to be established for achievement of the interim and final goals. In some cases, these schedules may extend beyond the intended five-year life of the MS4 permit. Specific programmatic strategies are also prescribed to identify the means of achieving the established goals within the schedules. Lastly, the WQIPs also require adaptive management, so that Copermittees may learn from special studies and past efforts to use the most efficient and effective strategies and Best Management Practices to achieve water quality goals. The stated intent of the Permit is to have compliance based on the development, implementation and adaptation of the strategies in WQIPs to meet the established goals and ultimately water quality standards.

CONCERNS REGARDING TENTATIVE ORDER

Provision A – Prohibitions and Limitations

The present use of the limitations in Provision A of the Tentative Order presents a dichotomy between requiring adaptive management BMP programs (i.e., WQIPs) and including receiving water limitations that prohibit discharges from the MS4s causing or contributing to violations of water quality standards[1]. The dichotomy may discourage the City from supporting the WQIP process, including adaptive management, if there is enforcement exposure based on the prohibition of discharges from the MS4s causing or contributing to violations of water quality standards. The City could be in violation immediately and continuously regardless of the efforts put towards the WQIPs and therefore may be discouraged from funding and participating in the adaptive management process that could ultimately work towards achieving water quality standards.

Board staff has verbalized that they have the discretion as to whether or not to enforce the receiving water limitations provision and intend not enforce this provision as long as the Copermittees demonstrate adequate progress through WQIP implementation and adaptation of program strategies. Furthermore, Board staff stated they have been directed to take a passive role and allow the State process[2] to be completed prior to making changes to the San Diego Regional MS4 Permit.

Attachment E – Specific Provisions for Total Maximum Daily Loads Applicable to Order No. R9-2013-0001

The Bacteria TMDL[3] states that for watersheds where there are no longer any impairments listed on the 2008 303(d) List (for REC-1 water quality standards), the Phase I MS4s are not required to submit a load reduction plan and are not subject to any further action under the TMDL as long as monitoring continues to support compliance with REC-1 water quality standards. However, if the impairment returns for REC-1 water quality standards, the Responsible Parties will be required to submit a load reduction plan to the RWQCB.

The City of Del Mar and other Responsible Parties in the San Dieguito and Los Peñasquitos watersheds demonstrated to the RWQCB that the two watersheds are within this scenario where the Pacific Ocean Shoreline of the two watersheds are no longer listed as impaired for indicator bacteria under REC-1 water quality standards. The Responsible Copermittees received written confirmation (see attached two email) that they are "not subject to further action under Resolution No. R9-2010-0001 as long as monitoring data continues to support compliance with the REC-1 water quality standards." This scenario essentially places our two watersheds in a "dormant TMDL", unless the Pacific Ocean shoreline of the one or both of the watersheds are relisted on future 303(d) lists for indicator bacteria[4].

---

[1] Tentative Order R9-2013-0001 Provision A.2.a.

[2] State Water Resources Control Board is holding a Public Workshop on MS4 permits Receiving Water Limitations (RWL) Language on November 20, 2012. There is currently no schedule as to when and if the SWRCB will develop revised positions on RWL for MS4 permits.

[3] Revised TMDL for Indicator Bacteria, Project I – Twenty Beaches and Creeks in the San Diego Region (Including Tecolote Creek) adopted by SDRWQCB Resolution No. R9-2010-0001

[4] Page A66 of SDRWQCB Resolution No. R9-2010-0001

Attachment E, Section 6[5] of the Tentative Order requires, amongst other provisions, the compliance with Water Quality Based Effluent Limitations (WQBELs). The WQBELs as described in the Tentative Order are expressed as Receiving Water Limitations, Effluent Limitations and as Best Management Practices requirements. As written, the Responsible Copermittees in the two watersheds are required to meet the listed WQBELs even while under the "dormant TMDL" condition.

There is a conflict between relisting of the Pacific Ocean shoreline and the more strict WQBEL limitations. Relisting of the Pacific Ocean shoreline would be done under the criteria established in the 2004 SWRCB Listing Policy[6] which allows for a certain number of water quality standard exceedances prior to listing. The WQBEL limitations allow **zero** water quality standard exceedances under dry weather conditions – a much higher bar with which to comply. If the WQBELs are included in the final adopted Permit, at a minimum, the WQBEL compliance is only applicable when the TMDL is in an active phase – i.e., the waterbody is impaired and listed on the 303(d) list as specified in the Bacteria TMDL (SDRWQCB Resolution R9-2010-0001). Otherwise, the Copermittees will be required to focus intense resources to address bacteria at the Pacific Ocean shorelines where water quality monitoring has demonstrated that it is not an issue. This ironic paradox would be contradictory to the watershed based adaptive management process where the objective is to focus limited resources on the highest water quality issues.

Provision E.3.c.(2) Hydromodification Management BMP Requirements
The Tentative Order defines hydromodification as:

> The change in the natural watershed hydrologic processes and runoff characteristics (i.e., interception, infiltration, overland flow, and groundwater flow) caused by urbanization or other land use changes that result in increased stream flows and sediment transport. In addition, alteration of stream and river channels, such as stream channelization, concrete lining, installation of dams and water impoundments, and excessive streambank and shoreline erosion are also considered hydromodification, due to their disruption of natural watershed hydrologic processes.

The Tentative Order requires that priority development projects, including redevelopment projects, are required to control post-project runoff flow rates and durations so as not to result in increased potential for erosion, or degraded instream habitat conditions downstream of the projects. There are several explicit exemptions for these requirements identified in the Tentative Order. However, these exemptions are not inclusive of many of the exemptions identified in the San Diego Regional Copermittees Final Hydromodification Management Plan[7] (HMP). The exemptions identified in the HMP include, but are not limited to, projects that discharges to an exempt river reach, or a tidally-influenced area and other areas where there was little or no increased potential for erosion, or degraded instream habitat conditions downstream of the projects.

Over 95% of the City of Del Mar's MS4 system drains directly to either the Pacific Ocean or to tidally influenced areas of the San Dieguito estuary and river. The areas that drain to the Pacific

[5] Attachment E, Section 6 of the Tentative Order is the Specific Provisions for Total Maximum Daily Loads Applicable to Order R9-2013-0001 for the Revised TMDL for Indicator Bacteria, Project I – Twenty Beaches and Creeks in the San Diego Region (Including Tecolote Creek)
[6] State Water Resources Control Board – Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List, adopted September 2004
[7] Approved on July 14, 2010 by San Diego RWQCB Resolution No. 2010-0066

Ocean will remain exempt per the Tentative Order, however, those areas that drain to tidally influenced areas of the San Dieguito estuary and river will not be exempt even though they have no Hydromodification impacts. The City will be forced to require priority development projects to mitigate for impacts they will not have.

City of
Encinitas

November 5, 2012

Honorable Grant Destache, Chair
Honorable Board Members
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, California 92123-4340

SUBJECT: TENTATIVE ORDER R9-2013-0001 REGIONAL NPDES PERMIT FOR MUNICIPAL SEPARATE STORM SEWER SYSTEMS (MS4s) DRAINING THE WATERSHEDS OF WITHIN THE SAN DIEGO REGION

Dear Chairman Destache and Board Members,

As it relates to the forthcoming Public Workshop on November 13th, 2012 please accept this letter on behalf of the City of Encinitas and the responsible parties of the San Marcos Hydrologic Area (HA) including the Cities of Carlsbad, Escondido, San Marcos, and the County of San Diego, as identified in Resolution No. R9-2010-0001 incorporating into the San Diego Basin Plan the *Revised Total Maximum Daily Loads (TMDL) for Indicator Bacteria, Project I – Twenty Beaches and Creeks in the San Diego Region (including Tecolote Creek)* (Bacteria TMDL).

At the November 13, 2012 Public Workshop, two significant and interrelated regulatory Orders will converge that individually deserve careful consideration, and even more so collectively. Tentative Order No. R9-2013-0001 includes *Attachment E – Specific Provisions for Total Maximum Daily Loads Applicable to Order No. R9-2013-0001*, and specific provisions for implementing the TMDLs adopted by the San Diego Water Board. Included in *Attachment E* are compliance requirements specific to the Bacteria TMDL[1], including the San Marcos HA.

The Bacteria TMDL states that for watersheds where there are no longer any impairments listed on the 2008 303(d) List (for REC-1 water quality standards), the Phase I MS4s are not required to submit a load reduction plan and are <u>not subject to any further action under the TMDL as long as monitoring continues to</u>

[1] Revised TMDL for Indicator Bacteria, Project I – Twenty Beaches and Creeks in the San Diego Region (Including Tecolote Creek) adopted by SDRWQCB Resolution No. R9-2010-0001

Tel 760/633-2600 FAX 760/633-2627, 505 South Vulcan Avenue, Encinitas, CA 92024 TDD 760/633-2700

support compliance with REC-1 water quality standards. However, if the impairment returns for REC-1 water quality standards, the Responsible Parties will be required to submit a load reduction plan to the RWQCB.

The City of Encinitas and the San Marcos HA Responsible Parties have demonstrated to the RWQCB that this hydrologic area is consistent with the scenario described in the Bacteria TMDL, as the Pacific Ocean Shoreline Segment at Moonlight Beach in Encinitas (in the San Marcos HA) is no longer listed as impaired for indicator bacteria under REC-1 water quality standards. The Responsible Parties received written confirmation (*See Attached E-Mail dated Wednesday, May 16, 2012)* that they are "*not subject to further action under Resolution No. R9-2010-0001 as long as monitoring data continues to support compliance with the REC-1 water quality standards.*" This scenario effectively places the San Marcos HA in a "dormant TMDL" status, unless the Pacific Ocean shoreline of the San Marcos HA is relisted on future 303(d) lists for indicator bacteria[2] and REC-1 impairment.

Attachment E, Section 6[3] of the Tentative Order requires, amongst other provisions, compliance with Water Quality Based Effluent Limitations (WQBELs). The WQBELs as described in the Tentative Order are expressed as Receiving Water Limitations, Effluent Limitations and as Best Management Practices requirements. As *Attachment E* of the Tentative Order is currently written, the Responsible Copermittees in the San Marcos HA are required to meet the listed WQBELs even while under the "dormant TMDL" condition.

Further exacerbating this conflict, there is a disparity between relisting of the Pacific Ocean shoreline and the more strict WQBEL limitations presented in the Tentative Order. If future conditions and monitoring data were to support a re-listing of the Pacific Ocean shoreline at Moonlight Beach, this would be done under the criteria established in the 2004 SWRCB Listing Policy[4] which allows for a certain number of water quality standard exceedances prior to listing. In clear contrast, the WQBEL limitations in the Tentative Order allow **zero** water quality standard exceedances under dry weather conditions – a much higher bar with which to comply than the listing criteria. In effect, San Marcos HA Responsible Parties will be required to focus intense resources to address bacteria at this Pacific Ocean shoreline segment where water quality monitoring has demonstrated an impairment does not exist.

[2] Page A66 of SDRWQCB Resolution No. R9-2010-0001
[3] Attachment E, Section 6 of the Tentative Order is the Specific Provisions for Total Maximum Daily Loads Applicable to Order R9-2013-0001 for the Revised TMDL for Indicator Bacteria, Project I – Twenty Beaches and Creeks in the San Diego Region (Including Tecolote Creek)
[4] State Water Resources Control Board – Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List, adopted September 2004

In summary and in consideration of this involved and complex set of issues it is important to acknowledge the following facts:

- Per the 2010 303(d) list, the Pacific Ocean shoreline at Moonlight Beach (San Marcos HA) is NOT impaired for REC-1 Beneficial Uses (Moonlight Beach is the location that is the basis for including the San Marcos HA in the Bacteria TMDL).
- Per the 2010 303(d) list, the listing at Moonlight Beach for total coliform is based upon the water quality objectives for the SHELL beneficial use only, and as stated above, is not listed for REC-1.
- Per Resolution No. R9-2010-0001, the TMDL applies only to REC-1 and does not apply to SHELL impairments

  Pg. 4, footnote 17: "waterbodies with SHELL beneficial use impairments will be addressed in a separate TMDL project and/or standards action."

Based upon this background information and the conclusions presented above, at this time the Responsible Parties of the San Marcos HA would like to request your direction to RWQCB staff to address the conflict between the RWQCB adopted Bacteria TMDL and the compliance requirements of Tentative Order R9-2013-0001.

Sincerely,

Gus Vina,
City Manager, City of Encinitas

cc: Erik Steenblock, City of Encinitas
Todd Snyder, County of San Diego
Elaine Lukey, City of Carlsbad
Cheryl Filar, City of Escondido
Erica Ryan, City of San Marcos

Attachment A

Erik Steenblock

From: Deborah Jayne [djayne@waterboards.ca.gov]

Sent: Wednesday, May 16, 2012 5:27 PM

To: elaine.lukey@carlsbadca.gov; Erik Steenblock; vina@cityofencinitas.org; constantine_kontaxis@dot.ca.gov; cfilar@escondido.org; eryan@san-marcos.net; Todd.Snyder@sdcounty.ca.gov

Cc: David Barker; Deborah Woodward; Eric Becker; Jeremy Haas; Lisa Honma; Wayne Chiu

Subject: Your April 23, 2012 Letter Regarding Bacteria TMDLs and Moonlight State Beach

Dear Mr. Vina et al,
Thank you for your letter dated April 23, 2012 requesting written acknowledgment of your conclusions regarding the applicability of the Bacteria TMDLs to Moonlight State Beach and the requirement for submittal of a Bacteria (or Comprehensive) Load Reduction Plan (BLRP or CLRP).

The REC-1 TMDLs adopted under Resolution R9-2010-0001 remain in effect and applicable at Moonlight State Beach. However you are correct that the Responsible Parties (RPs) are not required to submit a BLRP or CLRP (specific to this beach segment) within 18 months of the effective date of the Bacti I TMDLs because this beach segment is not currently impaired/listed for REC-1. Furthermore, the Moonlight State Beach segment is not subject to further action under Resolution No. R9-2010-0001 as long as monitoring data continues to support compliance with the REC-1 water quality standards (Resolution No. R9-2010-0001 page A2). If, however, the segment is re-listed on a future 303(d) List for a REC-1 impairment, the RPs will be required to submit a BLRP or CLRP for this beach segment within 6 months of the adoption of the 303(d) List by the San Diego Regional Board (Resolution No. R9-2010-0001 page A66).

I trust this email adequately addresses your inquiry regarding TMDL applicability and BLRP or CLRP submittal. Regarding ongoing monitoring requirements, please refer to your MS4 permit for the general requirements and direct any specific monitoring questions to Mr. Wayne Chiu at wchiu@waterboards.ca.gov . Please feel free to contact me or Wayne at any time if additional clarification is needed.

Sincerely,

Deborah Jayne
Senior Environmental Scientist
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, California 92123-4340
Office: (858) 467-2972
Fax: (858) 571-6972
e-mail: djayne@waterboards.ca.gov

THE CITY OF SAN DIEGO

December 4, 2012

VIA EMAIL to: rb9agenda@waterboards.ca.gov

Mr. Gary Strawn
Acting Chair
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123

Subject: Tentative Order No. R9-2013-0001, December 12, 2012 Regional Board Meeting Agenda Item No. 11

Dear Mr. Strawn:

Thank you for the opportunity to participate in the Regional Water Quality Control Board's (Regional Board) December 12, 2012 workshop regarding the Tentative Order No. R9-2013-0001 hereinafter referred to as the "Tentative Order." This letter is being submitted to communicate the City of San Diego's (City) concerns regarding the Tentative Order for discussion at the Regional Board's December 12th meeting. A summary of the key issues is provided below. In addition, the City participated with the Copermittees in the San Diego region to develop written responses to the questions raised by the Regional Board at the November 13, 2012 workshop. The City requests that the Regional Board direct staff to work with the Copermittees to address these remaining issues before considering approval of the Tentative Order.

- *Revise the Tentative Order to allow a Copermittee to achieve compliance with Receiving Water Limitations, Areas of Special Biological Significance (ASBS) and Total Maximum Daily Load (TMDL) requirements, if the Copermittee is implementing an approved Water Quality Improvement Plan.* The City is committed to protecting and improving water quality in the San Diego Region. To that end, it is the City's objective for the Tentative Order to allow for the City to efficiently integrate its TMDL, ASBS and Municipal Permit requirements into an adaptive management program that allows the City to achieve compliance through implementation and iterative improvement of programs designed to achieve water quality goals. The mechanics and structure of the Water Quality Improvement Plan developed by Regional Board staff provide an innovative, thoughtful, and strategic framework for such an approach. However, the Tentative Order still does not provide a pathway for the City to achieve compliance with ASBS and TMDL regulations and the

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Hotline (619) 235-1000 Fax (858) 541-4350

Tentative Order's receiving water limitations while implementing the Water Quality Improvement Plans. Without these linkages, there remains little incentive for the City to undertake the significant increases in investments that would be required to implement the Water Quality Improvement Plans.

- *Revise the Bacteria TMDL requirements to allow for load- and BMP-based compliance, per the adopted Bacteria I TMDL.* The Bacteria I TMDL Basin Plan Amendment included options for concentration and load-based methods of calculating Waste Load Allocations. In addition, the Basin Plan Amendment allowed for the possibility of BMP-based compliance with the Bacteria I TMDL provided certain criteria and assurances were acceptable to Regional Board staff. These options should be included in the Tentative Order.

- *Revise the Tentative Order to uphold the previously adopted San Diego Hydromodification Management Plan (San Diego HMP), Resolution No. R9-2010-0066.* This plan has been in effect for less than two years. The San Diego HMP was developed by an expert consultant team that utilized extensive scientific studies, analysis and modeling to determine the appropriate hydromodification control criteria. Additionally, the San Diego Copermittees have embarked upon a $1.5 million, 5 year monitoring plan to validate the parameters and design criteria. There have been no scientific advances in the last 2 years to justify revisions to the San Diego HMP, therefore we request allowing the Copermittees to continue implementation of the current San Diego HMP.

- *Replace the monitoring and assessment requirements in the Draft Permit (Provision D.4) with the strategic monitoring approach developed collectively by the Copermittees.* The Copermittees' approach will more efficiently and effectively address critical questions necessary to adaptively manage the City's programs and realize our storm water quality goals.

We appreciate this opportunity to share our comments and look forward to continued discussions in finding ways to improve and protect water quality. If you have any questions please contact Drew Kleis, Program Manager at (858) 541-4329.

Sincerely,

Kris McFadden

Kris McFadden
Deputy Director

KM:dk

cc: David Gibson, Executive Officer, San Diego Regional Water Quality Control Board
Heather Stroud, City Attorney's Office
Bill Harris, Transportation & Storm Water Department
Sumer Hasenin, Transportation & Storm Water Department
Ruth Kolb, Transportation & Storm Water Department
Andre Sonksen, Transportation & Storm Water Department

Pala Pauma Valley Community Sponsor Group
P O Box 1273, Pauma Valley, CA 92061
760.481.4201

By: USPS

Monday, December 10, 2012

Mr. Rich Crompton, Director
County of San Diego Department of Public Works
5510 Overland Ave, Ste 410
San Diego, CA 92123

Dear Mr. Crompton,

Re: Comment – Tentative Order No.R9-2013-0001, Regional MS4 Permit,
Place ID: 786088Wchiu

At its December 4, 2012 meeting the Pala Pauma Community Sponsor Group ("PPCSG") voted unanimously to support the action of San Diego County to protect water quality while controlling the mounting and unsubstantiated costs of increased regulation on local governments, business and industry. In particular, PPCSG supports the view that regulation based upon unproven science used in pursuit of parametric objectives that are apparently unattainable is poor governance and detrimamential to the interests of our community.

PPCSG believes that it is incumbent upon regulatory agencies to ensure that their enacted regulations are practical, cost-effective, and scientifically based. We are concerned that, otherwise, public funds may have to be spent to comply with requirements that are not proven nor effective, and that this will ultimately reduce the funding available for community projects and essential public services and increase the costs absorbed by trade and industry thereby inhibiting badly needed economic growth.

It appears that, as written, the Tentative Order will result in a significant and unprecedented level of regulation and cost without clear scientific basis or environmental benefit. The three main areas of concern in the draft permit are: i.) a far-reaching Bacteria Total Maximum Daily Load ("BTMDL"), ii.) additional requirements for development projects, and iii.) performance standards that unnecessarily expose municipalities to third-party lawsuits

PPCSG understands that the cost to comply with the Bacteria TMDL is estimated to be between \$2.6 billion and \$4.9 billion for the named watersheds in the region over the 20 year TMDL compliance timeline, of which only 18 years remain. The numeric targets in this TMDL may never be attainable even if government agencies were to spend billions in public resources, thereby increasing the costs of business and trade. PPCSG understand that available technology does not exist to return urbanized watersheds back to pristine, "reference" conditions.

Additionally, the Tentative Order requires that new and re-development projects return site hydrology to pre-development conditions as opposed to pre-project conditions. Returning urban infill projects to conditions that existed under "natural", pre-urban conditions would be a substantial constraint to re-development to the disadvantage of general Plans that seek to use infill development as a way of reducing urban sprawl. Further, the Tentative Order ignores all of the good work invested in the Hydromodification Management Plan developed at a significant cost to the public over the past years between the County and Regional Board staff and apparently seeks to impose a new, one-size-fits-all requirements standard that is unrealistic and without scientific justification. The result of all these changes is that the structures built to mitigate development impacts will need to be bigger and will cost significantly more than under the currently approved program.

PPCSG understands that receiving water limitations language is contrary to the intent of the Federal Clean Water Act, which is to assure municipal agencies will be regulated to a reasonable standard resulting in State and Regional Water Boards having the responsibility to ensure that water quality regulations are applied in a context that results in <u>economic and environmental sustainability</u>. PPCSG further understands that the 21 Co-permittees in our region (the County, 18 cities, Port District, and Airport Authority) already spend close to $120 million a year to comply with current regulations. PPCSG would like to see the Regional Board adopt Permit standards that will be cost neutral in a way that local municipalities will have the flexibility to apply funding to priority areas.

PPCSG is hopeful that the final permit language will result in programs that are rational from both environmental and economic standpoints -regulation within reason- and not impose upon our community the crippling disadvantages of regulation without reason.

Yours sincerely,

Charles Mathews

Charles Mathews, Chair,
Pala Pauma Valley Community Sponsor Group.

Copy: PPCSG members
Gary Strawn, Vice Chairman
Eric Anderson, SD RWQCB
Henry Abarbanel, SD RWQCB
Tomas Morales, SD RWQCB
David Gibson, SD RWQCB
Wayne Chiu, SD RWQCB
California Regional Water Quality Control Board, San Diego Region
9174 Sky Park Court, Suite 100
San Diego California 92123-4340
Stephanie Gaines, DPW Watershed Protection Program (by email)

Via e-mail to lwalsh@waterboards.ca.gov

San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

December 10, 2012

RE: Supplemental Comments for Aliso Watershed in South Orange County
San Diego Regional Municipal Separate Storm Sewer System (MS4) Permit,
Tentative Order No. R9-2012-0011

The South Laguna Civic Association, established in 1946, supports comments and recommendations submitted September 14, 2012 by the "Environmental Groups" regarding the administrative draft of the San Diego Regional Municipal Separate Storm Sewer System (MS4) Permit, Tentative Order No. R9-2012-0011 ("Administrative Draft Permit").

While a regional permit can provide improved levels of efficiency, smaller, high value habitats and coastal receiving waters established as critical marine life recovery areas may be overlooked. The Aliso Watershed in south Orange County represents an area requiring closer consideration.

Aliso Creek discharges 1 to 5 million gallons per day of dry weather urban runoff from known inland MS4 point sources. Twenty years of monitoring reports and over $20 million have clearly identified at least one dozen offending storm drains with daily dry weather flows exceeding 150,000 gallons per day (GPD). Only one storm drain in Laguna Niguel has received a Clean-up and Abatement Order during this period.

As recently as 1982, surveys of Aliso Creek indicated no flows throughout the dry season. In fact, early ranching of Aliso Canyon with subsequent destruction of critical native trees and vegetation led to long drought conditions and widespread, fatal dehydration of cattle.

Today, the primary source of elevated creek flows originates exclusively from inland over-irrigation and careless discharges of recycled water. Non-native creek flows transport a toxic variety of pollutants and carcinogens from residential, commercial and municipal known point sources with measurable quantities of herbicide, pesticide, fertilizer, automotive and similar residues to protected creek, estuary and coastal receiving waters. Aliso Beach is permanently posted for contaminated water and remains a risk to public health and safety.
(Please see Exhibit A – 2011 Aliso Creek Daily Flow/e.g., August 1, 2011 @ 7.6cfs = 4.9 MGD)

<u>Economics of Water Pollution</u>

Water Districts profit significantly from the sales of recycled water yet fail to be held accountable by the SDRWQCB for illicit discharges generated specifically by careless over-irrigation. Over-irrigation produces hundreds of thousands of dollars in excess revenues each year to inland Water Districts that persistently ignore the impact of their product water. Profiting from water pollution discharges to protected receiving waters is illegal as adjudicated by Friends of the Earth v Laidlaw (2000) and other statutes and regulations.

"District Court found that Laidlaw had gained a total economic benefit of $1,092,581 as a result of its extended period of noncompliance with the permit's mercury discharge limit; nevertheless, the court concluded that a civil penalty of $405,800 was appropriate. In particular, the District Court found that the judgment's "total deterrent effect" would be adequate to forestall future violations…" (Friends of Earth, Inc. v. Laidlaw Environmental Services (TOC), Inc. - 528 U.S. 167 (1999)

In the Aliso Watershed, recycled water sold for irrigation and over watering produces an average creek discharge flow of 3 MGD during the nine month dry season. Sold at $1000 per Acre Foot (AF), this irrigation product water yields revenues to inland Water Districts of over $10 million during the five year MS4 Permit cycle. (calculation: 3 MGD = 9 AF x $1000/AF x 300 days = $ 2.7/year x 5 year permit cycle = $10 mil+).

Lacking effective enforcement measures by the SDRWQCB, these excessive and illegal profits encourage increased sales of irrigation water without any accountability for the obvious impacts of water products to protected creek and coastal receiving waters. The Irvine Ranch Water District, El Toro Water District, Santa Margarita Water District and Moulton Niguel Water District must not be allowed to profit from water pollution.

Persistent violations of MS4 requirements are acknowledged by all parties yet the SDRWQCB refuses to invoke effective enforcement measures and fines. Without economic disincentives, offending Water Districts gain illegal profits while inland cities accumulate tax property revenues from poorly engineered development projects. Citations against the more egregious offending storm drain dischargers can release funds for effective mitigation measures and support incentives for regional MS4 compliance.

Environmentally Sensitive Areas (ESA)

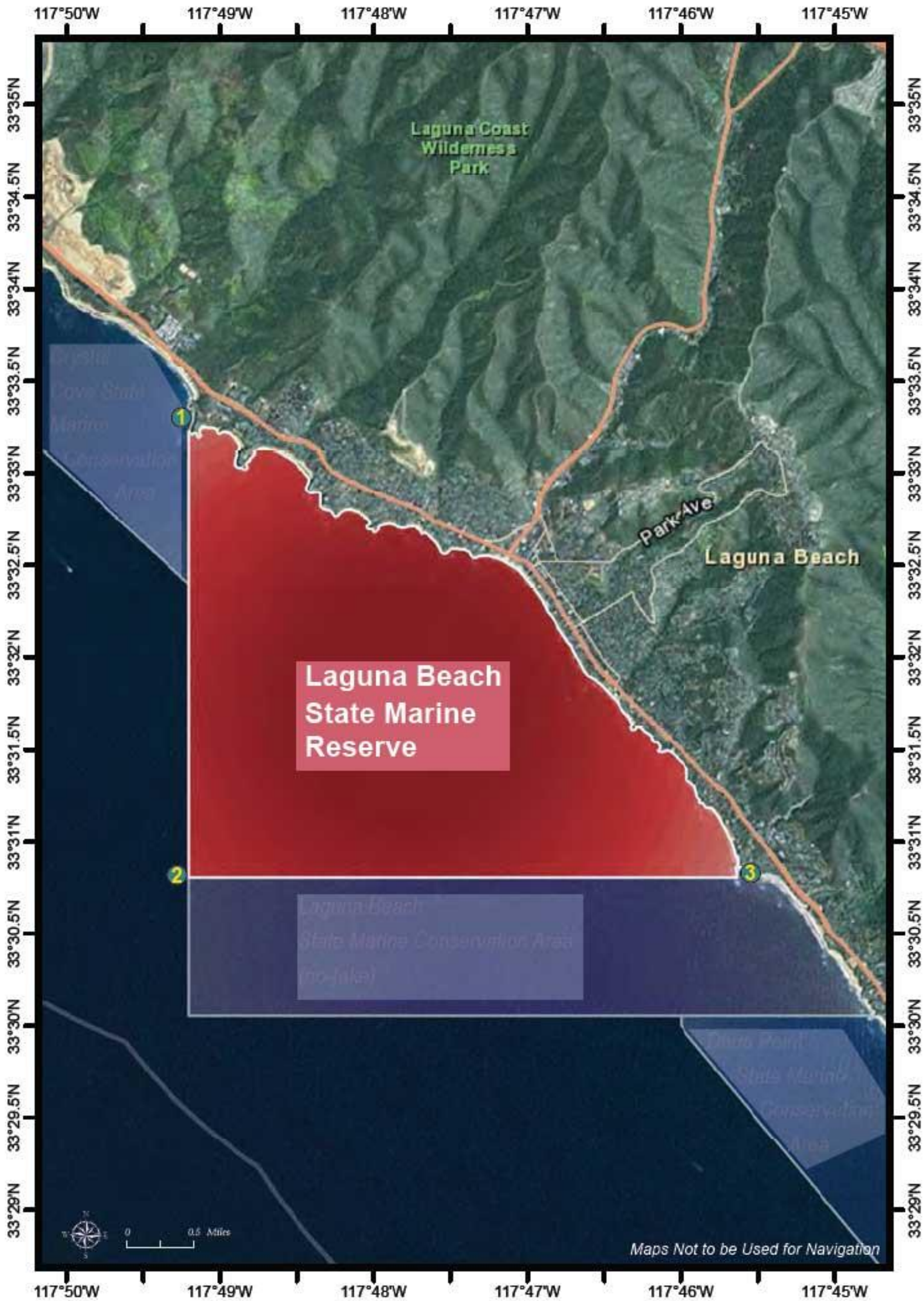
The Aliso Watershed is a compact 34 square mile area suffering decades of neglect and pollution originating from poorly engineered residential developments among inland cities. Plans to add 17,000 new houses to South Orange County in the coming years will exacerbate the water pollution crisis facing Laguna Beach. Runoff management plans fail to control dry weather urban runoff and knowingly contribute directly to increased flows and erosion during routine storm events.

The Aliso Creek Wilderness Park remains degraded from erosion impacts to streambed habitat and threatens to expose critical sewage infrastructure transporting 10 to 15 million gallons of secondary sewage to the Aliso Creek Ocean Outfall only 1.2 miles offshore. A recent study by TetraTech for the South Orange County Wastewater Authority (SOCWA) determined the integrity of creek infrastructure to be capable of failure in as little as 5 years. Coastal receiving waters at the mouth of Aliso Creek are impaired by polluted urban runoff flowing at 1 to 5 million gallons per day (GPD). Aliso Creek is listed as a 303(d) Impaired Water Body by the Clean Water Act and continues to fail to meet present and previous MS4 Permit requirements. (Exhibit B – Aliso Creek Watershed 303(d) Impaired Waterbodies)

All Co-Permitees, as signatories to the MS4 Permit, are legally responsible for water quality in terms of coastal receiving waters. The regulatory and legal nexus is clear between unpermitted discharges by inland Co-Permitees, creek erosion and infrastructure damage, ocean pollution and public health hazards associated with these contaminated daily flows.

Aliso Beach, at the mouth of the federally listed contaminated creek, is permanently posted. However, coastal receiving waters are protected as the Laguna Beach State Marine Conservation Area established unanimously by the California Fish & Game Commission on January 1, 2012.

Laguna Beach State Marine Reserve



The proposed MS4 Permit does not adequately address efficacious measures to protect creek and coastal receiving waters while allowing contaminated discharges to persist without adequate enforcement actions. Lacking meaningful enforcement actions, inland cities as Co-Permitees, persist in ignoring or circumventing water quality regulations with impunity while creek and coastal receiving waters and ESA habitats continue to be incrementally degraded by polluted dry weather flows. Damage to coastal habitats is cumulative and potentially expensive in terms of restoration.

Likewise, failed Best Management Practices (BMP) stormwater facilities required as a Condition of Approval for inland residential, industrial and municipal developments are inadequately engineered devices incapable of mitigating elevated flows from stormwater events directed to creek and coastal receiving waters. The cumulative impacts of contaminated dry weather discharges and elevated stormwater flows have destroyed the functions of the Aliso Estuary (a protected coastal wetland), tidepools, fish nurseries and local kelp forests.

Shellfish areas in California receive the highest water quality protection standards. The economic value of shellfish to the economy is well established and place names such as Abalone Point, Mussel Cove, Shellfish Beach, etc. along Laguna Beach's coastal receiving waters suggests the prominence of shellfish habitat in the local area. Routine underwater surveys of mussel grounds near the mouth of Aliso Creek reveal large areas of dead shellfish likely exposed to the urban runoff plume. Dry weather discharges and elevated stormwater flows to Laguna Beach's coastal receiving waters are incompatible with protection of ESA Shellfish habitat and should be vigorously regulated and prohibited in the proposed MS4 Permit.

Laguna's coastal receiving waters are prime foraging grounds for protected marine life including coastal dolphins, gray whales and blue whales.

Safari/Marc Carpenter, via Associated Press

A blue whale surfacing at 1000 Steps, South Laguna

The California Coastal Act is specific in protecting the health and welfare of marine mammals among other species. Therefore, the proposed MS4 Permit must address water quality inconsistencies among regulating agencies.

1. California Coastal Act, Article 4, Section 30230. Recent summer sightings of federally protected Blue Fin Whales feeding at the location of the Aliso Ocean Outfall suggest the need for compliance with the Coastal Act. The unseasonal presence of marine mammals feeding on krill indicates the presence of phytoplankton populations sustained by nutrient rich urban runoff and offshore sewage discharge plumes migrating to surface waters. New research also highlights the presence of hormonal endocrine disruptors in recycled water and sewage discharges as a contributing factor in the feminization of male fish.

2. California Coastal Act, Article 4, Section 30231. The SDRWQCB overlooks requirements for "the biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams."

3. Water Reuse Law, Water Code Sections 461-465 and Water Reclamation Law, Water Code Sections 13500-13556 requiring beneficial reuse of inland water product to implement recycled water throughout Laguna Beach in achieving a State mandated 20% reduction in imported water by 2020.

The recent Army Corp of Engineers Study Area Map recognizes the relationship of MS4 regulated areas by incorporating the coastal receiving waters for lower Aliso Creek project considerations. No similar map or chart is available to track and monitor regulated coastal receiving waters subjected to the contaminated urban runoff "freshwater lens".

U.S. Army Corps of Engineers
Aliso Creek Ecosystem Restoration Study
USGS Topographic Map

Figure 2.1-1

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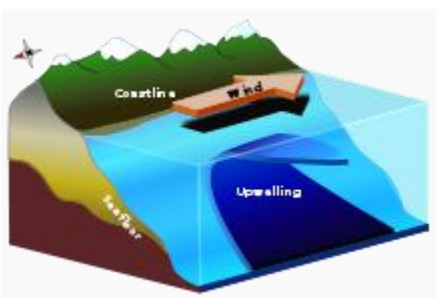
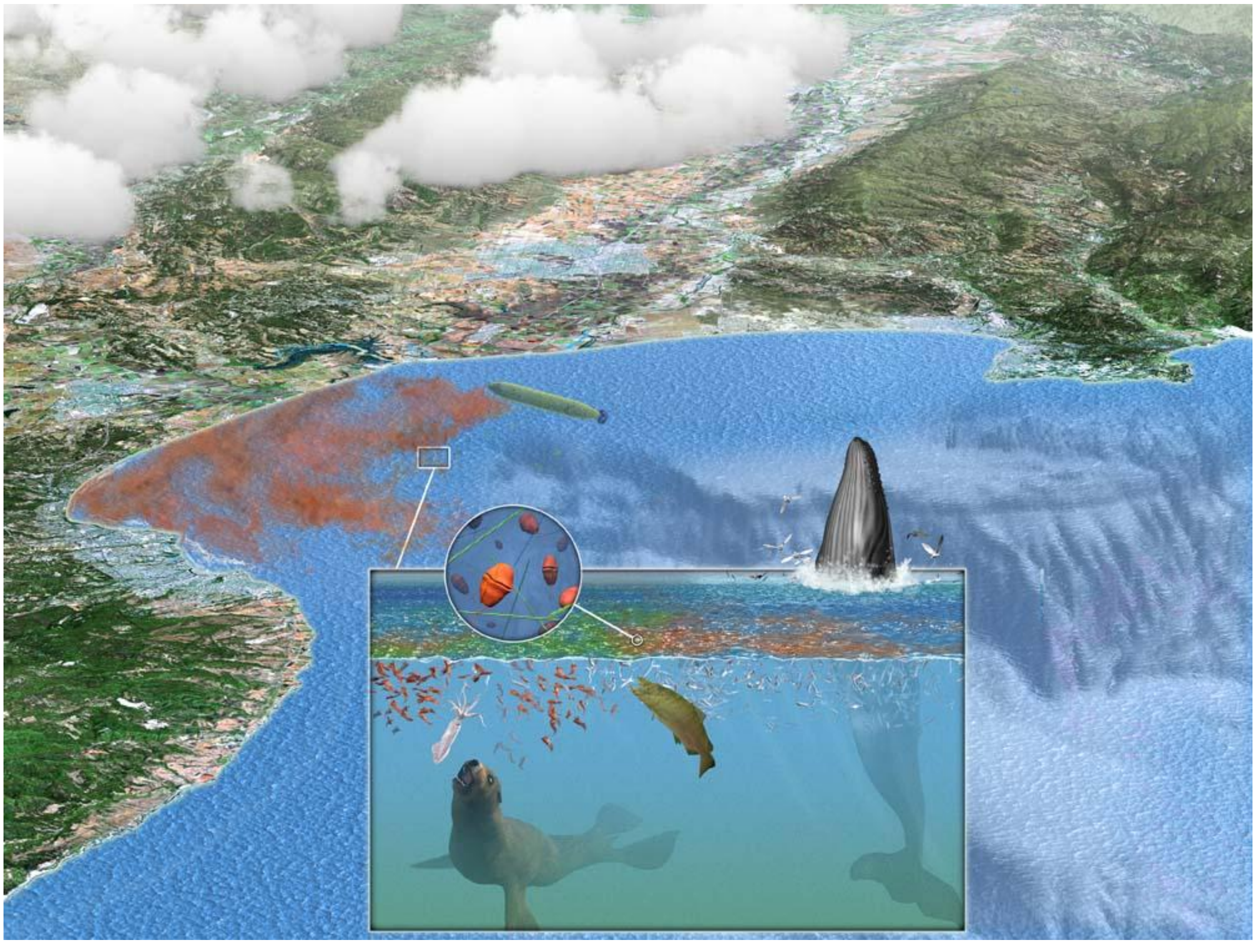
Urban Runoff, Secondary Sewage Discharges & Ocean Upwelling

Coastal receiving waters at the mouth of Aliso Creek are protected as the Laguna State Marine Conservation Area (SMCA). These important tidepool, rocky shore and kelp forest habitats, however, are subjected to multiple water pollution impacts from the combined urban creek urban runoff plume and Aliso Creek Ocean Outfall.

Ocean upwelling transports contaminates from the offshore sewage discharges to shore and mix with the visible creek urban runoff freshwater plume. Harmful algae blooms fed by these “nutrient rich” discharges plague coastal receiving waters and contribute to the destruction of kelp forests and shoreline fish nurseries. Beach visitors, often from regional low-income disadvantaged communities, suffer exposure to severe public health threats.



Multiple requests to South Coast Wastewater Authority for a comprehensive interactive map of the Aliso Creek coastal discharge plume and the Aliso Creek Ocean Outfall Plume are routinely ignored. An accurate map will identify protected coastal receiving water resources including tidepools, rocky fish nurseries and shellfish habitats, kelp forests, dolphin birthing and foraging grounds, as well as near shore whale migration routes. Charting dominant littoral currents and counter currents will reveal distribution patterns of urban runoff induced Harmful Algae Blooms and thermal plumes. Lacking such basic information, assurances of safe ocean water quality are presented without a fundamental scientific understanding of coastal dynamics.



Dry weather urban runoff plumes to Laguna's coastal receiving waters feed summer-long Harmful Algae Blooms (HABs) contributing to domoic acid poisoning of sea lions, whales, shellfish and fishing resources.

<u>Hydromodification</u>

The rapid regional development of residential tracts over the past few decades has been accomplished using grading techniques to create long, flat terraced building sites. In an effort to simplify construction on flat sites, natural contours are replaced with cut and fill earthworks removing natural top soils before paving over hydric substrates and native deep root vegetation. These practices expose expansive clay soils.

Developers avoid expensive deep caissons to bedrock or multiple dewatering wells and simply pour concrete pads over unstable clay substrate. City leaders seeking increased tax revenues and development fees utilize engineers unfamiliar with local clay soils and the semi-arid ecology to approve massive grading plans that ultimately fail.

Unsuspecting homeowners subsequently experience extensive expansion and contraction of clay subsoils following annual storm events. As foundations fail, water supply lines, sewage lines and related infrastructure become compromised requiring expensive repairs. By this time, however, developers have either moved or filed for bankruptcy protection leaving thousands of present homeowners without remediation opportunities. Engineers, city planners and elected officials, while complicit, are not held accountable through enforcement by the SDRWQCB. Poorly engineered residential developments with substandard clay soils continue to be approved to aggravate the condition and burden taxpayers for expensive repairs.

The Aliso Watershed is a clear example of faulty hydromodification design. Beginning with the construction of the federal Chet Holfield Ziggerat Complex, large areas of the native creek with valuable hydric soils were paved over for massive parking lots. The channelized creek lost critical inland wetlands and groundwater percolation sites with the removal of over 1500 feet of the creek ox bow. This wetland site historically provided water, fish and double canopy vegetative cover for the early "Nigueli"... the name of a Juaneno Native American village once located near a lagoon along Aliso Creek. The City of Laguna Niguel derives its name from the Spanish designation of this critical creek ox bow area.

Systematic destruction of vast native watershed trees and vegetation to support early ranching activities continue to plague the effectiveness of this and many watersheds in the San Diego region. Developers and complacent city planners exploiting degraded ranchlands simply continue the “biodegradation” while avoiding the true costs to the environment and taxpayers for their profiteering urbanization schemes. Facing unrelenting pressure from developers, water districts and municipalities, regulatory agencies charged with protecting critical creek and coastal receiving waters, fail to invoke effective enforcement with measurable water quality benefits.

<u>Recommended Actions</u>

Poorly engineered projects can be re-engineered to achieve mandated water quality objectives.

1. Maps of all creek and coastal receiving waters indicating water quality impacts can be created by SCCWRP, Scripps, NOAA or any number of competent university or regulatory groups. A Bioregional Watershed Map will identify degraded land elements, offending storm drain outlets and candidate areas for re-forestation and estuarine/coastal restoration.

2. On an annual basis, citations against the primary six known storm drain point sources in each watershed can incrementally compel clean-up and abatement throughout a given watershed bioregion without the burden of costs to abate all points of contamination at once. Failed Best Management Practices (BMPs) urban runoff facilities, required as a Condition of Approval for inland residential developments, can be retrofitted with dry weather diversions to local Publically Owned Treatment Works (POTWs) or, alternatively, re-engineered with deep groundwater injection wells.

3. Fines must be allocated to re-vegetate impaired watersheds and kelp forests to restore the native functions of semi-arid creeks and protected coastal receiving waters. A re-forested Aliso Canyon with a canopy similar to San Mateo Creek will qualify for California Cap and Trade

funding to offset costs. Restoration of natural habitats is demonstrated to be the best, most cost effective measure for improving watershed water quality.

4. Restoration of high value coastal wetlands and estuaries will guarantee protection of natural beach sand berms and provide measurable improvement to coastal receiving waters. Funds from the California Coastal Conservancy and other wetland recovery resources can offset costs.

5. Watershed restoration will offer multiple community benefits by reducing destructive stormwater flows, eliminating pollutants and increasing eco-tourist revenues to surrounding cities. Large street cisterns incorporating designs proposed by GeoSynTech for the re-development of the Aliso Golf Course can serve as a model for extensive rainwater harvest/reuse systems. Restoration of some or all of the 1500 foot Aliso Creek Ox Bow in Laguna Niguel can restore hydric soils to reduce stormwater impacts.

6. Increased use of recycled water for wildland fire suppression along the entire Highway 73 Toll Road bisecting the Laguna Greenbelt will maintain a healthy, fire safe wilderness area. Orange County Measure M and State Proposition funds are available to offset costs. Increased use of recycled water reduces ocean discharges to the Laguna State Marine Conservation Area.

7. A citywide network of recycled water for all of Laguna Beach will reduce imported water demand significantly and increase water security, disaster preparedness and fire suppression resources. Revenues from routine use for irrigation mandated Fuel Modification Zones will provide new revenue streams. Laguna Beach is the only Orange County city without a comprehensive recycled water program and remains a "once use" community of valuable imported water.

The MS4 Permit Renewal process offers the opportunity to advance beyond failed measures and begin the renewal of the region's unique watershed and coastal ecology. All Stakeholders can benefit through proactive initiatives and, as the overall watershed ecology improves, the cost savings from stormwater damage, water pollution, protracted litigation and public health threats will become evident. The South Laguna Civic Association has offered constructive, critical information and suggestions during the previous MS4 Permit cycle which have been largely ignored to the public's detriment.
(Exhibit C – SLCA Comments on Tentative Order No. R9-2007-0002 NPDES, No. CAS0108740)

Cooperation and courage are essential and the South Laguna Civic Association remains committed to working towards real, measurable, sustainable solutions. On behalf of our community and the many visitors from throughout the world to our shores, we thank you for your review and support of our recommended actions.

Michael Beanan

Vice President
South Laguna Civic Association

mike@southlaguna.org

Attachments

Exhibit A - Daily Mean Discharge in Cubic Feet/Second - Water Year Jul 2011 to Jan 30, 2012
Exhibit B - Aliso Creek Watershed 303(d) Impaired Waterbodies)
Exhibit C – SLCA Comments to Tentative Order No. R9-2007-0002 NPDES, No. CAS0108740

Exhibit A - Daily Mean Discharge in Cubic Feet/Second Water Year Jul 2011 to Jan 30, 2012

Day	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
1	5.5	7.6	5.7	4.9	4.9	4.9	5.6		
2	5.4	6.3	5.6	4.6	4.8	4.8	5.6		
3	5.3	5.6	5.6	4.6	4.8	5.2	5.7		
4	5.8	5.4	5.5	12	26	4.9	5.6		
5	5.8	5.4	5.9	145	13	5	5.9		
6	5.5	5.4	6	28	20	5.4	5.8		
7	5.4	5.5	5.6	10	11	5.7	5.7		
8	5.5	5.4	5.4	6.9	6.9	6	7.1		
9	5.8	5.7	5.4	5.8	5.7	6.5	6		
10	5.7	5.6	8.4	5.3	5.2	5.9	5.6		
11	5.7	6	7.8	5	5.1	5.7	5.7		
12	5.8	5.8	7.1	5	36	22	5.7		
13	5.7	5.8	5.7	5.1	18	16	5.8		
14	5.8	5.7	5.2	5.1	8.7	8	5.4		
15	6	5.6	5.2	4.9	6.3	38	5.5		
16	5.9	5.7	5.1	4.9	5.5	18	19		
17	5.9	5.7	5.4	5	5.3	8.2	7.4		
18	5.9	5.4	5.3	5.3	5.2	6.9	6.1		
19	5.9	5.7	5.1	5.4	5.1	6.3	5.7		
20	5.8	5.7	5.1	5.4	86	6.4	5.5		

21	5.8	5.6	5	5.6	36	6		69	
22	6	5.6	5	5.3	10	5.5		16	
23	5.9	5.8	5.1	5.5	7.2	5.4		56	
24	5.9	5.8	5.1	5.5	6.1	5.5		19	
25	6	5.7	5.1	5.6	5.6	5.5		9.2	
26	5.6	5.8	5.1	5.3	5.4	5.7		7.3	
27	5.6	5.6	5.2	4.9	5.3	5.8		6.6	
28	5.7	5.6	5	4.9	5	5.7		6.1	
29	5.9	5.6	5	4.7	5.1	5.5		5.9	
30	5.7	5.8	5	4.7	5.1	5.7		------	
							------	------	---
31	8.9	5.8	------	4.8	------	5.9		---	

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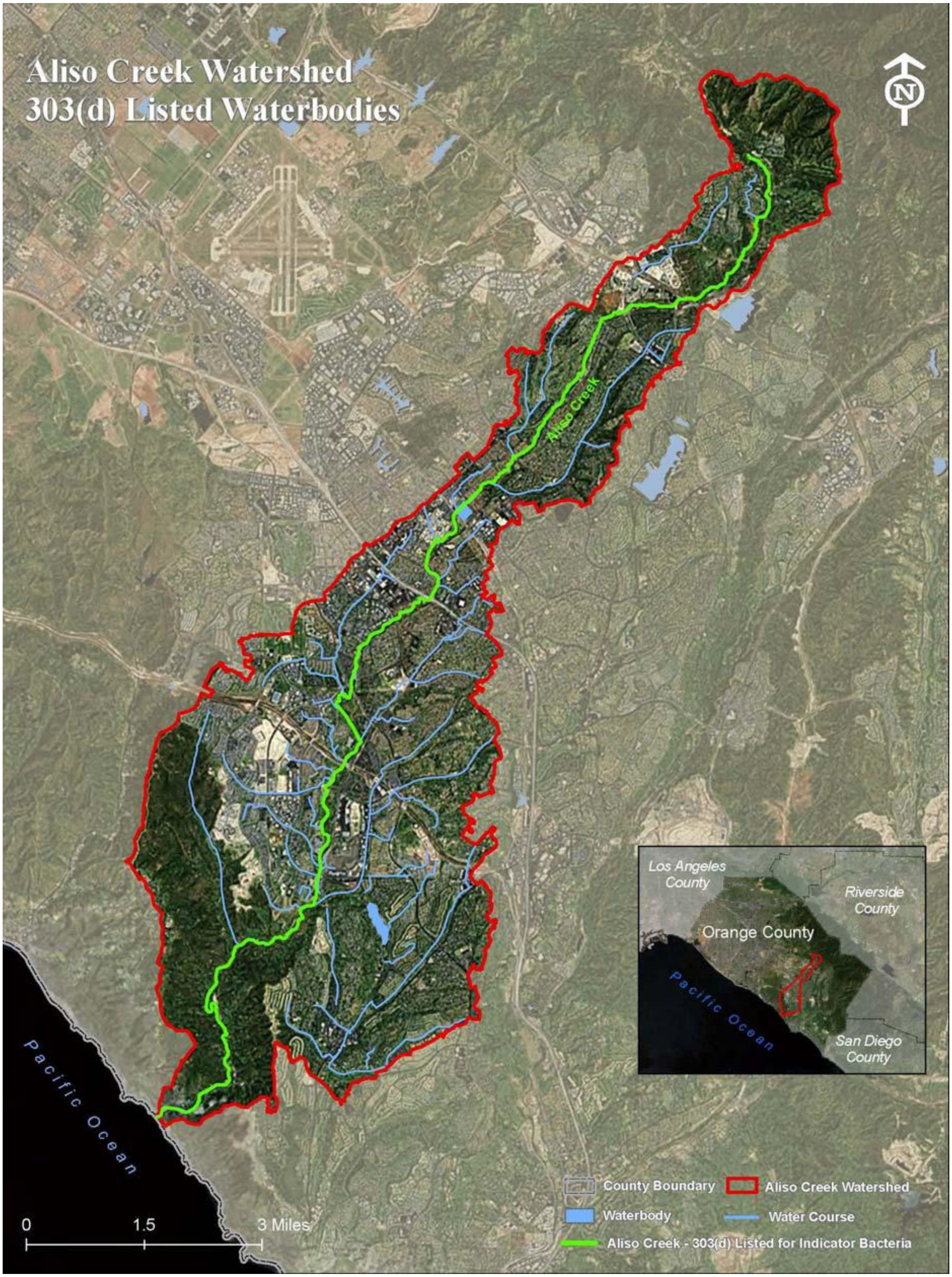

Exhibit C - SLCA Comments to 2007 MS4 Permit

Jeremy Haas April 11, 2007
California Regional Water Quality Control Board
San Diego Region 9
9174 Sky Park Court, Suite 100
San Diego, CA 92123
RE: Tentative Order No. R9-2007-0002 NPDES, No. CAS0108740

The members of the community of South Laguna represented by the South Laguna Civic Association, established in 1946, recognizes urban runoff from dry weather flows continues to be discharged through regional storm drain systems permitted exclusively to convey rain water.

The proposed SDRWQCB Tentative Order No. R9-2007-0002 knowingly, willfully and intentionally perpetuates a threat to health and safety while contributing to degradation of local creek and coastal water resources by allowing MS4 storm drain systems to transport polluted water originating from the imported water supply industry.

Dry weather flow rates in the subject watershed presently exceed all previous flow rates and are recognized as the principle source of nutrient loading and ocean pollution. Chemical fingerprinting analysis of urban runoff by the Santa Margarita Water District attributes the source of 60% to 90% of urban runoff dry weather flows as originating from imported water sources in either Northern California or Colorado. Dry weather flows to storm drains are from anthropogenic influences rather than natural storm events.

Seminal research by the University of Southern California and others concludes urban runoff is responsible for feeding prolonged, destructive algae blooms along the Southern California Bight. In conveying inland sources of fertilizer and phosphates nutrients, dry weather urban runoff estimated at 5,000,000 gallons per day in the Aliso Watershed alone is causing increased outbreaks of domoic acid poisoning and deaths among sea mammals in Laguna Beach. The SDRWQCB fails to take into consideration impacts of uncontrolled dry season urban runoff on the health and welfare of coastal receiving waters. In spite of repeated requests, the SDRWQCB and Co-Permitees to not incorporate the urban runoff ocean plume into the watershed mapping procedure rendering decision making ineffective and monitoring activities scientifically incomplete.

As indicated in Staff Reports, the SDRWQCB, South Orange County Wastewater Authority (SOCWA), inland cities and County Co-Permitees continue to fail to Cleanup and Abate contaminated dry weather urban runoff flows and thereby violate key statues of the Porter-Cologne Act and Clean Water Act.
In allowing the County and City Co-Permitees to continue to discharge polluted urban runoff water flows, the members of the SLCA and the general public are denied access to safe, unpolluted coastal recreational opportunities while exposing them to known respiratory and digestive illnesses. The incremental and cumulative discharge from Aliso Watershed storm drains also knowingly and willfully contributes to potential health risks from consuming local fish.

Likewise, potential private property values are threatened by disclosures during real estate transactions of public health hazards emanating from polluted coastal waters.

Residences at the mouth of Aliso Creek are permanently damaged by summer urban runoff from erosion and stagnant ponds. Damage from urban runoff pollution to critical kelp habitats and marine mammals characteristic of South Laguna Marine Reserve off of Aliso Beach are well documented in the scientific literature.

The Aliso Watershed has more than 64 storm drains with elevated fecal coliform levels and excessive flow rates. The inability of the SDRWQCB over the past 20 years to control illegal dry weather discharges suggests a pattern of failed interventions portending a dangerous precedent of chronic future water pollution to the community of South Laguna with a population of 5,000 residents and the general beach visiting public.

The South Laguna Civic Association (SLCA) seeks a thorough review of the laws, regulations and facts pertaining to mismanagement of the subject MS4 Storm Drain Permit. Verifiable action capable of significant reductions in dry weather flow rates must be implemented. Numerical flow rate reduction, specific performance benchmark deadlines and significant penalties for non-compliance must be incorporated into any credible permitting process. Interception of urban runoff flows at known inland point sources is technologically feasible through deployment of approved Best Available Control Technologies presently used by the development, military and oil industries. If necessary, a watershed Cleanup and Abatement Order can accelerate permitting and fast track measures until such time full compliance is achieved.

Failure to mitigate or comply requires the SDRWQCB to be directed to California Water Code Section 13304(a) and following to seek an injunction against the County and offending cities or perform the work itself. Concurrent with the present evaluation of Tentative Order No. R9-2007-0002, the SLCA seeks emergency action due to significant, immediate and potential harm from known health risks associated with dry weather urban runoff conveying elevated levels of fecal coliform and other contaminates to South Laguna since:

1. Substantial harm to the community of South Laguna will continue to occur this summer from exposure to dry-weather flows of contaminated urban runoff in the subject watershed. The approval of a systematically flawed MS4 Storm Drain Program will establish a dangerous precedent in the Aliso Creek Watershed and other impaired watersheds in the State of California to the detriment of South Laguna’s public health and safety as well as the protection of natural resources.

2. Neither the inland cities, County, SDRWQCB, SOCWA nor public will incur substantial harm from issuance of a comprehensive dry weather storm drain management program. The South Laguna Civic Association, in fact, will benefit from incremental reduction of contaminated flows from inland storm drains into creek and coastal receiving waters. Establishing a pattern of enforcement and full compliance with cleanup and abatement laws will initiate additional timely actions by the SDRWQCB to improve water quality in the Aliso Watershed and elsewhere. Costs associated with a comprehensive program to control dry weather flows can be minimized by fines, deployment of cost saving water conservation measures and revenues generated from beneficial reuse opportunities of 5 million gallons of urban runoff per day in the Aliso Watershed.

3. As indicated in this and other communications, substantial questions of fact and law are associated with the proposed Tentative Order No. R9-2007- 0002. The fact remains that immediate compliance and cessation of dry weather urban runoff is technologically and economically feasible as demonstrated by earlier diversions to the Moulton Niguel Water District's sewer treatment facility and, later, short term operation of mobilized urban runoff filtration units.

The narrative below cites a number of laws pertaining to enforcement of Cleanup and Abatement Orders (California Water Code Section 13304); the SWRCB Water Quality Enforcement Policy (February 19, 2002; pages 3,4,11,26, 39,42); regulations and policies governing Environmental Justice (Government Code Section 65040.12 and Public Resources Code Section 72000).

The County and City Co-Permitees concede their failure to Cleanup and Abate elevated levels of fecal coliform and increased urban runoff flow rates in the Aliso Watershed. The SDRWQCB does not comply with California Water Code Section 13304. Indeed, during the past 20 years, the Regional Board has failed to effectively intervene.

California Water Code Section 213300-13308, Chapter 5, provides the SDRWQCB Enforcement authority to issue a Cleanup and Abatement Order to remedy dry weather urban runoff.

Section 13304(a) "Upon failure of any person to comply with a cleanup and abatement order, the attorney general, at the request of the board, shall petition the Superior Court of the County for an issuance of an injunction requiring the person to comply with the order."

The SDRWQCB unwillingness to enforce compliance also violates Section 13304 (1)(b);(2)(a), (c), (e) to expend available money themselves to perform cleanup, abatement or remedial work; to intervene to perform the work itself; recover costs for cleanup and abatement work; and protect or prevent threatened probability of harm to persons, property or natural resources.

It is again worth noting, temporary compliance was achieved in 2003 utilizing mobilized water filtration units recognized among Best Management Practices (BMP). During its brief period of operation, the above BMP treated over 14 million gallons at JO3PO2 to reduce fecal coliform from 10,000 cfu's to less than 1. The SDRWQCB, SOCWA, Moulton Niguel Water District, City of Laguna Niguel and County dischargers arbitrarily elected to terminate this effective technology to experiment with low cost constructed wetlands, which ultimately failed to reach compliance levels for fecal coliform at the JO3PO2 outlet and took no effort to remove flows originating from abandoned imported water sources.

The SWRCB Water Quality Enforcement Policy (February 19, 2002; pages 3,4,11,26, 39,42) specifically directs the Regional Board to take action against the following:

- Any knowing, willful, or intentional violation of the (Porter Cologne Act)
- Any violation of (the Porter Cologne Act) that enables the violator to benefit economically from noncompliance, either by realizing reduced costs or by gaining a competitive edge advantage.
- Any violation that is a chronic violation or that is committed by a recalcitrant violator.
- Any violation that cannot be corrected in 30 days.

The SDRWQCB has taken no action pursuant to the above policies while proceeding to accommodate City and County Co-Permitees, Water Districts, SOCWA and developers at the expense of and detriment to the members of the SLCA and the general public.

Section 13350(m) of the Porter-Cologne Clean Water Act defines nuisance as anything which meets all of the following requirements:

1. Is injurious to health, or is indecent of offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life and property.

2. Affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal.

3. Occurs during, or as a result of, the treatment or disposal of wastes.

Dry weather urban runoff meets and exceeds the legal definition of "nuisance" by virtue of it's widespread impacts to water quality variables. "Waste" refers to "waste water" knowingly and willfully generated by imported and reclaimed water sold at reduced rates that ignore significant post-irrigation dry weather urban runoff impacts.

Members of the South Laguna Civic Association are at particular risk of injurious health from frequent exposure to pollution in Aliso Creek and recreational coastal water activities. Such threats and illnesses create an obstruction to the free use of public property at local County parks, protect State Marine Reserves and beaches to thereby interfere with the comfortable enjoyment of life and property.
The extent of annoyance and damage is unequal with increasing harm to individuals such as swimmers, surfers, SCUBA divers, etc. with more frequent contact to polluted creek and ocean waters according to recent studies by the University of California, Irvine. Young children playing long hours at the beach and pregnant women are particularly high-risk populations.

The casual relationship occurring with the discharge of contaminated urban runoff wastewater with elevated fecal coliform levels is well established in scientific and medical literature as to impose a viable threat to the community of South Laguna. Government Code Section 65040.12 and Public Resources Code Section 72000 states:

"…the fair treatment of people of all races, cultures and income with respect to the development, adoption, implementation and enforcement of environmental laws, regulations and policies"

The proposed Tentative Order No. R9-2007-0002 is discriminatory and violates the State of California's definition of Environmental Justice.

As previously noted, the community of South Laguna and visitors to the Aliso Creek Watershed and Aliso Creek County Beach have entreated the SDRWQCB for decades for relief from polluted urban runoff flows resulting from the non-regulation or enforcement of the County/City's chronic storm drain discharges of dry season urban runoff. Local low income and working class residents have suffered damages to health, safety and liberty in their access to Aliso Creek and the Pacific Ocean.

Despite the obvious tangible and verifiable nature of these damages, South Laguna and the general public have yet to receive any effective regulatory assistance either from the State or Regional Water Boards. This failure to provide relief is not due to any lack of knowledge or information. The SDRWQCB has repeatedly and extensively investigated the mechanism by which storm drains physically convey fecal coliform bacteria and other contaminants downstream into the Aliso/Woods Canyon Regional Wilderness Park, South Laguna and the Aliso Creek County Beach. There remains no doubt that the City/County dry weather storm drain discharges are the cause of summer beach and ocean pollution.

Despite this clear and present causal relationship, the SDRWQCB and Staff have denied pleas from the public for remedial action in the form of abatement of nonseasonal storm drain urban runoff, beneficial reuse for sustainable treatment projects, water conservation and immediate temporary mobilized emergency capture/treatment options common among petrochemical, agribusiness and development economic sectors. In addition, the SDRWCB has not supplied a contingency emergency plan to protect our community and the public from current and summer dry weather MS4 storm drain discharges.

Instead, the Regional Board has relied on promulgating more general directives and future contamination tables, which may or may not be effective in abating polluted urban runoff. The proposed Tentative Order No. R9-2007-0002 is to accommodate the failures of inland Water Districts, SOCWA, Cities and County at the expense of the community, public and ocean ecology.

The SDRWQCB action when combined with the Staff and City/County history of ineffective action towards the residents and visitors of South Laguna, have the cumulative effect of giving second class status to the physical health and safety needs of the public in the Aliso Watershed. Thus any action by the Regional Board to approve the use of MS4 Storm Drain System to knowingly convey dry weather urban runoff flows is discriminatory and violates the State of California’s definition of Environmental Justice.

Conclusion

The general regulations, requirements and studies pertaining to the Aliso Creek Watershed and associated MS4 Storm Drain System are clearly not effective in controlling water pollution or the effects of artificially elevated flow rates during the area’s annual ten month dry season.

More than twenty years and $20 million dedicated to achieve compliance in a relatively small, compact 34 square miles residential development watershed is an enormous investment and, ultimately, waste of taxpayer revenues. The failure to achieve compliance represents a lost opportunity to demonstrate effective interventions to protect communities like South Laguna from polluted urban runoff and sends a message to the public that urban runoff pollution cannot be controlled.

Despite the various failed efforts over two decades, the fact remains numerous State laws are being violated by the SDRWCB for allowing the discharge of dry weather flows with elevated fecal coliform and related contaminate levels to continue to pollute daily the protected receiving waters of Aliso Creek and the Pacific Ocean. By this communication, the SLCA reserves the right to appeal any unfavorable decision perpetuating dry season urban runoff flows to Aliso Beach, South Laguna to the SWRCB and State Attorney General for timely relief.

The South Laguna Civic Association appreciates the efforts by the San Diego Regional Water Quality Control Board to consider the enormous impacts of uncontrolled dry weather urban runoff pollution before approving a genuinely effective Storm Drain Permit Program for the Aliso Watershed.

Respectfully submitted,

Michael Beanan, Director
South Laguna Civic Association
PO Box 9668
South Laguna, California, 92651

April 10 and 11, 2013
Item No. 8
Supporting Document No. 5

ASSOCIATED GENERAL CONTRACTORS OF AMERICA
SAN DIEGO CHAPTER, INC.
6212 FERRIS SQUARE - SAN DIEGO, CALIFORNIA 92121
(858) 558-7444 - FAX (858) 558-8444
SKILL - INTEGRITY - RESPONSIBILITY

December 12, 2012

Wayne Chiu, P.E.
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, California 92123-4340

Re: Comment – Tentative Order No. R9-2013-001 – Regional MS4 Permit - Place ID: 786088Wchiu

Dear Mr. Chiu:

This letter is written in response to the San Diego Regional Water Quality Control Board's Tentative Order R9-2012-0011 ("Permit") dated October 31, 2012. We have reviewed the draft of the Permit; there is no question if the Permit, as now proposed, goes into effect, it will impose excessively expensive and onerous regulations not only on local governments but on regional businesses and the public at large. The regulations, as written, are untested with no proof of improved water quality.

The Associated General Contractors of America ("AGC"), San Diego Chapter, represents over 1,000 firms that build the region's industrial, commercial, institutional, heavy highway and general engineering construction projects. We understand the importance of a clean, safe water supply; we want that for our region and for our families. However, it is imperative the regulations put in place to achieve this goal are reasonable, tested and known, to the extent possible, to produce the outcome of improving water quality.

The use of Water Quality Improvement Plans ("WQIP") is an excellent way to develop a cost-effective approach to improved water quality. We would encourage the Board to allow the WQIPs to be developed, ensuring public participation, and implemented before moving forward with enforcement of new regulatory requirements.

Other serious concerns are the stringent new proposal for stormwater retention and discharge and the non-existing source of funding to execute the proposed changes.

Our request is for the Regional Water Quality Control Board to allow the current Permit to remain in effect until WQIPs are developed for the 10 watersheds in District 9. This District needs to develop a Regional Permit that is based on rules and regulations known to be sustainable and effective. The development and use of WQIP's will give our communities that opportunity without the imposition of impossible regulation at horrendous economic cost to our regional cities, local businesses and the residents of our communities.

Thank you for hearing our concerns. If you have questions, please contact me at 858.558.7444.

Sincerely,

Debbie Day

Debbie Day
Vice President,
Engineering Construction and Industry Relations

Continental Maritime of San Diego

SAN DIEGO REGIONAL WATER QUALITY CONTROL BOARD

2012 DEC 18 PM 12 39

12DEC12
CMSD Serial Number: 237-12

Mr. Wayne Chiu, P.E.
Place ID: 786088Wchiu
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

Re: Comment - Tentative Order No. R9-2013-001, Regional MS4 Permit

Dear Mr. Chiu:

As a member of the San Diego Port Tenants Association, I am responding to the San Diego Regional Water Quality Control Board's Tentative Order R9-2012-0011 ("Permit") dated October 31, 2012. After reviewing the proposed Permit, I am concerned it will impose expensive and untested regulations on local governments, businesses, and residents. The new permit will impact the region without improving water quality.

I do understand the importance of clean, safe water to the region and as a member of the business community I am interested in improving San Diego's water. It is important, however, that we use our limited resources wisely, and ensure that our efforts produce the desired outcome of improving water quality. I applaud the Board's inclusion of Water Quality Improvement Plans (WQIP) as a first step in developing a cost-effective approach to improving our water. Analysis remains a critical component of a successful strategy, and I am glad to see that the Board is committed to finding the best possible solution to water quality improvement.

I am concerned however that the costs associated with enforcing and implementing the permit will have a negative impact on my business and San Diego's economy. The four primary areas of concern include: 1) the strict liability for exceeding water quality objectives; 2) the additional and changing requirements for development projects, impacting items such as storm water retention and discharge; 3) the preemption of WQIPs by new and changing regulatory requirements prior to allowing the WQIPs to be developed and implemented; and 4) the lack of reliable funding sources to implement these regulatory changes.

While it is necessary to hold individuals, businesses and governments accountable these measures must be reasonably achieved and provide a significant and positive impact on San Diego's water. I respectfully request that the Permit focus on the timely development of effective and enforceable WQIPs, and that each of these be developed through a process that ensures public participation. I also ask that the designation of Best Management Practices in each watershed be determined through the WQIP process rather than the one size fits all strategy currently proposed in the Permit. I ask further that, until the Board adopts a WQIP for a watershed, the provisions of the existing Permit remain in place for that watershed. Finally, in order to avoid unnecessary litigation I request that the Board adopt the WQIPs as Orders implementing the proposed Permit.

I urge you to adopt final permit language that is evidence-based and both environmentally and economically sustainable. Please contact me using the number below, X236, with questions. Thank you for your consideration.

Sincerely,

Dewey Youngerman
Manager, EH&S

Doc Scanned On: 12.18.12
DONOVAN Time: 1243

Cc: Sharon Cloward, San Diego Port Tenants Association

David J. Akers, P.E.
Fellow - American Society of Civil Engineers, Fellow – American Concrete Institute
Consulting Concrete and Materials Engineer
5841 Amaro Drive, San Diego, CA 92124
858-437-1445

December 12, 2012

California Regional Water Quality Control Board, San Diego Region
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

Reference: **ORDER NO. R9-2013-0001/NPDES NO. CAS0109266**

Subject: Sustainable Structural Source Control Storm Water BMPs

Board Members:

Water is the most precious resource next to clean air that we have in southern California. Without a safe, reliable source clean water for drinking, cooking, bathing, and commercial uses (high-tech research and manufacturing), the habitability of our region is seriously degraded. As you prepare the referenced order, I urge you to strongly consider the implementation and use of sustainable, structural source control BMPs that will capture, treat, and infiltrate storm and landscape water in-place.

Sustainability is defined as practices that allow the present generation to meet our needs without compromising the ability of the succeeding generations to meet their needs. Founded on economic, environmental, and social principles, sustainability ties together low-cost infrastructure to solve environmental issues in everyone's best interest.

The paper "California's Water Energy Relationship" prepared by the California Energy Commission noted that 19% of the state's electrical usage plus huge quantities of natural gas and diesel fuel were used in development, transportation, and usage of California's water. Of this nearly one-fifth of an already constrained resource, 22% is used in moving water from northern to southern California (10,300 GWh or 4.1% of the total electrical usage). Four percent is used in wastewater processing. A first line of defense is needed to reduce the need for more imported water and reduce the amount of water being processed and decrease the demand on an already overstressed electrical system.

Until "toilet to tap" becomes socially accepted, systems that naturally capture, treat, and slowly release storm and landscape water into the shallow and deep aquifers and waterways are needed. Such low-impact development systems are more sustainable and less costly than large storm water treatment plants that ultimately discharge huge plumes of clean water into the ocean. Examples of these LIDs are pervious concrete, permeable interlocking pavers, rain-gardens, storm detention basins, and porous asphalt.

Pervious concrete is in the simplest terms conventional concrete that is made without the inclusion of sand. It contains only cementitious material (portland cement and perhaps fly ash a recycled industrial by-product), water, and coarse aggregate. The concrete has a void content of 18% to 25% and is typically placed over a 6-inch to 10-inch recharge basin of 1-inch maximum size aggregate. Pervious concrete can be designed to accept the water from the parking lot, building roof, and hardscape so that even in the slowest draining soils, no water will leave the site.

Permeable interlocking pavers are small precast concrete blocks that portions of their corners removed. The ½-inch square opening at the intersection of four blocks is filled with small aggregate which allows water to infiltrate into a permeable base under the pavers. Their performance is very similar to pervious concrete.

The pre-infiltration storage capacity of one acre of PV/PIPs is approximately 9,600 cf or 2.7-in of storm water. The water that passes through PV/PIPs is cleaned by naturally occurring micro-organisms as it infiltrates the soil. Once in the soil, the water stays in a shallow aquifer where it available to surface vegetation or it eventually replenishes local waterways or it continues to deeper aquifers where it can be removed by pumping for domestic and commercial uses. Pervious concrete and permeable interlocking pavers will provide a 20 to 30-year service life with minimal maintenance. The uses of PC/PIPs are generally in parking lots, but they have also been used in sidewalks, nature trails, low-volume streets, and gutters. Caltrans has used pervious concrete in rest stop parking lots and on highway shoulders.

PC/PIPs used in parking lots free space for additional economic and recreational development. Development is constrained by the amount of parking that is available. When storm detention basins are used, valuable land is consumed in constructing an “attractive nuisance” that fills with trash during dry periods and breeds mosquitoes when wet. PV/PIPs are storm detention basins that have dual uses. An example of pervious concrete replacing a storm detention basin is Stratford Place, a 19 unit sub-division in Sultan, WA, where two detention basins were replaced with pervious concrete streets, sidewalks, and driveways allowing the developer to construct two additional homes with overall construction savings of $260,000. The completed site hydraulically mimicked the natural state. The Kaiser Hospital organization is now using pervious concrete for parking lots in its new projects.

PV/PIPs are energy efficient. Once constructed, the energy requirement is possibly an occasional sweeping to keep the surface voids open.

Rain gardens are attractive methods for capturing and treating storm water, but have a limited capacity compared to PV/PIPs. Detention basins can store large quantities of water, but are generally attractive nuisances. Porous asphalt pavement is similar to pervious concrete in that fine aggregate is removed to create the voided interstitial structure. The major drawback to PAP is that asphalt is a flexible material that is subject to weathering of the organic structural material. In hot weather, the PAP can be shoved by traffic closing the surface voids. Ultraviolet radiation degrades the asphalt surface (oil). Typical asphalt pavement surfaces are rejuvenated by spraying with fresh oil or a slurry seal. Neither option is viable for PAP since the surface voids would be closed. Further, as the price of oil rises and refining techniques are improved, the amount of asphalt oil is reduced and its price is increasing compared to portland cement which has been relatively stable.

In closing, a sustainable first line of defense is needed to capture, treat, and infiltrate storm and landscape water back into our natural system. Wyatt Troxell, a former board member of the Inland Empire Utility Agency, commented after a pervious concrete presentation that "for every acre of ground that covered by streets or buildings, we must import an acre-foot of water forever." Capturing, treating, and re-using water is essential.

Respectfully,

David J. Akers, P.E.
Civil Engineer

SDAR
SAN DIEGO ASSOCIATION OF REALTORS®

The Trusted Voice of San Diego Real Estate

December 12, 2012

Mr. Wayne Chiu, P.E.
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

Re: Comment—Tentative Order No. R9-2013-001, Regional MS4 Permit,

Place ID: 786088Wchiu

Dear Mr. Chiu:

As President of the Greater San Diego Association of REALTORS® (SDAR), the largest trade association in San Diego County representing over 12,000 members, I am responding to the San Diego Regional Water Quality Control Board's Tentative Order R9-2012-0011 ("Permit") dated October 31, 2012. After reviewing the proposed Permit, we are concerned it will impose expensive, onerous, and untested regulations on local governments, businesses, and residents. These new regulations will impact the region's economy without improving its water quality.

Everyone understands the importance of clean, safe water to the region. As a member of the business community, I too am interested in improving San Diego's water. It is important, however, that we use our limited resources wisely. We must ensure that our efforts produce the desired outcome of improving water quality.

SDAR applauds the Board's inclusion of Water Quality Improvement Plans (WQIP) as a first step in developing a cost-effective approach to improving our water. Analysis remains a critical component of a successful strategy. Furthermore, we are glad to see that the Board is committed to finding the best possible solution to water quality improvement.

We are concerned, however, that the costs associated with enforcing and implementing the permit will have a negative impact on my business and San Diego's economy. The four primary areas of concern include: 1) the strict liability for exceeding water quality objectives; 2) the additional and changing requirements for development projects, impacting items such as storm water retention and discharge; 3) the preemption of WQIPs by new and changing regulatory requirements prior to allowing the WQIPs to be developed and implemented; and 4) the lack of reliable funding sources to implement these regulatory changes.

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It is necessary to hold individuals, businesses and governments accountable. However, it is critical that the accountability measures can be reasonably achieved and are likely to have a significant and positive impact on San Diego's water. Due to these concerns, we respectfully request that the Permit focus on the timely development of effective and enforceable WQIPs. We also request that each of the WQIPs be developed through a process that ensures public participation. We ask also that the designation of appropriate Best Management Practices in each watershed be determined through the WQIP process rather than the one size fits all strategy currently being proposed in the Permit. We further request that until the Board adopts a WQIP for a watershed that the provisions of the existing Permit remain in place for that watershed. Finally, in order to avoid unnecessary litigation, we request that the Board adopt the WQIPs as Orders implementing the proposed Permit.

On behalf of SDAR, I urge you to adopt final permit language that is evidence-based and as well as environmentally and economically sustainable. Thank you for your consideration. Please contact Jordan Marks, SDAR Director of Government Affairs, at 858-715-8012 if you have any questions.

Sincerely,

Donna Sanfilippo
President
Greater San Diego Association of REALTORS®

With more than 12,000 members, the Greater San Diego Association of REALTORS® is the largest trade association in the county. Our REALTORS® adhere to a code of ethics and professional standards above and beyond the norm. We help our members sell more homes. We help people realize the dream of home ownership. And we are dedicated to protecting private property rights.

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California State Senate

SENATOR
MARK WYLAND
THIRTY-EIGHTH SENATE DISTRICT

COMMITTEES
BUSINESS & PROFESSIONS
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INSURANCE
LABOR & INDUSTRIAL RELATIONS
TRANSPORTATION & HOUSING

December 12, 2012

Mr. Wayne Chiu, P.E.
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

Re: Comment—Tentative Order No. R9-2013-001, Regional MS4 Permit, Place ID: 786088Wchiu

Dear Mr. Chiu:

I am responding to the San Diego Regional Water Quality Control Board's Tentative Order R9-2012-0011 ("Permit") dated October 31, 2012. After reviewing the proposed permit, I am concerned it will impose expensive and burdensome regulations on local governments, businesses, and residents throughout San Diego County. As a member of the legislature, I too am interested in improving our regional water quality. However, we must use our limited resources wisely, and ensure that our efforts produce the desired outcome of improving water quality.

I applaud the Board's inclusion of Water Quality Improvement Plans (WQIP) as a first step in developing a cost-effective approach. However, I am concerned that the costs associated with enforcing and implementing the permit will have a negative impact on many businesses within the region. My concerns include: 1) the strict liability for exceeding water quality objectives; 2) the additional and changing requirements for development projects, impacting items such as storm water retention and discharge; 3) the preemption of WQIPs by new and changing regulatory requirements prior to allowing the WQIPs to be developed and implemented; and 4) the lack of reliable funding sources to implement these regulatory changes.

I urge you to adopt final permit language that is evidence-based and both environmentally and economically sustainable. Thank you for your consideration.

Sincerely,

Mark Wyland

MARK WYLAND
Senator, 38th District

JAMUL DULZURA
COMMUNITY PLANNING GROUP
P.O. Box 613
Jamul, California 91935

December 14, 2012

Mr. Rich Crompton, Director
County of San Diego Department of Public Works
5510 Overland Ave, Ste 410
San Diego, CA 92123

SUBJECT: Comment – Tentative Order No.R9-2013-0001, Regional MS4 Permit, Place ID: 786088Wchiu

Dear Mr. Crompton,

The Jamul Dulzura Community Planning Group feels compelled to provide written comments on the draft San Diego Regional MS4 Permit to ensure that water quality regulations are practical, cost-effective, and scientifically based. While we are not directly regulated by the Regional MS4 Permit, we are concerned that public funds may have to be spent to comply with requirements that are not proven or effective, and that this will ultimately reduce the funding available for community projects and essential public services.

It is vital that the resources required to implement regulations are balanced with other public and environmental programs. For this reason we have joined the County's call to action to protect water quality while controlling the mounting and unsubstantiated costs of increased regulation on local governments, business and industry. As written, the Tentative Order will result in a significant and unprecedented level of regulation and cost without clear scientific basis or environmental benefit. The three main areas of concern in the draft permit are: 1) a far-reaching Bacteria Total Maximum Daily Load (TMDL), 2) additional requirements for development projects, and 3) performance standards that unnecessarily expose municipalities to third-party lawsuits. These requirements needlessly increase costs for regulated parties and may further constrain development in the region.

The cost to comply with the Bacteria TMDL is estimated between $2.6 billion and $4.9 billion for the named watersheds in the region over the 20 year TMDL compliance timeline, of which only 18 years remain. The numeric targets in this TMDL may never be attainable even if the County and other municipalities were to spend billions in public resources. This puts us in an untenable situation with the public, who will ultimately fund this effort. Technology simply does not exist to return urbanized watersheds back to pristine, "reference" conditions. The TMDL compliance targets must be attainable. The Bacteria TMDL requirement should not be incorporated into the MS4 Permit until there are more practical goals to work toward. We cannot ask the public to fund a program that will not succeed.

The cost of doing business in California has already pushed many businesses and developers out of the state. The draft permit will impose significant hardships on development. Permit requirements would require almost all development projects in the County to comply with hydromodification requirements, regardless of whether the projects themselves contribute to the problem. It also requires that new and re-development projects return site hydrology to pre-development conditions as opposed to pre-project conditions. Returning urban infill projects to conditions that existed under "natural", pre-urban conditions would be a substantial constraint to re-development. Over the last several years, local governments in San Diego have worked together with Regional Board staff and a host of technical experts to develop a Hydromodification Management Plan with reasonable and scientifically based standards. The

Regional Board recently approved that Plan. This draft permit ignores all of the good work invested in that Plan, which was developed at a significant cost to the public. In its place, it would impose new, one-size-fits-all requirements that impose a standard that is unrealistic and without scientific justification. The result of all these changes is that the structures built to mitigate development impacts will need to be bigger and will cost significantly more than the current approved program. Implementing these requirements would be an economic burden to our region and, are targeted at an unobtainable endpoint.

Accordingly, we would like for the Regional Board to honor existing plans, including the Hydromodification Management Plan. SANDAG has worked for many years through a comprehensive public process to develop the Regional Transportation Plan and Regional Comprehensive Plan that provides the framework for local General Plans. These plans recognize regional smart growth opportunity areas, including infill development. These are sound principals. Urban infill reduces aerial deposition which then reduces pollutant loading in urban runoff. Re-development is considered an environmentally preferable method of development. The MS4 permit should encourage re-development, retrofit landscapes, and green streets, through greater flexibility and reduced requirements rather than penalizing it with additional cost and constraints. To this end, any new regulations must be integrated into approved plans and must not be a burdensome, additional layer.

Finally, the draft permit includes performance standards that should be amended so that regulated municipalities are not unnecessarily exposed to third-party litigation. This Permit's receiving water limitations language is contrary to the intent of the federal Clean Water Act, which is to assure municipal agencies will be regulated to a reasonable standard. The State and Regional Water Boards have the discretion and a responsibility to ensure that water quality regulations are applied in a context that results in economic and environmental sustainability. It is imperative to reduce the threat of litigation when a municipality is engaged in a good faith effort to comply. The current receiving water provisions do not serve the environment, the public or the permittees. Public funds should be used to implement comprehensive programs that are proactive and adaptive to promote clean water goals.

Local government must have the flexibility to make policy decisions for the good of our residents. The 21 Copermittees in our region (the County, 18 cities, Port District, and Airport Authority) already spend close to $120 million a year to comply with current permit requirements. Heal the Bay's own report cards show that water quality at local beaches is improving. We would like to see the Regional Board adopt a permit that will be cost neutral and that local municipalities will have the flexibility to apply funding to priority areas.

We are hopeful that the final permit language will result in programs that make sense from both an environmental and economic standpoint. Please contact me if you have questions or would like to discuss our concerns.

Sincerely,

Michael Casinelli

Michael Casinelli, Chair
Jamul Dulzura Community Planning Group

CC:
Vice Chairman Gary Strawn, San Diego Regional Water Quality Control Board (SD RWQCB)
Board Member Eric Anderson, SD RWQCB
Board Member Henry Abarbanel, SD RWQCB
Board Member Tomas Morales, SD RWQCB
Executive Officer David Gibson, SD RWQCB
Mr. Wayne Chiu, SD RWQCB

April 10 and 11, 2013
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RAMONA COMMUNITY PLANNING GROUP
15873 HWY 67, RAMONA, CALIFORNIA 92065
Phone: (760)445-8545

December 14, 2012

Mr. Rich Crompton, Director
County of San Diego Department of Public Works
5510 Overland Ave, Ste 410
San Diego, CA 92123

Dear Mr. Crompton,

SUBJECT: Comment – Tentative Order No.R9-2013-0001, Regional MS4 Permit, Place ID: 786088Wchiu

As the Ramona Community Planning Group, a land use advisory group to the County of San Diego for land use issues in Ramona, we feel compelled to provide written comments on the draft San Diego Regional MS4 Permit to ensure that water quality regulations are practical, cost-effective, and scientifically based. While we are not directly regulated by the Regional MS4 Permit, we are concerned that public funds may have to be spent to comply with requirements that are not proven or effective, and that this will ultimately reduce the funding available for community projects and essential public services.

It is vital that the resources required to implement regulations are balanced with other public and environmental programs. For this reason we have joined the County's call to action to protect water quality while controlling the mounting and unsubstantiated costs of increased regulation on local governments, business and industry. As written, the Tentative Order will result in a significant and unprecedented level of regulation and cost without clear scientific basis or environmental benefit. The three main areas of concern in the draft permit are: 1) a far-reaching Bacteria Total Maximum Daily Load (TMDL), 2) additional requirements for development projects, and 3) performance standards that unnecessarily expose municipalities to third-party lawsuits. These requirements needlessly increase costs for regulated parties and may further constrain development in the region.

Finally, the draft permit includes performance standards that should be amended so that regulated municipalities are not unnecessarily exposed to third-party litigation. This Permit's receiving water limitations language is contrary to the intent of the federal Clean Water Act, which is to assure municipal agencies will be regulated to a reasonable standard. The State and Regional Water Boards have the discretion and a responsibility to ensure that water quality regulations are applied in a context that results in economic and environmental sustainability. It is imperative to reduce the threat of litigation when a municipality is engaged in a good faith effort to comply. The current receiving water provisions do not serve the environment, the public or the permittees. Public funds should be used to implement comprehensive programs that are proactive and adaptive to promote clean water goals.

Local government must have the flexibility to make policy decisions for the good of our residents. The 21 Copermittees in our region (the County, 18 cities, Port District, and Airport Authority) already spend close to $120 million a year to comply with current permit requirements. Heal the Bay's own report cards show that water quality at local beaches is improving. We would like to see the Regional Board adopt a permit that will be cost neutral and that local municipalities will have the flexibility to apply funding to priority areas.

We are hopeful that the final permit language will result in programs that make sense from both an environmental and economic standpoint. Please contact Jim Piva if you have questions or would like to discuss our concerns.

Sincerely,

Jim Piva

JIM PIVA, Chair
Ramona Community Planning Group

CC:
Vice Chairman Gary Strawn, San Diego Regional Water Quality Control Board (SD RWQCB)
Board Member Eric Anderson, SD RWQCB
Board Member Henry Abarbanel, SD RWQCB
Board Member Tomas Morales, SD RWQCB
Executive Officer David Gibson, SD RWQCB
Mr. Wayne Chiu, SD RWQCB

MARY JO LANZAFAME
ASSISTANT CITY ATTORNEY

HEATHER L. STROUD
DEPUTY CITY ATTORNEY

OFFICE OF
THE CITY ATTORNEY
CITY OF SAN DIEGO

Jan I. Goldsmith
City Attorney

CIVIL ADVISORY DIVISION
1200 THIRD AVENUE, SUITE 1100
SAN DIEGO, CALIFORNIA 92101-4100
TELEPHONE (619) 533-5800
FAX (619) 533-5856

December 19, 2012

VIA EMAIL AND U.S. MAIL

Catherine Hagen, Esq.
San Diego Regional Water Quality Control Board
9174 Sky Park Ct., Suite 100
San Diego, CA 92123-4340

RE: Hydromodification Management Requirements of Draft Tentative Order No. R9-2013-0001 (San Diego Regional MS4 Permit)

Dear Ms. Hagen:

The purpose of this letter is to further address the nexus issue raised by members of the Regional Board at the Municipal Separate Storm Sewer Systems (MS4) permit workshop held on December 12, 2012. As the Copermittees commented at the workshop, we are concerned that the hydromodification management requirements would expose the Copermittees to significant litigation risk and may be unenforceable. Specifically, we are concerned with the provisions: (1) requiring Copermittees to compel development projects that have no impact on hydromodification to implement on-site or "alternative compliance" hydromodification mitigation measures; and (2) using "pre-development (naturally occurring)" runoff reference condition as applied to sites that are, in fact, developed. These requirements are located in Provision E(3)(c) of the Draft Tentative Order.

We are concerned that implementing these requirements would subject the Copermittees to liability under the takings clauses of the U.S. and California Constitutions and the Mitigation Fee Act because of the questionable nexus between a project's impacts on hydromodification and the hydromodification management measures in the Draft Tentative Order. When imposing a condition on a development permit, a local government is required under the federal and state constitutions to establish that the condition bears a reasonable relationship to the impacts of the project. This rule applies even to legislatively enacted requirements and impact fees or exactions.[1] Moreover, fees imposed on a discretionary ad hoc basis are subject to heightened scrutiny under a two-part test. First, local governments must show that there is a substantial relationship between the burden created by the impact of development and any fee or exaction.[2] Second, a project's impacts must bear a "rough proportionality" to any development fee or

[1] *Building Indus. Ass'n v. City of Patterson*, 171 Cal. App. 4th 886, 898 (2009).
[2] *Nollan v. California Coastal Comm'n*, 483 U.S. 825, 837 (1987).

exaction.[3] Under California law, the *Nollan/Dolan* heightened scrutiny test also applies to in-lieu fees.[4]

The Legislature has memorialized these requirements in the Mitigation Fee Act which establishes procedures that local governments must follow to impose impact fees.[5] Irrespective of whether the hydromodification management requirements are implemented by legislative act or on an ad hoc basis, the Copermittees' attempt to enforce them as proposed in the Tentative Order would likely result in claims alleging unconstitutional takings of private property and violations of the Mitigation Fee Act. This is because a developer could argue that limiting hydromodification impacts of already developed property to its "naturally occurring" state, or requiring hydromodification mitigation measures for impacts not imposed by the project, would not have a legally sufficient nexus to the impact of the development project.

Based on these concerns, we respectfully request that these provisions be modified. The Copermittees will be submitting comments on this issue and a redline of the Draft Tentative Order prior to the close of the public comment period on January 11, 2013. In the meantime, we are available to meet with you to discuss this important issue.

Sincerely yours,

JAN I. GOLDSMITH, City Attorney

By

Heather L. Stroud
Deputy City Attorney

COUNTY OF ORANGE
Nicholas S. Chrisos, County Counsel

By

Ryan M. F. Baron
Senior Deputy County Counsel

[3] *Dolan v. City of Tigard*, 512 U.S. 374, 391 (1994).
[4] *Ehrlich v. City of Culver City*, 12 Cal. 4th 854, 876 (1996).
[5] Cal. Gov't Code §§ 66000-66025.

CITY OF SAN MARCOS

By

Helen Holmes Peak
Lounsbery Ferguson Altona & Peak, LLP
Attorneys for City of San Marcos

COUNTY OF RIVERSIDE
Pamela J. Walls, County Counsel

By

Karin Watts-Bazan
Principal Deputy County Counsel

CITY OF ALISO VIEJO

By

Shawn Hagerty, Best Best & Krieger LLP
Attorneys for City of Aliso Viejo

CITY OF SANTEE

By

Shawn Hagerty, Best Best & Krieger LLP
Attorneys for City of Santee

CITY OF LAKE FOREST

By

Shawn Hagerty, Best Best & Krieger LLP
Attorneys for City of Lake Forest

HLS:cw
Doc. No.:488983

CITY OF SAN MARCOS

By

Helen Holmes Peak
Lounsbery Ferguson Altona & Peak, LLP
Attorneys for City of San Marcos

COUNTY OF RIVERSIDE
Pamela J. Walls, County Counsel

By Karin Watts-Bazan

Karin Watts-Bazan
Principal Deputy County Counsel

CITY OF ALISO VIEJO

By

Shawn Hagerty, Best Best & Krieger LLP
Attorneys for City of Aliso Viejo

CITY OF SANTEE

By

Shawn Hagerty, Best Best & Krieger LLP
Attorneys for City of Santee

CITY OF LAKE FOREST

By

Shawn Hagerty, Best Best & Krieger LLP
Attorneys for City of Lake Forest

HLS:cw
Doc. No.:488983

SAN DIEGO PORT TENANTS ASSOCIATION

December 19, 2012

Mr. David Gibson, Executive Officer
California Regional Water Quality Control Board
San Diego Region
9174 Sky Park Court, Ste. 100
San Diego, CA 92123-4340

Dear Mr. Gibson,

I am contacting you on behalf of the San Diego Port Tenant's Association (SDPTA). The Association was formed in 1989 as a non-profit mutual benefit corporation and is made up of over 250 members that include Tideland's businesses that are tenants of the Unified Port District. On behalf of the Board of Directors of the San Diego Port Tenants Association, please allow me to offer the follow comments and suggestions in regard to the Regional MS4 Permit:

Monitoring and Assessment. With regard to the use of members of the public to support volunteer monitoring, SDPTA is very concerned about the possibility for mis-interpretation of this provision. Well-intentioned but overly-aggressive parties may interpret this provision to allow volunteers to enter private property, via the public right-of-way, looking for unlawful or improper discharges. This raises several legal concerns and poses significant liability issues for copermitees should a volunteer be injured in the course of an unauthorized inspection, or if private property is damaged, or if manufacturing processes are adversely affected as a result of the unauthorized intrusion.

We recommend that the language governing the use of volunteers be very explicit regarding the intent of the Board which we believe is to help

2390 SHELTER ISLAND DRIVE, SUITE 210 • SAN DIEGO, CALIFORNIA 92106 • (619) 226-6546 • FAX (619) 226-6557 • EMAIL: sharon@sdpta.com, sophie@sdpta.com
www.sdpta.com

copermitees reduce monitoring costs by utilizing volunteers to monitor properties that are part of the public right-of-way.

Non-Storm Water Discharges. The Regional MS4 Permit currently specifies that air conditioner condensation is a non-storm water discharge that must be directed to landscaped areas or other pervious surfaces, where feasible. SDPTA is concerned about the cost of compliance for this particular. Re-routing condensation lines in existing buildings, more often than not is very expensive. We would suggest that the new requirements be limited to development/re-development. In addition, discharges from fire suppression equipment maintenance activities can be treated with BMPs and in such cases should not be considered an illicit discharge.

Finally, The Regional MS4 Permit Generally specifies that all non-storm water discharges must be terminated rather than making a distinction that discharges with permits are actually authorized. SDPTA recommends that the Regional Board add language for clarification, something like the following:

> *Each Copermittee shall effectively prohibit all types of non-storm water discharges into its MS4 nless such discharges are authorized by a separate National Pollutant Discharge Elimination system (NPDES) Permit.*

On behalf of SDPTA, I want to thank the Regional Board and Staff for the very collaborative nature of this process. We thank you for the opportunity to submit these comments, and appreciate your consideration.

Best regards,

Sharon Cloward

Sharon Cloward
President, San Diego Port Tenants Association

Cc: SDPTA Board of Directors
Port Chair, Lou Smith, San Diego Unified Port District
Port President, Wayne Darbeau, San Diego Unified Port District

April 10 and 11, 2013
Item No. 8
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Julian Community Planning Group

P.O. Box 249, Julian, CA 92036

January 4, 2013

Ms. Stephanie Gaines, Land Use/Environmental Planner
DPW/Watershed Protection Program (M.S. 0326)
5510 Overland Avenue, Suite 410
San Diego CA 921123

Dear Stephanie;

First I want to thank you for meeting with our Planning Group to discuss the reissuance process regarding the region NPDES Permit (MS4 Storm Water) with particular focus on the Total Maximum Daily Load plan (TMDL) and the effects that may have on our community.

After reviewing the documents provided to us, discussing the issue with you, and considerable discussion by our Group, the following statement has been prepared to express the position of the Julian Community Planning Group:

1) As written, the tentative order MS4 will result in a significant, unprecedented and likely unattainable level of regulation and unsustainable cost. The tentative order includes:

A. Far reaching water quality improvements.

B. Performance standards that cannot conceivably be attained.

C. Transferring the state's responsibility of cost to the local agencies, including testing, liability, and enforcement.

D. Ignoring of existing plans developed by other agencies.

E. Requiring the co-permittee to comply with unknown conditions.

The far reaching water quality improvements likely never can be attained, especially in urban developed areas. Will the Regional Water Quality Control Board remove legal conforming residences to obtain pre-development conditions; or require all existing developments to retrofit in order to attain the requested standards?
There are also jurisdictions over which the co-permittee has no authority and therefore can not require compliance. Those include Caltrans, State lands and parks, Federal lands and parks, and Indian Reservations.

2) The San Diego Regional Water Quality Control Board is attempting to pass all cost and responsibility to the co-permittee. Why would any agency accept these liabilities and costs? The County of San Diego has estimated the cost to comply with the Bacteria TMDL alone to be between 2.6 and 4.9 million dollars.

3) The County of San Diego, Cities and SanDag have worked extensively to develop Transportation plans, regional comprehensive plans and general plans that address the concerns shown in the tentative order MS4. The San Diego Regional Water Quality Control Board has ignored this effort in the new proposed regulation.

4) The proposed MS4 permit requires the co-permittees to accept new regulation without knowledge of what they are or their impacts.

5) The requirement of returning all watersheds back to pristine reference level is just not practical nor feasible.

6) The County of San Diego should not require the portion of the County in the Colorado River Basin to comply with San Diego County Water Quality Control Board requirements. The issues and conditions in the Colorado River Basin are not similar to those in the western coastal portion of the County.

Thank you for including our comments in your presentation to the San Diego Region Water Quality Control Board.

Sincerely

Jack D. Shelver

Jack D. Shelver, Chair
Julian Community Planning Group

Walsh

OTAY LAND COMPANY

SAN DIEGO REGIONAL WATER QUALITY CONTROL BOARD

2013 JAN -7 P 2:29

Promoting Chula Vista's future by preserving its past.

January 4, 2013

San Diego Water Board
9174 Sky Park Circle
Suite 100
San Diego, CA 92123
Attn: Mr. Tomas Morales

Subject: Tentative order No. R9-2013-0001
Municipal Separated Storm Sewer Systems (MS4s)
Draining the Watersheds within the San Diego Region

Dear Mr. Morales,

I would like to thank you for hosting the two recent public workshops on the Tentative Order No. R9-2013-0001 regarding MS4s Draining the Watersheds within the San Diego Region. They were very informative and I appreciated the opportunity to address the Board at both hearings.

Our company is close to completing our entitlements for a sustainable, walkable, "green" master planned community in Otay Ranch. Our property is adjacent to Otay River west of Otay Lakes. We have spent thousands of man hours and millions of dollars planning a community that takes the environment into consideration, including water quality.

As I mentioned when I addressed the Board, the Otay River Valley west of the dam is barren and full of invasive plant species that literally suck the water out of the ground. In following the hydromodification requirements that were implemented only about a year ago, we have devised a plan that will clean our storm water runoff prior to introducing it into the Otay River. Once the water is reintroduced into the river we will remove the invasive plants and establish wetland varieties which will flourish and bring the river valley back to what it once was many years ago. We are able to accomplish this because the Otay River west of the dam is currently exempt from hydromodification requirements.

This exemption was put into place based on scientific research and technical expertise of the Hydromodification Task Force. This committee, representing environmental and engineering experts determined that limiting runoff to certain bodies of water and rivers within your jurisdiction would not be beneficial to the health of those watersheds. Due to the influence of the Otay Lakes and Dam upstream of our project, the Otay River was determined to be one of the bodies of water that would benefit from the exemption.

If the exemption for the Otay River is deleted from the new Tentative Order, our land plan will be altered and our restoration efforts will not be put in place.

In addition, the proposed Tentative Order also calls for retention onsite of the 24 hour 85th percentile storm event. Similar to the issue of hydromodification, retention of flows from the majority of storm events will adversely impact this watershed that is described as being "starved" for runoff in the Otay River Watershed Management Plan. Since infiltration is infeasible on our site due to soil conditions, the permit proposes to arbitrarily increase our bioretention facilities by 25%, a number that does not appear to have any scientific basis.

We applaud the new permit for looking at regional solutions through the implementation of the Watershed Improvement Plans. However, we should be allowed to operate under the current permit until the Watershed Improvement Plans determine the best regional solutions for the health of each watershed. Specifically, we request that the hydromodification exemptions be left in place and the retention requirements not be added to the permit until the Watershed Improvement Plans determine whether retention is beneficial to the watersheds.

Sincerely,

Jeff O'Connor
Director of Operations

Cc: Paul Borden
Kent Aden

April 10 and 11, 2013
Item No. 8
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County of San Diego

HERMAN REDDICK
PROGRAM MANAGER
(858) 974-5813
FAX (858) 974-5928

PUBLIC SAFETY GROUP
SAN DIEGO COUNTY FIRE AUTHORITY
5510 Overland Ave, Suite 250, San Diego, CA 92123

KEN MILLER & RALPH STEINHOFF
FIRE SERVICES COORDINATOR
(858) 974-5920
FAX (858) 974-5928

January 4, 2013

Mr. Wayne Chiu, P.E.
California Regional Water Quality Control Board, San Diego Region
9174 Sky Park Court, Suite 100
San Diego California 92123-4340

Dear Mr. Chiu,

SUBJECT: Amendment of Draft Permit Language for Fire Fighting Activities – Tentative Order No.R9-2013-0001, Regional MS4 Permit, Place ID: 786088Wchiu

As a local authority affected by the most recent MS4 Draft Permit we feel compelled to provide written comments to ensure that water quality regulations are practical, cost-effective, and scientifically justified. Since the County Fire Authority will be directly regulated by the Regional MS4 Permit, we are concerned that public funds and critical personnel may have to be spent or resourced to comply with requirements that are unnecessary, and that this will ultimately reduce the emergency personnel and funding available for essential public services.

It is vital that the resources required to keep our communities safe from the threat of fire be solely purposed for that task. For this reason the 15 rural fire agencies within San Diego County have joined the County Fire Authority's call to action to protect water quality while controlling the mounting and unsubstantiated costs of increased regulation on local governments, business, and industry. As written, the Tentative Order will result in a significant and unprecedented level of regulation and cost without clear scientific basis or environmental benefit. The Fire Authority along with the 15 rural agencies believe that the language incorporated in a re-issued permit should not deviate from the current permit unless the RWQCB can provide clear evidence that emergency fire fighting activities and fire sprinkler line flushing significantly impact stormwater runoff, and that the increased costs associated with proposed changes are justified and feasible. Accordingly, we ask that the Regional Board honor the language in the existing permit and make no changes at this time.

In order to provide the best service possible the Fire Authority and its 15 participating agencies must be focused on emergency activities and not with implementing BMPs or removing debris caused by the emergency after the fact. This should be the sole responsibility of the entities owning or operating the sites or facilities for which the fire agencies are responding. The Fire Authority also believes that existing requirements are sufficient to ensure that the flushing of fire sprinkler systems has minimal impact to storm water quality and should not be prohibited. These activities exist for the safety of the public and the environment and should be continued in their current fashion pursuant to existing permit requirements.

We are hopeful that the final permit language will result in programs that make sense from a public safety, environmental and economic standpoint. Please contact Greg Schreiner, Fire Marshal, if you have questions or would like to discuss our concerns. His number is 858-495-5425, email is greg.schreiner@sdcounty.ca.gov

Sincerely,

Herman Reddick,
Program Manager

CC:
Acting Chairman Gary Strawn, San Diego Regional Water Quality Control Board (SD RWQCB)
Board Member Eric Anderson, SD RWQCB
Board Member Henry Abarbanel, SD RWQCB
Board Member Tomas Morales, SD RWQCB
Board Member Sharon Kalemkiarian, SD RWQCB
Executive Officer David Gibson, SD RWQCB

January 5, 2013

Via e-mail to wchiu@waterboards.ca.gov
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

RE: Comments on Tentative Order Number: R9-2013-0001

Dear Mr. Chiu:

I am a professor of microbiology and general biology for San Diego County Community Colleges and a member of the San Diego Coastkeeper Community Advisory Council. I respectfully submit the following comments on the draft San Diego Regional Municipal Separate Storm Sewer System permit, Tentative Order No. R9-2013-0001.

Urban runoff is the San Diego region's most urgent pollution problem. Arguably, it is the most difficult to solve. In a region known for its beaches and strong tourism economy, polluted runoff makes our beaches and waterways unsafe for swimming, fishing and other recreation for at least 72 hours after a rain event. Even in dry weather, our "urban drool" from residents and businesses overwatering lawns becomes a major pollution source. A recent scientific article by Viswanathan *et al.* delineated 'urban runoff' as a problem in almost every watershed in San Diego County:

Watersheds and Description of Associated Concerns

Name of watersheds	Water quality concerns	Impacts
Carlsbad	Surface water quality degradation, beach closures, sedimentation, habitat degradation, and eutrophication	Urban runoff, agricultural runoff, sewage spills, domestic animals, and livestock
Otay	Surface water quality degradation, sedimentation, habitat degradation, and loss	Urban runoff, agricultural runoff, resource extraction, septic systems, and marinas
Penasquitos	Decline in surface water quality, beach closures, sedimentation, habitat degradation, and eutrophication	Urban runoff, sewage spills, dredging, and landfill leachate
Pueblo San Diego	Decline in surface water quality, habitat degradation, and toxins	Urban runoff
San Diego	Decline in surface water quality, degrading habitats, sediment, and eutrophication	Urban runoff, agricultural runoff, mining operations, sewage spills, and sand mining
San Dieguito	High levels of coliform bacteria, nutrients and sediment, resulting in declining surface water quality and habitat degradation	Urban runoff, agricultural runoff, and domestic animals
San Juan	Decline in water quality and habitat loss	Urban runoff, agricultural runoff, and military operations from Camp Pendleton are the major sources of pollution in this watershed
San Luis Rey	High levels of coliform bacteria, nutrients and sediment, resulting in declining surface water quality and habitat degradation	Agriculture and orchards, livestock, urban runoff, sand mining, and septic systems
Santa Margarita	Surface and groundwater quality degradation; habitat loss	Excessive sedimentation from development and agricultural areas
Sweetwater	Declining surface and groundwater quality and habitat degradation	Agricultural and urban runoff
Tijuana	Most severely impacted watershed in San Diego Basin	Urban runoff, sewage spills, industrial discharges, agricultural, livestock, and septic systems

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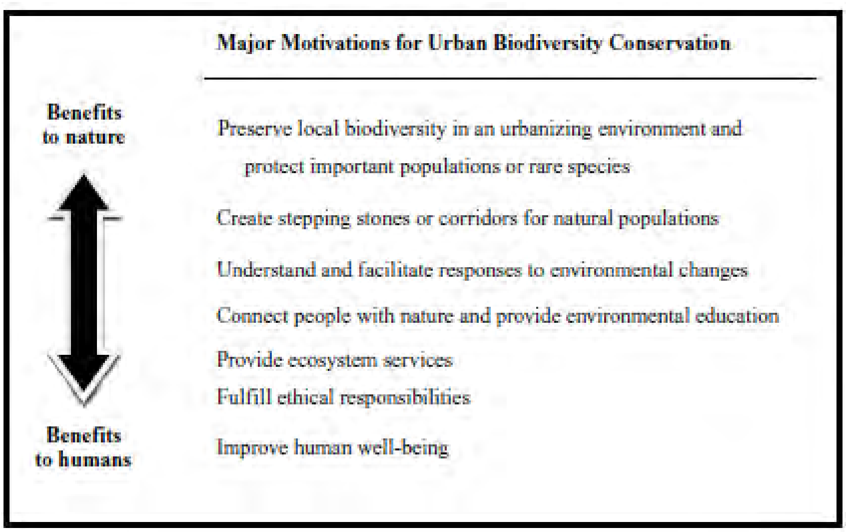
The good news is by working together as a community, we can solve this challenging public health problem. The Water Quality Improvement Plans proposed in the draft permit have the potential to become powerful tools to help us improve water quality within our watersheds. However, the Copermittees cannot be tasked with creating these plans alone. Specifically:

- The Permit should require formation of a stakeholder advisory group for each watershed that includes representatives of environmental groups with knowledge of the watershed.
- This stakeholder advisory group should work closely with the Copermittees and a regional board staff member while the Water Quality Improvement Plans are being developed to ensure these plans aggressively pursue water quality gains.
- The stakeholder advisory process should include accountability and measureable milestones to ensure the goals of the Permit are being met.

By taking advantage of the knowledge and resources of diverse stakeholders like municipalities, businesses and residents, our region can be on the cutting-edge of addressing urban runoff and creating healthier communities and watersheds. But this can only be achieved if these diverse voices are impacting the planning process in a meaningful way. The impacts of reaching our goals together are two-fold, resulting in a win-win situation for the environment and society as described by Dearborn and Kark :



As San Diego continues to grow at 10% annually, it is imperative that we "understand and facilitate responses to environmental changes" as not only an 'ethical responsibility', but to improve our own human well-being. I've seen constant growth (even in the past 4 years of "recession") in the East County, including a steady degradation of the biodiversity of the San Diego River despite the best conservation efforts of San Diego Mission Trails and other county and city parks. What occurs upstream is beyond the control of parks and land set aside for conservation. Urban runoff is a major contributor to this.

San Diego County Community Colleges and the San Diego Coastkeeper Community Advisory Council recognize the challenge urban runoff presents to our region, and we want to do our part to solve the problem. San Diego County Community Colleges and the San Diego Coastkeeper Community Advisory Council are interested in participating in a Water Quality Improvement Plan development process for the San Diego River watershed.

San Diego County Community Colleges the San Diego Coastkeeper Community Advisory Council urges the Regional Board to enhance the stakeholder participation opportunities as Water Quality Improvement Plans are developed and then approve the permit.

Respectfully submitted,

Professor Hector Valtierra,
M.A. (Liberal Arts), M.S. (Biochemistry), MPH (Public Health)
San Diego County Community Colleges
San Diego Coastkeeper Community Advisory Council

References

Dearborn DC and Kark S. **Motivations for Conserving Urban Biodiversity**. *Conservation Biology*. April 2010. Vol. 24, No. 2; pgs. 432 – 440.

Viswanathan S, Voss KA, Alex Pohlman, Gibson D, and Purohit J. **Evaluation of the Biocriteria of Streams in the San Diego Hydrologic Region**. *Journal of Environmental Engineering*. June 2010. Vol. 136; pgs. 627 - 637.

THE CITY OF SAN DIEGO

January 7, 2013

VIA EMAIL TO: wchiu@waterboards.ca.gov

Wayne Chiu, P.E.
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego California 92123-4340

Dear Mr. Chiu:

Subject: Draft Municipal Storm Water Permit, Tentative Order No. R9-2013-0001

Thank you for the opportunity to comment on the San Diego Regional Water Quality Control Board's (Regional Board) draft Municipal Storm Water Permit (Tentative Order No. R9-2013-0001, hereinafter referred to as "Tentative Order"). The City of San Diego (City) participated with the twenty one permittees in the San Diego region subject to the current Municipal Permit (Copermittees) to develop a collective set of comments on the Tentative Order. The Copermittee comments were submitted separately by the County of San Diego and are supported by the City. In addition, the City submits this letter to provide additional comments on the Tentative Order.

- *Revise the Tentative Order to allow for compliance with Discharge Prohibitions, Receiving Water Limitations, and Areas of Special Biological Significance (ASBS) and Total Maximum Daily Load (TMDL) requirements if a Copermittee is implementing an approved Water Quality Improvement Plan (WQIP) that includes a reasonable assurance analysis.* The City's objective is for the Tentative Order to allow the City to efficiently integrate its TMDL, ASBS and Municipal Permit requirements into a program that allows for compliance through implementation. The WQIP developed by Regional Board staff provides an innovative, thoughtful, and strategic framework for such an approach. However, the Tentative Order does not provide a mechanism for the City to achieve compliance with ASBS and TMDL regulations and the Tentative Order's prohibitions and limitations while implementing the WQIPs. The City supports the proposed process offered by the San Diego Copermittees which links compliance to the WQIPs provided that a reasonable assurance analysis is provided which demonstrates that water quality goals will be met if the WQIP is implemented. The City requests inclusion of the Copermittee's "WQIP-Based Compliance" option in the Tentative Order.

- *Incorporate 4 options from the adopted Bacteria I TMDL into the Tentative Order.* The following options are included in the Bacteria I TMDL and consistent with federal regulations. These options should be included in the Tentative Order because they encourage

Transportation & Storm Water Department
9370 Chesapeake Drive, Suite 100, MS 1900 • San Diego, CA 92123
Hotline (619) 235-1000 Fax (858) 541-4350

efforts to target the highest polluting outfalls, address multiple pollutants comprehensively, and improve best management practices through adaptive management.

1. Mass (load)-based method for complying with Water Quality Based Effluent Limits (WQBELs). A mass (load)-based approach would allow the City to achieve water quality improvements more quickly and efficiently by targeting the highest polluting outfalls in each watershed.
2. BMP-based method for complying with WQBELs. The Bacteria I TMDL allows for BMP-based WQBELs, and is supported by federal regulations provided that measurable goals are set and efforts are iteratively adapted if water quality targets are not initially met. The WQIP-Based Compliance framework proposed by the Copermittees in their comment letter qualifies as a BMP-based program, consistent with federal regulations.
3. Adjusting interim Bacteria I TMDL compliance dates. The Bacteria I TMDL allows for Copermittees to propose alternative interim dry and wet weather compliance dates if the Copermittee proposes to address multiple pollutants (in addition to bacteria) through a comprehensive approach.
4. TMDL Re-opener. The Bacteria I TMDL states that the TMDL will be re-opened within 5 years after the effective date or later as new information becomes available to improve the science supporting the TMDL. The Tentative Order should include a corresponding acknowledgement that the adopted Order will be re-opened if the Bacteria I TMDL is amended.

- *Revise the Tentative Order to uphold the previously adopted San Diego Hydromodification Management Plan (San Diego HMP), Resolution No. R9-2010-0066.* This plan has been in effect for less than two years. The San Diego HMP was developed by an expert consultant team that utilized extensive scientific studies, analysis and modeling to determine the appropriate hydromodification control criteria. Additionally, the Copermittees have embarked upon a $1.5 million, 5 year monitoring plan to validate the parameters and design criteria. There have been no scientific advances in the last 2 years to justify revisions to the San Diego HMP. Therefore, we request allowing the Copermittees to continue implementation of the current San Diego HMP. Additionally, the Tentative Order expands the application of HMP controls beyond a project's impact by: 1) imposing HMP requirements on sites that have no potential of causing erosion downstream; and 2) setting pre-development as a baseline for HMP mitigation. The City requests limiting the HMP requirements to only the project's impact.

- *Replace the monitoring and assessment requirements in the Tentative Order (Provision D.4) with the strategic monitoring approach developed collectively by the Copermittees.* The Copermittees' approach will more efficiently and effectively address critical questions necessary to adaptively manage the City's programs and realize our storm water quality goals.

- *Add the San Diego Unified Port District (Port) as a Municipal Separate Stormwater Sewer System (MS4) Operator to the Shelter Island Yacht Basin Copper TMDL.* The Port should be listed as an MS4 Operator because the Port is responsible for storm drains in parking lots within the Port's jurisdiction that drain to the Shelter Island Yacht Basin.

Thank you for the opportunity to comment. We look forward to continued discussions in finding ways to improve and protect water quality. If you have any questions please contact Drew Kleis, Program Manager at (858) 541-4329.

Sincerely,

Kris McFadden

Kris McFadden
Deputy Director

KM:dk

cc: Heather Stroud, Deputy City Attorney, City Attorney's Office
Sumer Hasenin, Senior Civil Engineer, Storm Water Division
Drew Kleis, Program Manager, Storm Water Division
Ruth Kolb, Program Manager, Storm Water Division
Andre Sonksen, Program Manager, Storm Water Division

April 10 and 11, 2013
Item No. 8
Supporting Document No. 5

Wayne Chiu

January 8, 2013

SAN DIEGO REGIONAL
WATER QUALITY
CONTROL BOARD
2013 JAN 11 PM 12 17

Wayne Chiu, P.E.
California Regional Water Quality Control Board, San Diego Region
9174 Sky Park Court, Suite 100
San Diego California 92123-4340

Subject: City of Imperial Beach comments on the proposed Tentative Order No. R9-2013-0001

Dear Mr. Chiu:

The City of Imperial Beach appreciates this opportunity to provide comments on the Tentative Order No. R9-2013-0001. We recognize the effort made by RWQCB staff to consider and discuss the various stakeholder positions for this new permit and agree that developing a new permit through a series of focused meetings was innovative and successful in getting the stakeholders to understand each other's positions for achieving the same end goal of improved water quality. We hope that similar efforts for collaboration are continued at the water board.

The City of Imperial Beach has been actively involved in the focus meeting process and subsequent special workshops held on the new permit. The City also participated in the development of the San Diego Regional Copermittees response to the new permit and support the redline draft being proposed by the Copermittees. The comments on the new permit below are provided in addition to the comments being made by the San Diego Copermittees. We look forward to working with the RWQCB on the final development of this new storm water permit and are optimistic that this new permit will allow for the more efficient use of community resources to implement a successful storm water management program.

Comments by the City of Imperial Beach on Tentative Order R9-2013-0001:

- Provision A: The point of jurisdictional compliance under provision A is vague and presents the potential for unintended 3rd party lawsuits. If the regional board truly embraces an adaptive approach to address priority pollutants then that needs to be explicitly clear in the new permit. It is not clear if compliance means meeting the water quality objective or implementing an adaptive WQIP. We recognize the position by the Regional Board to not get ahead of the State Water Board especially in light of the recent November 20th workshop in Sacramento to discuss concerns on the limitations of receiving water limitations in municipal storm water permits, however, we want to strongly emphasize the importance of preventing unnecessary and costly 3rd party lawsuits in the new permit.
- Provision D: We strongly support the San Diego County Copermittee's recommended changes to the monitoring program in Provision D. The Copermittees met with RWQCB staff on multiple occasions after the focus meetings to discuss recommended changes. Please incorporate a monitoring program such as the one suggested by the Copermittees that uses a scientific and question driven monitoring approach that most effectively uses public funding to demonstrate any statistically significant changes in water quality.
- E.3.B.2.e Priority Development Project Categories: The definition for a priority development project that "discharges directly to" an Environmental Sensitive Area was changed in this permit. The clarifying language from the last permit specified flows that "discharge directly to" <u>as outflow from a drainage conveyance systems that is comprised entirely of flows from the subject development and not commingled with flows from adjacent lands</u>. It is my understanding from the RWQCB that their intent was not to change the definition for discharging to an Environmentally Sensitive Area and request that the clarifying language from the old permit is reintroduced for clarity.

- E.3.B.3.b Priority Development Project Exemptions: Major maintenance on roads, alleys, and sidewalks should be treated different than other redevelopment projects because design standards and public safety take priority over water quality regulations. It is not practical to incorporate green streets and LIDs into every street retrofit project due to site feasibility, conflicting design standards, and increased project costs; however, the Copermittees should be allowed the flexibility to consider the application of green streets and LIDs into street retrofit projects whenever and wherever feasible.
- E.3.B.3.c Priority Development Project Exemptions: Single family residential redevelopment projects should not be held to the specific design standards for regular priority development projects because it discourages redevelopment of old properties. LID and HMP sizing criteria requires hydrology reports and engineered BMP design plans that captures the 24-hr 85th percentile storm event and prevents not more than 10 percent of the naturally occurring flow off the site, which is beyond the normal scope of many single family residential projects. These regulations are complex and hard to understand for the regular home owner and general contractor. Requiring costly engineered BMP plans for single family residential redevelopment projects disproportionally impacts lower income communities like Imperial Beach that already have a hard time encouraging new development. We support permit language that does not require engineered BMP solutions for single family residential projects such as the disconnection of impervious surfaces, improved landscaped areas with 12" of loamy soil, and incorporation of LID concepts into the project area.
- E.3.C.2 Hydromodification Management BMP Requirements: We strongly support the recommended HMP changes discussed at length by the San Diego Copermittees. Most importantly the City requests the HMP exemptions that were removed from the previous permit be reintroduced. The entire City of Imperial Beach discharges into a tidally influenced area and does not contribute to downstream erosion. Requiring HMP on project sites in the City does not make any sense and furthermore, requiring offsite mitigation somewhere in the watershed essentially translates into a tax on development that does not mitigate for any downstream flow impacts from the project site.
- E.3.C.3.b Alternative Compliance Project Options: It does not seem appropriate for the RWQCB or any government agency to regulate alternative compliance based on LEED Certified Redevelopment projects when there are other green building certification programs on the market. Being LEED Certified does not necessarily modify storm water runoff pollution. LEED accreditation is a noteworthy building accomplishment but it is bad policy to write LEED into the regulations.
- Attachment E Provisions for TMDLs: We support the comments made by the County of San Diego related to incorporating the requirements of existing TMDLs into this new permit.

Sincerely,

Chris Helmer
Environmental Programs Manger

cc: Gary Brown – City Manager; Greg Wade – Assistant City Manager; Hank Levien – Public Works Director

From:	Jessica Toth
To:	Chiu, Wayne@Waterboards
Subject:	Comments on Tentative Order No. R9-2013-0001
Date:	Tuesday, January 08, 2013 12:55:28 PM

January 8, 2013

San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

RE: Comments on Tentative Order Number: R9-2013-0001

Dear Mr. Chiu:

Curious Company respectfully submits the following comments on the draft San Diego Regional Municipal Separate Storm Sewer System permit, Tentative Order No. R9-2013-0001.

Urban runoff is the San Diego region's most urgent pollution problem. Arguably, it is the most difficult to solve. In a region known for its beaches and strong tourism economy, polluted runoff makes our beaches and waterways unsafe for swimming, fishing and other recreation for at least 72 hours after a rain event. Even in dry weather, our "urban drool" from residents and businesses overwatering lawns becomes a major pollution source.

The good news is by working together as a community, we can solve this challenging public health problem. The Water Quality Improvement Plans proposed in the draft permit have the potential to become powerful tools to help us improve water quality within our watersheds. However, the Co-permittees cannot be tasked with creating these plans alone.
Specifically:

* The Permit should require formation of a stakeholder advisory group for each watershed that includes representatives of environmental groups with knowledge of the watershed.
* This stakeholder advisory group should work closely with the Co-permittees and a regional board staff member while the Water Quality Improvement Plans are being developed to ensure these plans aggressively pursue water quality gains.
* The stakeholder advisory process should include accountability and measureable milestones to ensure the goals of the Permit are being met.

By taking advantage of the knowledge and resources of diverse stakeholders like municipalities, businesses and residents, our region can be on the cutting-edge of addressing urban runoff and creating healthier communities and watersheds. But this can only be achieved if these diverse voices are impacting the planning process in a meaningful way.

Curious Company recognizes the challenge urban runoff presents to our region, and we want to do our part to solve the problem. Curious Company is interested in participating in a Water Quality Improvement Plan development process for San Dieguito Watershed.

Curious Company urges the Regional Board to enhance the stakeholder participation opportunities as Water Quality Improvement Plans are developed and then approve the permit.

Respectfully submitted,
Jessica Toth
Curious Company

Jessica Toth
Curious Company
www.curiousco.com
(760) 809-1143

January 8, 2013

Wayne Chiu, P.E.
California Regional Water Quality Control Board, San Diego Region
9174 Sky Park Court, Suite 100
San Diego California 92123-4340

Subject: Comment – Tentative Order No. R9-2013-0001, Regional MS4 Permit, Place ID: 786088Wchiu.

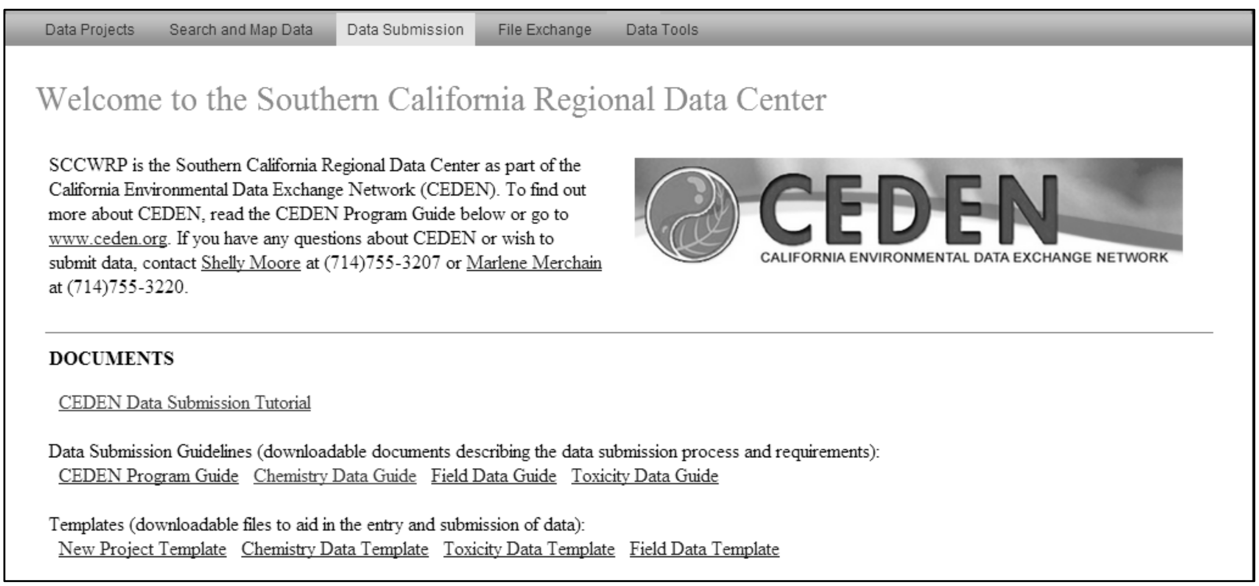
Topic: Requirement to upload data to CEDEN

Section F.3.b.(3) of the Tentative Order requires that, “Any monitoring data utilized in developing the Annual Report must be uploaded to the California Environmental Data Exchange Network (CEDEN).”

We ask the RWQCB to either remove this requirement or make it optional. We see the following problems with the above requirement:

1. At its core, this new permit relies on Water Quality Improvement Plans which are to be prepared on a watershed by watershed basis. Bifurcating the reporting of monitoring information from the goals and objectives of the WQIPs makes the data unintelligible and superfluous to the public. Data should be reported through independent data warehouses associated with each of the ten WQIPs.

2. The phrase “any monitoring data” is ambiguous and creates a compliance burden on co-permittees that CEDEN currently does not support. As seen in the screen shot below, CEDEN supports only Chemistry, Field, and Toxicity data. The overall monitoring task under the Order includes a much larger data set.



3. Uploading data to CEDEN seems redundant since the Order is also asking co-permittees, “Any monitoring and assessment data utilized in developing the Annual Report must be provided on the Regional Clearinghouse required pursuant to Provision F.4.” A WMA-based data warehouse is a more practical and comprehensive source of data for the RWQCB, other co-permitees, and public.

4. In practical terms, uploading "any monitoring data" to CEDEN is unnecessary. CEDEN, through its data upload process, basically provides data standardization. However, the Order already requires that all monitoring data be compatible with SWAMP, the Surface Water Ambient Monitoring Program adopted by the State Water Board. So CEDEN formats must be identical to SWAMP, which happens to be the case, nullifying the value added by CEDEN. Co-permittees should not be burdened with this additional cost and statutory obligation.

   The California Department of Water Resources or the State Water Board requires that grant funded projects submit their monitoring data to CEDEN. The primary recipients of these grants are non-government organizations employing citizen volunteers, and projects that do not have any legal obligation to meet stormwater permit requirements. Since their monitoring programs may not meet statutory standards, achieving some level of standardization through CEDEN in these situations is a reasonable objective. However, this is not the case with stormwater permittees.

Respectfully yours,

Joe

Joe Purohit
EcoLayers, Inc.

Phone: 858 240 2340
Email: joe@ecolayers.com

OTAY RANCH
NEW HOMES
HOME BUILDER
SINCE 1990

SAN DIEGO REGIONAL
WATER QUALITY
CONTROL BOARD
2013 JAN 10 AM 11 28

January 8, 2013

Ms. Laurie Walsh
San Diego Regional Water Quality Control Board
9174 Sky Park Circle, Suite 100
San Diego, CA 92123

RE: Tentative Order No. R9-2013-0001/Municipal Separated Storm Sewer Systems (MS4s) Draining the Watersheds within the San Diego Region

Dear Ms. Walsh:

Thank for the opportunity to provide comments on Tentative Order No. R-9-2013-0001. Our company is close to completing entitlements for a sustainable, walkable master planned community within the Otay Ranch. We have been processing these entitlements for the past four years and have expended millions of dollars planning a community that protects the environment, and specifically, water quality.

Our project is located north of the Otay River Valley and has been designed consistent with the permit approved by the Board just a year ago. In following the requirements in the current permit, we have devised a plan that cleans all project storm water runoff prior to introducing into the Otay River. This plan is contingent upon maintaining the hydromodification exemption for the Otay River.

The Otay River exemption was put into place based on the scientific and technical expertise of the Hydromodification Task Force. This committee, representing environmental and engineering experts, determined that limiting runoff to certain bodies of water and rivers within your jurisdiction would not be beneficial to the health of those watersheds. Due to the influence of the Otay Lakes and Dam upstream of our project, your Board approved an exemption for the Otay River.

If the Otay River exemption is removed from the new Tentative Order, our land plan would need to be dramatically altered, in effect, wiping out years of planning, engineering and environmental work.

The proposed Tentative Order also calls for retention of the 24 hour 85th percentile storm event onsite. Retention flows from the majority of storm events will adversely impact the Otay River watershed that is described as being "starved" for runoff in the Otay River Watershed Management Plan. Since infiltration is infeasible on our site due to soil conditions, the new permit proposes to arbitrarily increase our bio-retention facilities by 25%, a number that does not appear to have any scientific basis but would severely impact our land plans.

We certainly appreciate efforts to identify regional solutions through implementation of the Watershed Improvement Plans; however, we must be allowed to operate under the current permit until the Watershed Improvements Plans determine the best regional solutions for each watershed. Specifically, we ask that the Otay River hydromodification exemption remain in place and the retention requirements not be added to the permit until and if the Watershed Improvement Plans determine if retention is beneficial to the Otay River watershed.

Thank you for your consideration.

Sincerely,

Ranie Hunter

Ranie L. Hunter
Executive Vice President

County of San Diego

RICHARD E. CROMPTON
DIRECTOR

DEPARTMENT OF PUBLIC WORKS

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January 8, 2013

Wayne Chiu, P.E.
California Regional Water Quality Control Board, San Diego Region
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

Dear Mr. Chiu:

SAN DIEGO COPERMITTEE COMMENT SUBMITTAL – TENTATIVE ORDER NO. R9-2013-0001, REGIONAL MS4 PERMIT, PLACE ID 786088WCHIU

Thank you for the opportunity to comment on Tentative Order No. R9-2013-0001, NPDES No. CAS0109266, *National Pollutant Discharge Elimination System (NPDES) Permit and Waste Discharge Requirements for Discharges of Urban Runoff from the Municipal Separate Storm Sewer Systems (MS4s) Draining the Watersheds within the San Diego Region* (Tentative Order). The County of San Diego, as Principal Permittee, submits the attached comments on behalf of the 21 Copermittees subject to Regional Water Quality Control Board (Regional Board) Order 2007-0001, the existing San Diego County MS4 Permit.

These comments were developed jointly with the San Diego Copermittees and should be considered to represent a general group consensus. However, although we have strived to obtain unanimity in our comments and proposed permit revisions, individual Copermittees do sometimes have differing opinions. These will be expressed in separate written comments provided by individual Copermittees.

We greatly appreciate the public process employed to date toward the development of a new and improved permit for the San Diego Region, as well as the openness of staff and Regional Water Quality Control Board (Regional Board) members in listening to the issues and concerns put forth by the County and numerous other interested parties. The San Diego Copermittees' recommended edits to the Tentative Order are attached. The supporting rationale for each is provided in a separate comment table. Most edits are in the form of redline-strikeout changes.

Again, thank you for the opportunity to participate in the development of a new permit for the San Diego Region. We look forward to continued discussion of the issues raised above. If you have questions, please contact Todd Snyder, Land Use & Environmental Planning Manager, at (858) 694-3482, or todd.snyder@sdcounty.ca.gov.

Sincerely,

CID TESORO, Manager
Department of Public Works

CT:js

Attachments: San Diego Copermittee Recommended Edits to Tentative Order R9-2013-0001
San Diego Copermittee Comment Table

CC: Todd Snyder, Department of Public Works

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

TENTATIVE
ORDER NO. R9-2013-0001
NPDES NO. CAS0109266

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT AND WASTE DISCHARGE REQUIREMENTS FOR DISCHARGES FROM THE MUNICIPAL SEPARATE STORM SEWER SYSTEMS (MS4s) DRAINING THE WATERSHEDS WITHIN THE SAN DIEGO REGION

The San Diego County Copermittees in Table 1a are subject to waste discharge requirements set forth in this Order.

Table 1a. San Diego County Copermittees

City of Carlsbad	City of Oceanside
City of Chula Vista	City of Poway
City of Coronado	City of San Diego
City of Del Mar	City of San Marcos
City of El Cajon	City of Santee
City of Encinitas	City of Solana Beach
City of Escondido	City of Vista
City of Imperial Beach	County of San Diego
City of La Mesa	San Diego County Regional Airport Authority
City of Lemon Grove	San Diego Unified Port District
City of National City	

After the San Diego Water Board receives and considers the Orange County Copermittees' Report of Waste Discharge and makes any necessary changes to the Order, the Orange County Copermittees in Table 1b will become subject to waste discharge requirements set forth in this Order after expiration of Order No. R9-2009-0002, NPDES No. CAS0108740 on or after December 16, 2014.

Table 1b. Orange County Copermittees

City of Aliso Viejo	City of Rancho Santa Margarita
City of Dana Point	City of San Clemente
City of Laguna Beach	City of San Juan Capistrano
City of Laguna Hills	City of Laguna Woods
City of Laguna Niguel	County of Orange
City of Lake Forest	Orange County Flood Control District
City of Mission Viejo	

After the San Diego Water Board receives and considers the Riverside County Copermittees' Report of Waste Discharge and makes any necessary changes to this Order, the Riverside County Copermittees in Table 1c will become subject to waste discharge requirements set forth in this Order after expiration of Order No. R9-2010-0016, NPDES No. CAS0108766 on or after November 10, 2015.

Table 1c. Riverside County Copermittees

City of Murrieta	County of Riverside
City of Temecula	Riverside County Flood Control and Water Conservation District
City of Wildomar	

The Orange County Copermittees and Riverside County Copermittees may become subject to the requirements of this Order at a date earlier than the expiration date of their current Orders subject to the conditions described in Provision F.6 of this Order if the Copermittees in the respective county receive a notification of coverage from the San Diego Water Board.

The term Copermittee in this Order refers to any San Diego County, Orange County, or Riverside County Copermittee covered under this Order, unless specified otherwise.

This Order provides permit coverage for the Copermittee discharges described in Table 2.

Table 2. Discharge Locations and Receiving Waters

Discharge Points	Locations throughout San Diego Region
Discharge Description	Municipal Separate Storm Sewer System (MS4) Discharges
Receiving Waters	Inland Surface Waters, Enclosed Bays and Estuaries, and Coastal Ocean Waters of the San Diego Region

Table 3. Administrative Information

This Order was adopted by the San Diego Water Board on:	**Month Day, 2013**
This Order will become effective on:	**Month Day, 2013**
This Order will expire on:	**Month Day, 2018**
The Copermittees must file a Report of Waste Discharge in accordance with Title 23, California Code of Regulations, as application for issuance of new waste discharge requirements no later than 180 days in advance of the Order expiration date.	

I, David W. Gibson, Executive Officer, do hereby certify that this Order with all attachments is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Diego Region, on Month Day, 2013.

TENTATIVE

David W. Gibson
Executive Officer

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(Cont'd)

I. FINDINGS

The California Regional Water Quality Control Board, San Diego Region (San Diego Water Board), finds that:

JURISDICTION

1. **MS4 Ownership or Operation.** Each of the Copermittees owns or operates an MS4, through which it discharges storm water and non-storm water into waters of the U.S. within the San Diego Region. These MS4s fall into one or more of the following categories: (1) a medium or large MS4 that services a population of greater than 100,000 or 250,000 respectively; or (2) a small MS4 that is "interrelated" to a medium or large MS4; or (3) an MS4 which contributes to a violation of a water quality standard; or (4) an MS4 which is a significant contributor of pollutants to waters of the U.S.

2. **Legal and Regulatory Authority.** This Order is issued pursuant to section 402 of the federal Clean Water Act (CWA) and implementing regulations (Code of Federal Regulations [CFR] Title 40, Part 122 [40 CFR 122]) adopted by the United States Environmental Protection Agency (USEPA), and chapter 5.5, division 7 of the California Water Code (CWC) (commencing with section 13370). This Order serves as an NPDES permit for discharges from MS4s to surface waters. This Order also serves as waste discharge requirements (WDRs) pursuant to article 4, chapter 4, division 7 of the CWC (commencing with section 13260).

   The San Diego Water Board has the legal authority to issue a regional MS4 permit pursuant to its authority under CWA section 402(p)(3)(B) and 40 CFR 122.26(a)(1)(v). The USEPA also made it clear that the permitting authority, in this case the San Diego Water Board, has the flexibility to establish system- or region-wide permits (55 Federal Register [FR] 47990, 48039-48042). The regional nature of this Order will ensure consistency of regulation within watersheds and is expected to result in overall cost savings for the Copermittees and San Diego Water Board.

   The federal regulations make it clear that the Copermittees need only comply with permit conditions relating to discharges from the MS4s for which they are operators (40 CFR 122.26(a)(3)(vi)). This Order does not require the Copermittees to manage storm water outside of their jurisdictional boundaries, but rather to work collectively to improve storm water management within watersheds.

3. **CWA NPDES Permit Conditions.** Pursuant to CWA section 402(p)(3)(B), NPDES permits for storm water discharges from MS4s must include requirements to effectively prohibit non-storm water discharges into MS4s, and require controls to reduce the discharge of pollutants ~~in storm water~~ to the maximum extent practicable (MEP), and to require other provisions as the San Diego Water Board determines are appropriate to control such pollutants. This Order prescribes conditions to assure

compliance with the CWA requirements for owners and operators of MS4s to effectively prohibit non-storm water discharges in to the MS4s, and require controls to reduce the discharge of pollutants in storm water from the MS4s to the MEP.

4. **CWA and CWC Monitoring Requirements.** CWA section 308(a) and 40 CFR 122.41(h),(j)-(l) and 122.48 require that NPDES permits must specify monitoring and reporting requirements. Federal regulations applicable to large and medium MS4s also specify additional monitoring and reporting requirements in 40 CFR 122.26(d)(1)(iv)(D), 122.26(d)(1)(v)(B), 122.26(d)(2)(i)(F), 122.26(d)(2)(iii)(D), 122.26(d)(2)(iv)(B)(2) and 122.42(c). CWC section 13383 authorizes the San Diego Water Board to establish monitoring, inspection, entry, reporting and recordkeeping requirements. This Order establishes monitoring and reporting requirements to implement federal and State requirements.

5. **Total Maximum Daily Loads.** CWA section 303(d)(1)(A) requires that "[e]ach state shall identify those waters within its boundaries for which the effluent limitations…are not stringent enough to implement any water quality standard applicable to such waters." The CWA also requires states to establish a priority ranking of impaired water bodies known as Water Quality Limited Segments and to establish Total Maximum Daily Loads (TMDLs) for such waters. This priority list of impaired water bodies is called the Clean Water Act Section 303(d) List of Water Quality Limited Segments, commonly referred to as the 303(d) List. The CWA requires the 303(d) List to be updated every two years.

   TMDLs are numerical calculations of the maximum amount of a pollutant that a water body can assimilate and still meet water quality standards. A TMDL is the sum of the allowable loads of a single pollutant from all contributing point sources (waste load allocations or WLAs) and non-point sources (load allocations or LAs), background contribution, plus a margin of safety. Discharges from MS4s are point source discharges. The federal regulations (40 CFR 122.44(d)(1)(vii)(B)) require that NPDES permits to incorporate water quality based effluent limitations (WQBELs) developed to protect a narrative water quality criterion, a numeric water quality criterion, or both, consistent with the assumptions and requirements of any available WLA for the discharge. Requirements of this Order implement the TMDLs adopted by the San Diego Water Board and approved by USEPA.

6. **Non-Storm Water Discharges.** Pursuant to CWA section 402(p)(3)(B)(ii), this Order requires each Copermittee to effectively prohibit discharges of non-storm water into its MS4. Nevertheless, non-storm water discharges into and from the MS4s continue to be reported to the San Diego Water Board by the Copermittees and other persons. Monitoring conducted by the Copermittees, as well as the 303(d) List, have identified dry weather, non-storm water discharges from the MS4s as a source of pollutants causing or contributing to receiving water quality impairments in the San Diego Region. The federal regulations (40 CFR 122.26(d)(2)(iv)(B)(1)) require the Copermittees to have a program to prevent illicit discharges to the MS4. The federal regulations, however, allow for specific categories of non-storm water discharges or flows to be addressed as illicit discharges only where such discharges

are identified as sources of pollutants to waters of the U.S.

7. **In-Stream Treatment Systems.** Pursuant to federal regulations (40 CFR 131.10(a)), in no case shall a state adopt waste transport or waste assimilation as a designated use for any waters of the U.S. Authorizing the construction of a runoff treatment facility within a water of the U.S., or using the water body itself as a treatment system or for conveyance to a treatment system, would be tantamount to accepting waste assimilation as an appropriate use for that water body. Runoff treatment must occur prior to the discharge of runoff into receiving waters. Treatment control best management practices (BMPs) must not be constructed in waters of the U.S. Construction, operation, and maintenance of a pollution control facility in a water body can negatively impact the physical, chemical, and biological integrity, as well as the beneficial uses, of the water body.

DISCHARGE CHARACTERISTICS AND RUNOFF MANAGEMENT

8. **Point Source Discharges of Pollutants.** Discharges from the MS4s may contain waste, as defined in the CWC, and pollutants that adversely affect the quality of the waters of the state. A discharge from an MS4 is a "discharge of pollutants from a point source" into waters of the U.S. as defined in the CWA. Storm water and non-storm water discharges from the MS4s may contain pollutants that cause or threaten to cause a violation of surface water quality standards, as outlined in the ~~Water Quality Control Plan for the San Diego Basin (~~Basin Plan~~). Storm water and non-storm water discharges from the MS4s are subject to the conditions and requirements established in the Basin Plan for point source discharges~~.

9. **Potential Beneficial Use Impairment.** The discharge of pollutants and/or increased flows from MS4s may cause or threaten to cause the concentration of pollutants to exceed applicable receiving water quality objectives and impair or threaten to impair designated beneficial uses resulting in a condition of pollution, contamination, or nuisance.

10. **Pollutants Generated by Land Development.** Land development has created and continues to create new sources of non-storm water discharges and pollutants in storm water discharges as human population density increases. This brings higher levels of car emissions, car maintenance wastes, municipal sewage, pesticides, household hazardous wastes, pet wastes, and trash. Pollutants from these sources are dumped or washed off the surface by non-storm water or storm water flows into and from the MS4s. When development converts natural vegetated pervious ground cover to impervious surfaces such as paved highways, streets, rooftops, and parking lots, the natural absorption and infiltration abilities of the land are lost. Therefore, runoff leaving a developed area without BMPs that can maintain pre-development conditions will contain greater pollutant loads and have significantly greater runoff volume, velocity, and peak flow rate than pre-development runoff from the same area.

11. **Runoff Discharges to Receiving Waters.** The MS4s discharge runoff into lakes, drinking water reservoirs, rivers, streams, creeks, bays, estuaries, coastal lagoons, the Pacific Ocean, and tributaries thereto within the eleven hydrologic units comprising the San Diego Region. Historic and current development makes use of natural drainage patterns and features as conveyances for runoff. ~~Rivers, streams and creeks in developed areas used in this manner are part of the Copermittees' MS4s regardless of whether they are natural, anthropogenic, or partially modified features. In these cases, the rivers, streams and creeks in the developed areas of the Copermittees' jurisdictions are both an MS4 and receiving water.~~ Numerous receiving water bodies and water body segments have been designated as impaired by the San Diego Water Board pursuant to CWA section 303(d).

12. **Pollutants in Runoff.** The most common pollutants in runoff discharged from the MS4s include total suspended solids, sediment, pathogens (e.g., bacteria, viruses, protozoa), heavy metals (e.g., cadmium, copper, lead, and zinc), petroleum products and polynuclear aromatic hydrocarbons, synthetic organics (e.g., pesticides, herbicides, and PCBs), nutrients (e.g., nitrogen and phosphorus), oxygen-demanding substances (e.g., decaying vegetation, animal waste), detergents, and trash. As operators of the MS4s, the Copermittees cannot passively receive and discharge pollutants from third parties. By providing free and open access to an MS4 that conveys discharges to waters of the U.S., the operator essentially accepts responsibility for discharges into the MS4 that it does not effectively prohibit or otherwise control. These discharges may cause or contribute to a condition of pollution or a violation of water quality standards.

13. **Human Health and Aquatic Life Impairment.** Pollutants in runoff discharged from the MS4s can threaten and adversely affect human health and aquatic organisms. Adverse responses of organisms to chemicals or physical agents in runoff range from physiological responses such as impaired reproduction or growth anomalies to mortality. Increased volume, velocity, rate, and duration of storm water runoff greatly accelerate the erosion of downstream natural channels. This alters stream channels and habitats and can adversely affect aquatic and terrestrial organisms.

14. **Water Quality Effects.** The Copermittees' water quality monitoring data submitted to date documents persistent exceedances of Basin Plan water quality objectives for runoff-related pollutants at various watershed monitoring stations. Persistent toxicity has also been observed at several watershed monitoring stations. In addition, bioassessment data indicate that the majority of the monitored receiving waters have Poor to Very Poor Index of Biological Integrity (IBI) ratings. These findings indicate that runoff discharges are causing or contributing to water quality impairments, and are a leading cause of such impairments in the San Diego Region. Non-storm water discharges from the MS4s have been shown to contribute significant levels of pollutants and flow in arid, developed Southern California watersheds, and contribute significantly to exceedances of applicable receiving water quality objectives.

15. Non-Storm Water and Storm Water Discharges. ~~Non-storm water discharges from the MS4s are not considered storm water discharges and therefore are not subject to the MEP standard of CWA section 402(p)(3)(B)(iii), which is explicitly for "Municipal … *Stormwater Discharges* (emphasis added)" from the MS4s.~~ Pursuant to CWA 402(p)(3)(B)(ii), non-storm water discharges into the MS4s must be effectively prohibited. "Permits for discharges from municipal storm sewers… shall require controls to reduce the discharge of pollutants to the maximum extent practicable…" 402(p)(3)(B)(iii).

16. Best Management Practices. Waste and pollutants which are deposited and accumulate in MS4 drainage structures will be discharged from these structures to waters of the U.S. unless they are removed. These discharges may cause or contribute to, or threaten to cause or contribute to, a condition of pollution in receiving waters. For this reason, pollutants in storm water discharges from the MS4s can be and must be effectively reduced in runoff by the application of a combination of pollution prevention, source control, and treatment control BMPs. Pollution prevention is the reduction or elimination of pollutant generation at its source and is the best "first line of defense". Source control BMPs (both structural and non-structural) minimize the contact between pollutants and runoff, therefore keeping pollutants onsite and out of receiving waters. Treatment control BMPs remove pollutants that have been mobilized by storm water or non-storm water flows.

17. BMP Implementation. Runoff needs to be addressed during the three major phases of development (planning, construction, and use) in order to reduce the discharge of storm water pollutants to the MEP, effectively prohibit non-storm water discharges, and protect receiving waters. Development which is not guided by water quality planning policies and principles can result in increased pollutant load discharges, flow rates, and flow durations which can negatively affect receiving water beneficial uses. Construction sites without adequate BMP implementation result in sediment runoff rates which greatly exceed natural erosion rates of undisturbed lands, causing siltation and impairment of receiving waters. Existing development can generate substantial pollutant loads which are discharged in runoff to receiving waters. Retrofitting areas of existing development with storm water pollutant control and hydromodification management BMPs is necessary to address storm water discharges from existing development that may cause or contribute to a condition of pollution or a violation of water quality standards.

18. Long Term Planning and Implementation. Federal regulations require municipal storm water permits to expire 5 years from adoption, after which the permit must be renewed and reissued. The San Diego Water Board recognizes that the degradation of water quality and impacts to beneficial uses of the waters in the San Diego Region occurred over several decades. The San Diego Water Board further recognizes that a decade or more may be necessary to realize demonstrable improvement to the quality of waters in the Region. This Order includes a long term planning and implementation approach that will require more than a single permit term to complete.

WATER QUALITY STANDARDS

19. Basin Plan. The San Diego Water Board adopted the Water Quality Control Plan for the San Diego Basin (Basin Plan) on September 8, 1994 that designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for receiving waters addressed through the plan. The Basin Plan was subsequently approved by the State Water Resources Control Board (State Water Board) on December 13, 1994. Subsequent revisions to the Basin Plan have also been adopted by the San Diego Water Board and approved by the State Water Board. Requirements of this Order implement the Basin Plan.

The Basin Plan identifies the following existing and potential beneficial uses for inland surface waters in the San Diego Region: Municipal and Domestic Supply (MUN), Agricultural Supply (AGR), Industrial Process Supply (PROC), Industrial Service Supply (IND), Ground Water Recharge (GWR), Contact Water Recreation (REC1), Non-contact Water Recreation (REC2), Warm Freshwater Habitat (WARM), Cold Freshwater Habitat (COLD), Wildlife Habitat (WILD), Rare, Threatened, or Endangered Species (RARE), Freshwater Replenishment (FRSH), Hydropower Generation (POW), and Preservation of Biological Habitats of Special Significance (BIOL). The following additional existing and potential beneficial uses are identified for coastal waters of the San Diego Region: Navigation (NAV), Commercial and Sport Fishing (COMM), Estuarine Habitat (EST), Marine Habitat (MAR), Aquaculture (AQUA), Migration of Aquatic Organisms (MIGR), Spawning, Reproduction, and/or Early Development (SPWN), and Shellfish Harvesting (SHELL).

20. Ocean Plan. The State Water Board adopted the Water Quality Control Plan for Ocean Waters of California, California Ocean Plan (Ocean Plan) in 1972 and amended it in 1978, 1983, 1988, 1990, 1997, 2000, and 2005. The State Water Board adopted the latest amendment on April 21, 2005 and it became effective on February 14, 2006. The Ocean Plan is applicable, in its entirety, to point source discharges to the ocean. Requirements of this Order implement the Ocean Plan.

The Ocean Plan identifies the following beneficial uses of ocean waters of the state to be protected: Industrial water supply; water contact and non-contact recreation, including aesthetic enjoyment; navigation; commercial and sport fishing; mariculture; preservation and enhancement of designated Areas of Special Biological Significance; rare and endangered species; marine habitat; fish spawning and shellfish harvesting

21. Sediment Quality Control Plan. On September 16, 2008, the State Water Board adopted the Water Quality Control Plan for Enclosed Bays and Estuaries – Part 1 Sediment Quality (Sediment Quality Control Plan). The Sediment Quality Control Plan became effective on August 25, 2009. The Sediment Quality Control Plan establishes: 1) narrative sediment quality objectives for benthic community protection from exposure to contaminants in sediment and to protect human health, and 2) a program of implementation using a multiple lines of evidence approach to interpret the narrative sediment quality objectives. Requirements of this Order implement the Sediment Quality Control Plan.

22. **National Toxics Rule and California Toxics Rule.** USEPA adopted the National Toxics Rule (NTR) on December 22, 1992, and later amended it on May 4, 1995 and November 9, 1999. About forty criteria in the NTR applied in California. On May 18, 2000, USEPA adopted the California Toxics Rule (CTR). The CTR promulgated new toxics criteria for California and, in addition, incorporated the previously adopted NTR criteria that were applicable in the state. The CTR was amended on February 13, 2001. These rules contain water quality criteria for priority pollutants.

23. **Antidegradation Policy.** This Order is in conformance with the federal Antidegradation Policy described in 40 CFR 131.12, and State Water Board Resolution No. 68-16, *Statement of Policy with Respect to Maintaining High Quality Waters in California*. Federal regulations at 40 CFR 131.12 require that the State water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy in State Water Board Resolution No. 68-16. State Water Board Resolution No. 68-16 incorporates the federal antidegradation policy where the federal policy applies under federal law. State Water Board Resolution No. 68-16 requires that existing quality of waters be maintained unless degradation is justified based on specific findings. The Basin Plan implements, and incorporates by reference, both the State and federal antidegradation policies.

CONSIDERATIONS UNDER FEDERAL AND STATE LAW

24. **Coastal Zone Act Reauthorization Amendments.** Section 6217(g) of the Coastal Zone Act Reauthorization Amendments of 1990 (CZARA) requires coastal states with approved coastal zone management programs to address non-point source pollution impacting or threatening coastal water quality. CZARA addresses five sources of non-point source pollution: agriculture, silviculture, urban, marinas, and hydromodification. This Order addresses the management measures required for the urban category, with the exception of septic systems. The runoff management programs developed pursuant to this Order fulfills the need for coastal cities to develop a runoff non-point source plan identified in the Non-Point Source Program Strategy and Implementation Plan. The San Diego Water Board addresses septic systems through the administration of other programs.

25. **Endangered Species Act.** This Order does not authorize any act that results in the taking of a threatened or endangered species or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code sections 2050 to 2097) or the Federal Endangered Species Act (16 USC sections 1531 to 1544). This Order requires compliance with receiving water limits, and other requirements to protect the beneficial uses of

waters of the State. The Copermittees are responsible for meeting all requirements of the applicable Endangered Species Act.

26. **Report of Waste Discharge Process.** The waste discharge requirements set forth in this Order are based upon the Report of Waste Discharge submitted by the San Diego County Copermittees prior to the expiration of Order No. R9-2007-0001 (NPDES No. CAS0109266). The Orange County and Riverside County Copermittees are not immediately covered by the waste discharge requirements in this Order. The San Diego Water Board understands that each municipality is unique although the Counties share watersheds and geographical boundaries. The Order will continue to use the Report of Waste Discharge process prior to initially making Orange County or Riverside County Copermittees subject to the requirements of this Order.

    The federal regulations (40 CFR 122.21(d)(2)) and CWC section 13376 impose a duty on the Copermittees to reapply for continued coverage through submittal of a Report of Waste Discharge no later than 180 days prior to expiration of a currently effective permit. This requirement is set forth in the Orange County Copermittees' and Riverside County Copermittees' currently effective permits at Provisions K.2.b and K.2.c, respectively. The Orange County Permit, Order No. R9-2009-0002 (NPDES No. CAS0108740) expires on December 16, 2014 and the Riverside County MS4 Permit, Order No. R9-2010-0016 (NPDES No. CAS0108766) expires on November 10, 2015.

    Unless the Orange County or Riverside County Copermittees apply for and receive early coverage under this Order, the Orange County Copermittees' and the Riverside County Copermittees' respective permits will be superseded by this Order upon expiration of their respective permits, subject to any necessary revisions to the requirements of this Order made after the San Diego Water Board considers their respective Reports of Waste Discharge through the public process provided in 40 CFR 124.

27. **Integrated Report and Clean Water Act Section 303(d) List.** The San Diego Water Board and State Water Board submit an Integrated Report to USEPA to comply with the reporting requirements of CWA sections 303(d), 305(b) and 314, which lists the attainment status of water quality standards for water bodies in the San Diego Region. USEPA issued its *Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act* on July 29, 2005, which advocates the use of a five category approach for classifying the attainment status of water quality standards for water bodies in the Integrated Report. Water bodies included in Category 5 in the Integrated Report indicate at least one beneficial use is not being supported or is threatened, and a TMDL is required. Water bodies included in Category 5 in the Integrated Report are placed on the 303(d) List.

    Water bodies with available data and/or information that indicate at least one beneficial use is not being supported or is threatened, but a TMDL is not required, are included in Category 4 in the Integrated Report. Impaired surface water bodies may be included in Category 4 if a TMDL has been adopted and approved (Category 4a); if other pollution control requirements required by a local, state or federal authority are stringent enough to implement applicable water quality standards within a reasonable period of time (Category 4b); or, if the failure to meet an applicable water quality standard is not caused by a pollutant, but caused by other types of pollution (Category 4c).

Implementation of the requirements of this Order will~~may~~ allow the San Diego Water Board to include surface waters impaired by discharges from the Copermittees' MS4s in Category 4 in the Integrated Report for consideration during the next 303(d) List submittal by the State to USEPA.

28. Economic Considerations. The California Supreme Court has ruled that although CWC section 13263 requires the State and Regional Water Boards (collectively Water Boards) to consider factors set forth in CWC section 13241 when issuing an NPDES permit, the Water Board may not consider the factors to justify imposing pollutant restrictions that are less stringent than the applicable federal regulations require. (*City of Burbank v. State Water Resources Control Bd.* (2005) 35 Cal.4th 613, 618, 626-627.) However, when pollutant restrictions in an NPDES permit are more stringent than federal law requires, CWC section 13263 requires that the Water Boards consider the factors described in CWC section 13241 as they apply to those specific restrictions.

As noted in the following finding, the San Diego Water Board finds that the requirements in this permit are not more stringent than the minimum federal requirements. Therefore, a CWC section 13241 analysis is not required for permit requirements that implement the effective prohibition on the discharge of non-storm water into the MS4 or for controls to reduce the discharge of pollutants in storm water to the MEP, or other provisions that the San Diego Water Board has determined appropriate to control such pollutants, as those requirements are mandated by federal law. Notwithstanding the above, the San Diego Water Board has developed an economic analysis of the requirements in this Order. The economic analysis is provided in the Fact Sheet.

~~**29. Unfunded Mandates.** This Order does not constitute an unfunded local government mandate subject to subvention under Article XIIIB, Section (6) of the California Constitution for several reasons, including, but not limited to, the following:~~

~~**a.** This Order implements federally mandated requirements under CWA section 402 (33 USC section 1342(p)(3)(B)).~~

~~**b.** The local agency Copermittees' obligations under this Order are similar to, and in many respects less stringent than, the obligations of non-governmental and new dischargers who are issued NPDES permits for storm water and non-storm water discharges.~~

~~**c.** The local agency Copermittees have the authority to levy service charges, fees, or assessments sufficient to pay for compliance with this Order.~~

~~**d.** The Copermittees have requested permit coverage in lieu of compliance with the~~

~~complete prohibition against the discharge of pollutants contained in CWA section 301(a) (33 USC section 1311(a)) and in lieu of numeric restrictions on their MS4 discharges (i.e. effluent limitations).~~

~~**e.** The local agencies' responsibility for preventing discharges of waste that can create conditions of pollution or nuisance from conveyances that are within their ownership or control under State law predates the enactment of Article XIIIB, Section (6) of the California Constitution.~~

~~**f.** The provisions of this Order to implement TMDLs are federal mandates. The CWA requires TMDLs to be developed for water bodies that do not meet federal water quality standards (33 USC section 1313(d)). Once the USEPA or a state develops a TMDL, federal law requires that permits must contain water quality based effluent limitations consistent with the assumptions and requirements of any applicable wasteload allocation (40 CFR 122.44(d)(1)(vii)(B)).~~

~~See the Fact Sheet for further discussion of unfunded mandates.~~

~~30.~~29. California Environmental Quality Act. The issuance of waste discharge requirements and an NPDES permit for the discharge of runoff from MS4s to waters of the U.S. is exempt from the requirement for preparation of environmental documents under the California Environmental Quality Act (CEQA) (Public Resources Code, Division 13, Chapter 3, section 21000 et seq.) in accordance with CWC section 13389.

STATE WATER BOARD DECISIONS

~~31.~~30. Compliance with Prohibitions and Limitations. The receiving water limitation language specified in this Order is consistent with language recommended by the USEPA and established in State Water Board Order WQ 99-05, *Own Motion Review of the Petition of Environmental Health Coalition to Review Waste Discharge Requirements Order No. 96-03, NPDES Permit No. CAS0108740*, adopted by the State Water Board on June 17, 1999. The receiving water limitation language in this Order requires storm water discharges from MS4s to not cause or contribute to a violation of water quality standards, which is to be achieved through an iterative approach requiring the implementation of improved and better-tailored BMPs over time. Implementation of the iterative approach to comply with receiving water limitations based on applicable water quality standards is necessary to ensure that storm water discharges from the MS4 will not ultimately cause or contribute to violations of water quality standards and will not create conditions of pollution, contamination, or nuisance.

~~32.~~31. Special Conditions for Areas of Special Biological Significance. On March 20, 2012, the State Water Board approved Resolution No. 2012-0012 approving an exception to the Ocean Plan effective prohibition against discharges to Areas of Special Biological Significance (ASBS) for certain nonpoint source discharges and NPDES permitted municipal storm water discharges. State Water Board Resolution No. 2012-0012 requires monitoring and testing of marine aquatic life and water quality in several ASBS to protect California's coastline during storms when rain water overflows into coastal waters. Specific terms, effective prohibitions, and special conditions were adopted to provide special protections for marine aquatic life and natural water quality in ASBS. The City of San Diego's municipal storm water discharges to the San Diego Marine Life Refuge in La Jolla, and the City of Laguna Beach's municipal storm water discharges to the Heisler Park ASBS are subject terms and conditions of State Water Board Resolution No. 2012-0012. The Special Protections contained in Attachment B to Resolution No. 2012-0012, applicable to these discharges, are hereby incorporated into this Order as if fully set forth herein.

ADMINISTRATIVE FINDINGS

~~33.~~32. **Executive Officer Delegation of Authority.** The San Diego Water Board by prior resolution has delegated all matters that may legally be delegated to its Executive Officer to act on its behalf pursuant to CWC section 13223. Therefore, the Executive Officer is authorized to act on the San Diego Water Board's behalf on any matter within this Order unless such delegation is unlawful under CWC section 13223 or this Order explicitly states otherwise.

~~34.~~33. **Standard Provisions.** Standard Provisions, which apply to all NPDES permits in accordance with 40 CFR 122.41, and additional conditions applicable to specified categories of permits in accordance with 40 CFR 122.42, are provided in Attachment B to this Order.

~~35.~~34. **Fact Sheet.** The Fact Sheet for this Order contains background information, regulatory and legal citations, references and additional explanatory information and data in support of the requirements of this Order. The Fact Sheet is hereby incorporated into this Order and constitutes part of the Findings of this Order.

~~36.~~35. **Public Notice.** In accordance with State and federal laws and regulations, the San Diego Water Board notified the Copermittees, and interested agencies and persons of its intent to prescribe waste discharge requirements for the control of discharges into and from the MS4s to waters of the U.S. and has provided them with an opportunity to submit their written comments and recommendations. Details of notification are provided in the Fact Sheet.

~~37.~~36. **Public Hearing.** The San Diego Water Board held a public hearing on Month Day, 2013 and heard and considered all comments pertaining to the terms and conditions of this Order. Details of the public hearing are provided in the Fact Sheet.

~~38.~~37. **Effective Date.** This Order serves as an NPDES permit pursuant to CWA section 401 or amendments thereto, and becomes effective fifty (50) days after the date of its adoption, provided that the Regional Administrator, USEPA, Region IX, does not object to this Order.

~~39.~~38. **Review by the State Water Board.** Any person aggrieved by this action of the San Diego Water Board may petition the State Water Board to review the action in accordance with CWC section 13320 and California Code of Regulations, title 23, sections 2050, et seq. The State Water Board must receive the petition by 5:00 p.m., 30 days after the San Diego Water Board action, except that if the thirtieth day following the action falls on a Saturday, Sunday or State holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at: http://www.waterboards.ca.gov/public_notices/petitions/water_quality or will be provided upon request.

THEREFORE, IT IS HEREBY ORDERED that the Copermittees, in order to meet the provisions contained in division 7 of the CWC and regulations adopted thereunder, and the provisions of the CWA and regulations adopted thereunder, must each comply with the following:

II. PROVISIONS

A. PROHIBITIONS AND LIMITATIONS

The purpose of this provision is to describe the conditions under which storm water and non-storm water discharges into and from MS4s are effectively prohibited or limited. The goal of the effective prohibitions and limitations is to protect the water quality and designated beneficial uses of waters of the ~~state~~ U.S. from adverse impacts caused or contributed to by MS4 discharges. This goal will be accomplished through the implementation of water quality improvement strategies and runoff management programs that effectively prohibit non-storm water discharges into the Copermittees' MS4s, and reduce pollutants in storm water discharges from the Copermittees' MS4s to the MEP. The process for determination of compliance with the Discharge Prohibitions (A.1), Receiving Water Limitations (A.2), and Effluent Limitations (A.3) is defined in Provision A.4.

1. Discharge Prohibitions

a. Discharges from MS4s in a manner causing, or threatening to cause, a condition of pollution, contamination, or nuisance in receiving waters of the ~~state~~ U.S. are effectively prohibited, unless such discharges are addressed by the Copermittee through A.1.d, A.3.b or A.4.

b. Non-storm water discharges into MS4s are to be effectively prohibited, unless such discharges are either authorized by a separate NPDES permit, or the discharge is a category of non-storm water discharges or flows that must be addressed pursuant to Provisions E.2.a.(1)-(5) of this Order.

c. Discharges from MS4s are subject to all waste discharge prohibitions in the Basin Plan, included in Attachment A to this Order, unless such discharges are addressed by the Copermittee through A.1.d, A.3.b, or A.4.

d. Storm water discharges from the City of San Diego's MS4 to the San Diego Marine Life Refuge in La Jolla, and the City of Laguna Beach's MS4 to the Heisler Park ASBS are authorized under this Order subject to the Special Protections contained in Attachment B to State Water Board Resolution No. 2012-0012 applicable to these discharges, included in Attachment A to this Order. All other discharges from the Copermittees' MS4s to ASBS are prohibited.

2. Receiving Water Limitations

a. Discharges from MS4s must not cause or contribute to the violation of water quality standards in any receiving waters, ~~including but not limited to~~ set forth in all applicable provisions ~~contained in:~~ below, unless such discharges are addressed by the Copermittee through A.1.d, A.3.b, or A.4:

(1) The San Diego Water Board's Basin Plan, including beneficial uses, water quality objectives, and implementation plans;

(2) State Water Board plans for water quality control including the following:

(a) Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries (Thermal Plan), and

(b) The Ocean Plan, including beneficial uses, water quality objectives, and implementation plans;

(3) State Water Board policies for water and sediment quality control including the following:

(a) Water Quality Control Policy for the Enclosed Bays and Estuaries of California,

(b) Sediment Quality Control Plan which includes the following narrative objectives for bays and estuaries:

(i) Pollutants in sediments shall not be present in quantities that, alone or in combination, are toxic to benthic communities, and

(ii) Pollutants shall not be present in sediments at levels that will bioaccumulate in aquatic life to levels that are harmful to human health,

(c) The Statement of Policy with Respect to Maintaining High Quality of Waters in California;[1]

(4) Priority pollutant criteria promulgated by the USEPA through the following:

(a) National Toxics Rule (NTR)[2] (promulgated on December 22, 1992 and amended on May 4, 1995), and

(b) California Toxics Rule (CTR).[3,4]

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[1] State Water Board Resolution No. 68-16
[2] 40 CFR 131.36
[3] 65 Federal Register 31682-31719 (May 18, 2000), adding Section 131.38 to 40 CFR

b. Discharges from MS4s composed of storm water runoff must not alter natural ocean water quality in an ASBS.

[4] If a water quality objective and a CTR criterion are in effect for the same priority pollutant, the more stringent of the two applies.

3. Effluent Limitations

a. TECHNOLOGY BASED EFFLUENT LIMITATIONS

Pollutants in ~~storm water~~ discharges from MS4s must be reduced to the MEP.[5]

b. WATER QUALITY BASED EFFLUENT LIMITATIONS

This Order establishes water quality based effluent limitations (WQBELs) consistent with the assumptions and requirements of all available TMDL waste load allocations (WLAs) assigned to discharges from the Copermittees' MS4s. Each Copermittee must comply with applicable WQBELs established for the TMDLs in Attachment E to this Order, pursuant to the applicable TMDL compliance schedules.

4. Compliance with Discharge Prohibitions and Receiving Water Limitations

Each Copermittee must achieve compliance with Provisions A.1.a, A.1.c and A.2.a of this Order through timely implementation of strategies, control measures and other actions as specified in Provisions B and E of this Order, including any modifications. The Water Quality Improvement Plans required under Provision B must be designed and adapted to ultimately achieve compliance with Provisions A.1.a, A.1.c and A.2.a, and may be used for compliance determination as described in Provision B.3.a.(3).

a. If exceedance(s) of water quality standards persist in receiving waters notwithstanding implementation of this Order, the Copermittees must comply with the following procedures:

(1) For exceedance(s) of a water quality standard in the process of being addressed by the Water Quality Improvement Plan, the Copermittee(s) must implement the Water Quality Improvement Plan as accepted by the San Diego Water Board, and update the Water Quality Improvement Plan, as necessary, pursuant to Provision F.2.c;

(2) Upon a determination by either the Copermittees or the San Diego Water Board that discharges from the MS4 are causing or contributing to ~~a new~~ persistent indications of an exceedance of an applicable water quality standard not addressed by the Water Quality Improvement Plan, the Copermittees must submit the following updates to the Water Quality Improvement Plan pursuant to Provision F.2.c or as part of the Annual Report

[5] This does not apply to MS4 discharges which receive subsequent treatment to reduce pollutants in ~~storm water~~ discharges to the MEP prior to entering receiving waters (e.g., low flow diversions to the sanitary sewer). Runoff treatment must occur prior to the discharge of runoff into receiving waters per Finding 7.

required under Provision F.3.b, unless the San Diego Water Board directs an earlier submittal:

(a) The water quality improvement strategies being implemented that are effective and will continue to be implemented,

(b) Water quality improvement strategies (i.e. BMPs, retrofitting projects, stream and/or habitat rehabilitation or restoration projects, adjustments to jurisdictional runoff management programs, etc.) that will be implemented to reduce or eliminate any pollutants or conditions that are causing or contributing to the exceedance of water quality standards,

(c) For Copermittees who are implementing the Water Quality Improvement Plan compliance option pursuant to Provision B.3.a.(3), the updated Water Quality Improvement Plan must provide reasonable assurance the updated strategies will address the new exceedance(s),

~~(c)~~(d) Updates to the schedule for implementation of the existing and additional water quality improvement strategies, and

~~(d)~~(e) Updates to the monitoring and assessment program to track progress toward achieving compliance with Provisions A.1.a, A.1.c and A.2.a of this Order;

(3) The San Diego Water Board may require the incorporation of additional modifications to the Water Quality Improvement Plan required under Provision B. The applicable Copermittees must submit any modifications to the update to the Water Quality Improvement Plan within 90 days of notification that additional modifications are required by the San Diego Water Board, or as otherwise directed;

(4) Within 90 days of the San Diego Water Board determination that the update to the Water Quality Improvement Plan meets the requirements of this Order, the applicable Copermittees must revise the jurisdictional runoff management program documents to incorporate the updated water quality improvement strategies that have been and will be implemented, the implementation schedule, and any additional monitoring required; and

(5) Each Copermittee must implement the updated Water Quality Improvement Plan.

b. The procedure set forth above to achieve compliance with Provisions A.1.a, A.1.c and A.2.a of this Order do not have to be repeated for continuing or recurring exceedances of the same water quality standard(s) following implementation of scheduled actions unless directed to do otherwise by the San Diego Water Board.

~~c. Nothing in Provisions A.4.a and A.4.b prevents the San Diego Water Board from enforcing any provision of this Order while the applicable Copermittees prepare and implement the above update to the Water Quality Improvement Plan and jurisdictional runoff management programs.~~

B. WATER QUALITY IMPROVEMENT PLANS

The purpose of this provision is to develop Water Quality Improvement Plans that guide the Copermittees' jurisdictional runoff management programs towards achieving the outcome of improved water quality in MS4 discharges and receiving waters. The goal of the Water Quality Improvement Plans is to ~~protect, preserve, enhance~~1) effectively prohibit non-storm water discharges into the MS4s, 2) reduce pollutants in discharges from the MS4s to the MEP, and ~~restore the~~ 3) support the attainment and reasonable protection, preservation, and enhancement of water quality and designated beneficial uses of waters of the state. This goal will be accomplished through an adaptive planning and management process that identifies the highest priority water quality conditions within a watershed and implements strategies through the jurisdictional runoff management programs to achieve improvements in the quality of discharges from the MS4s and receiving waters. Therefore, implementation of the Water Quality Improvement Plans also provides the basis for complying with Provisions A.1, A.2 and A.3, as described in Provision B.3.a.(3).

1. Watershed Management Areas

The Copermittees must develop a Water Quality Improvement Plan for each of the Watershed Management Areas in Table B-1. A total of ten Water Quality Improvement Plans must be developed for the San Diego Region.

Development of the Water Quality Improvement Plan for the Santa Margarita River Watershed Management Area shall commence upon notification of coverage of the Riverside County Copermittees under this Order. Until this time, the County of San Diego shall use the water quality priorities in the Santa Margarita River Watershed Urban Runoff Management Plan, developed pursuant to Order No. R9-2007-0001, to guide implementation of Provisions D and E within its jurisdiction.

Table B-1. Watershed Management Areas

Hydrologic Unit(s)	Watershed Management Area	Major Surface Water Bodies	Responsible Copermittees
San Juan (901.00)	South Orange County	- Aliso Creek - San Juan Creek - San Mateo Creek - Pacific Ocean - Heisler Park ASBS	- City of Aliso Viejo[1] - City of Dana Point[1] - City of Laguna Beach[1] - City of Laguna Hills[1] - City of Laguna Niguel[1] - City of Laguna Woods[1] - City of Lake Forest[1] - City of Mission Viejo[1] - City of Rancho Santa Margarita[1] - City of San Clemente[1] - City of San Juan Capistrano[1] - County of Orange[1] - Orange County Flood Control District[1]

Table B-1. Watershed Management Areas

Hydrologic Unit(s)	Watershed Management Area	Major Surface Water Bodies	Responsible Copermittees
Santa Margarita (902.00)	Santa Margarita River	- Murrieta Creek - Temecula Creek - Santa Margarita River - Santa Margarita Lagoon - Pacific Ocean	- City of Murrieta[2] - City of Temecula[2] - City of Wildomar[2] - County of Riverside[2] - County of San Diego[3] - Riverside County Flood Control and Water Conservation District[2]
San Luis Rey (903.00)	San Luis Rey River	- San Luis Rey River - San Luis Rey Estuary - Pacific Ocean	- City of Oceanside - City of Vista - County of San Diego
Carlsbad (904.00)	Carlsbad	- Loma Alta Slough - Buena Vista Lagoon - Agua Hedionda Lagoon - Batiquitos Lagoon - San Elijo Lagoon - Pacific Ocean	- City of Carlsbad - City of Encinitas - City of Escondido - City of Oceanside - City of San Marcos - City of Solana Beach - City of Vista - County of San Diego
San Dieguito (905.00)	San Dieguito River	- San Dieguito River - San Dieguito Lagoon - Pacific Ocean	- City of Del Mar - City of Escondido - City of Poway - City of San Diego - City of Solana Beach - County of San Diego
Penasquitos (906.00)	Penasquitos	- Los Penasquitos Lagoon - Pacific Ocean	- City of Del Mar - City of Poway - City of San Diego - County of San Diego
	Mission Bay	- Mission Bay - Pacific Ocean - San Diego Marine Life Refuge ASBS	- City of San Diego
San Diego (907.00)	San Diego River	- San Diego River - Pacific Ocean	- City of El Cajon - City of La Mesa - City of San Diego - City of Santee - County of San Diego
Pueblo San Diego (908.00) Sweetwater (909.00) Otay (910.00)	San Diego Bay	- Sweetwater River - Otay River - San Diego Bay - Pacific Ocean	- City of Chula Vista - City of Coronado - City of Imperial Beach - City of La Mesa - City of Lemon Grove - City of National City - City of San Diego - County of San Diego - San Diego County Regional Airport Authority - San Diego Unified Port District
Tijuana (911.00)	Tijuana River	- Tijuana River - Tijuana Estuary - Pacific Ocean	- City of Imperial Beach - City of San Diego - County of San Diego

Notes:
1. The Orange County Copermittees will be covered under this Order after expiration of Order No. R9-2009-0002, or earlier if the Orange County Copermittees meet the conditions in Provision F.6.
2. The Riverside County Copermittees will be covered under this Order after expiration of Order No. R9-2010-0016, or earlier if the Riverside County Copermittees meet the conditions in Provision F.6.
3. The County of San Diego is required to implement the requirements of Provision B for its jurisdiction within the Santa

Margarita River Watershed Management Area until the Riverside County Copermittees have been notified of coverage under this Order.

2. Priority Water Quality Conditions

The Copermittees must identify the water quality priorities within each Watershed Management Area that will be addressed by the Water Quality Improvement Plan. Where appropriate, Watershed Management Areas may be separated into subwatersheds to focus water quality prioritization and jurisdictional runoff management program implementation efforts by receiving water.

a. Assessment of Receiving Water Conditions

The Copermittees must consider the following, at a minimum, to identify water quality priorities based on impacts of MS4 discharges on receiving water beneficial uses:

(1) Receiving waters listed as impaired on the CWA Section 303(d) List of Water Quality Limited Segments (303(d) List);

(2) TMDLs adopted and under development by the San Diego Water Board;

(3) Receiving waters recognized as sensitive or highly valued by the Copermittees, including estuaries designated under the National Estuary Program under CWA section 320, wetlands defined by the State or U.S. Fish and Wildlife Service's National Wetlands Inventory as wetlands, and receiving waters identified as ASBS subject to the provisions of Attachment B to State Water Board Resolution No. 2012-0012 (Attachment A);

(4) The receiving water limitations of Provision A.2;

(5) Known historical versus current physical, chemical, and biological water quality conditions;

(6) Available, relevant, and appropriately collected and analyzed physical, chemical, and biological receiving water monitoring data, including, but not limited to, data describing:

(a) Chemical constituents,

(b) Water quality parameters (i.e. pH, temperature, conductivity, etc.),

(c) Toxicity Identification Evaluations for both receiving water column and sediment,

(d) Trash impacts,

(e) Bioassessments, and

(f) Physical habitat;

(7) Available evidence of erosional impacts in receiving waters due to accelerated flows (i.e. hydromodification);

(8) Available evidence of adverse impacts to the chemical, physical, and biological integrity of receiving waters; and

(9) The potential improvements in the overall condition of the Watershed Management Area that can be achieved.

b. ASSESSMENT OF IMPACTS FROM MS4 DISCHARGES

The Copermittees must consider the following, at a minimum, to identify the potential impacts to receiving waters that may be caused or contributed to by discharges from the Copermittees' MS4s:

(1) The discharge prohibitions of Provision A.1 and effluent limitations of Provision A.3; and

(2) Available, relevant, and appropriately collected and analyzed storm water and non-storm water monitoring data from the Copermittees' MS4 outfalls;

(3) Locations of each Copermittee's MS4 outfalls that discharge to receiving waters;

(4) Locations of MS4 outfalls that are known to persistently discharge non-storm water to receiving waters likely causing or contributing to impacts on receiving water beneficial uses;

(5) Locations of MS4 outfalls that are known to discharge pollutants in storm water causing or contributing to impacts on receiving water beneficial uses; and

(6) The potential improvements in the quality of discharges from the MS4 that can be achieved.

c. IDENTIFICATION OF PRIORITY WATER QUALITY CONDITIONS

(1) The Copermittees must use the information gathered for Provisions B.2.a and B.2.b to develop a list of priority water quality conditions as pollutants, stressors and/or receiving water conditions that are the highest threat to receiving water quality or that most adversely affect the physical, chemical, and biological integrity of receiving waters. The list must include the following information for each priority water quality condition:

(a) The beneficial use(s) associated with the priority water quality condition;

(b) The geographic extent of the priority water quality condition within the Watershed Management Area, if known;

(c) The temporal extent of the priority water quality condition (e.g., dry weather and/or wet weather);

(d) The Copermittees with MS4s discharges that may cause or contribute to the priority water quality condition; and

(e) An assessment of the adequacy of and data gaps in the monitoring data to characterize the conditions causing or contributing to the priority water quality condition, including a consideration of spatial and temporal variation.

(2) The Copermittees must identify the highest priority water quality conditions to be addressed by the Water Quality Improvement Plan, and provide a rationale for selecting a subset of the water quality conditions identified pursuant to Provision B.2.c.(1) as the highest priorities.

d. IDENTIFICATION OF MS4 SOURCES OF POLLUTANTS AND/OR STRESSORS

The Copermittees must identify and prioritize known and suspected sources of storm water and non-storm water pollutants and/or other stressors associated with MS4 discharges that cause or contribute to the highest priority water quality conditions identified under Provision B.2.c. The identification of known and suspected sources of pollutants and/or stressors that cause or contribute to the highest priority water quality conditions as identified for Provision B.2.c must consider the following:

(1) Pollutant generating facilities, areas, and/or activities within the Watershed Management Area, including:

(a) Each Copermittee's inventory of construction sites, commercial facilities or areas, industrial facilities, municipal facilities, and residential areas,

(b) Publicly owned parks and/or recreational areas,

(c) Open space areas, and

(d) All currently operating or closed municipal landfills or other treatment, storage or disposal facilities for municipal waste~~, and~~.

~~(e) Areas not within the Copermittees' jurisdictions (e.g., Phase II MS4s, tribal lands, state lands, federal lands) that are known or suspected to be discharging to the Copermittees' MS4s;~~

(2) Locations of the Copermittees' MS4s, including the following:

(a) All MS4 outfalls that discharge to receiving waters, and

(b) Locations of major structural controls for storm water and non-storm water (e.g., retention basins, detention basins, major infiltration devices, etc.);

~~(3) Other known and suspected sources of non-storm water or pollutants in storm water discharges to receiving waters within the Watershed Management Area, including the following:~~

~~(a) Other MS4 outfalls (e.g., Phase II Municipal and Caltrans),~~

~~(b) Other NPDES permitted discharges,~~

~~(c) Any other discharges that may be considered point sources (e.g., private outfalls), and~~

~~(d) Any other discharges that may be considered non-point sources (e.g., agriculture, wildlife or other natural sources);~~

~~(4)~~(3) Review of available data, including but not limited to:

(a) Findings from the Copermittees' illicit discharge detection and elimination programs,

(b) Findings from the Copermittees' MS4 outfall discharge monitoring,

(c) Findings from the Copermittees' receiving water monitoring,

(d) Findings from the Copermittees' MS4 outfall discharge and receiving water assessments, and

(e) Other available, relevant, and appropriately collected data, information, or studies related to pollutant sources and/or stressors that contribute to the highest priority water quality conditions as identified for Provision B.2.c.

~~(5)~~(4) The adequacy of the available data to identify and prioritize sources and/or stressors associated with MS4 discharges that cause or contribute to the highest priority water quality conditions identified under Provision B.2.c.

e. NUMERIC GOALS AND SCHEDULES

The Copermittees must develop and incorporate interim and final numeric goals[6] and schedules into the Water Quality Improvement Plan. Numeric goals must be used to support Water Quality Improvement Plan implementation and measure progress towards addressing the highest priority water quality conditions identified under Provision B.2.c. Numeric goals are not enforceable compliance standards, effluent limitations, or receiving water limitations. When establishing numeric goals and corresponding schedules, the Copermittees must consider the following:

(1) Final numeric goals must be based on measureable criteria or indicators, to be achieved in the receiving waters and/or MS4 discharges for the highest priority water quality conditions which will be capable of demonstrating the achievement of the restoration and/or protection of water quality standards in receiving waters;[7]

(2) Interim numeric goals must be based on measureable criteria or indicators capable of demonstrating incremental progress toward achieving the final numeric goals in the receiving waters and/or MS4 discharges; and

(3) Schedules must be adequate for measuring progress toward achieving the interim and final numeric goals required for Provisions B.2.e.(1) and B.2.e.(2). Schedules must incorporate the following:

(a) Interim dates for achieving the interim numeric goals,

(b) Compliance schedules for any applicable TMDLs in Attachment E to this Order,

(c) Compliance schedules for any ASBS subject to the provisions of Attachment B to State Water Board Resolution No. 2012-0012 (see Attachment A),

(d) Achievement of the final numeric goals in the receiving waters and/or MS4 discharges for the highest water quality priorities must be as soon as possible, and

[6] Interim and final numeric goals may take a variety of forms such as TMDL established WQBELs, action levels, pollutant concentration, load reductions, number of impaired water bodies delisted from the List of Water Quality Impaired Segments, Index of Biotic Integrity (IBI) scores, or other appropriate metrics. Interim and final numeric goals are not necessarily limited to one criterion or indicator, but may include multiple criteria and/or indicators. Except for TMDL established WQBELs, interim and final numeric goals and corresponding schedules may be revised through the adaptive management process under Provision B.5.

[7] Achievement of final numeric goals within 10 years represents progress towards attainment of water quality standards, but is not a requirement to fully attain all applicable water quality standards or all priority receiving water conditions within 10 years.

(e) Final dates for achieving the final numeric goals must not initially extend more than 10 years beyond the effective date of this Order, unless a longer period of time is authorized by the San Diego Water Board Executive Officer or the schedule includes an applicable TMDL in Attachment E to this Order.

3. Water Quality Improvement Strategies and Schedules

The Copermittees must develop specific water quality improvement strategies to address the highest priority water quality conditions identified within a Watershed Management Area. The water quality improvement strategies must address the highest priority water quality conditions by ~~preventing or eliminating~~ effectively prohibiting non-storm water discharges to ~~and from~~ the MS4, reducing pollutants in ~~storm water~~ discharges from the MS4 to the MEP, and restoring and/or protecting the water quality standards of receiving waters.

a. Water Quality Improvement Strategies

The Copermittees must identify and prioritize water quality improvement strategies based on their likely effectiveness and efficiency, and implement strategies to effectively prohibit non-storm water discharges to the MS4, reduce pollutants in ~~storm water~~ discharges from the MS4 to the MEP, improve the physical, chemical, and biological receiving water conditions, and achieve the interim and final numeric goals in accordance with the schedules required for Provision B.2.e.(3). The following water quality improvement strategies must be included and described in the Water Quality Improvement Plan:

(1) Specific strategies and/or activities that may be implemented by one or more Copermittees within their jurisdictions through the jurisdictional runoff management programs that will address the highest priority water quality conditions within the Watershed Management Area, in accordance with the following requirements:

(a) Strategies and/or activities must, at a minimum, be described for each jurisdictional runoff management program component where strategies to address the highest priority water quality conditions are required under Provision E;

(b) The Water Quality Improvement Plan must describe the circumstances or conditions when and where the strategies or/activities should be or will be implemented, but specific details about how each Copermittee will implement the strategies and/or activities within its jurisdiction are not required; and

(c) Descriptions of strategies and/or activities must include any monitoring, information collection, special studies, and/or data analysis that is necessary to assess the effectiveness of the strategy and/or activity toward addressing the highest priority water quality conditions.

(2) Additional strategies and/or activities that may be implemented within the Watershed Management Area on a jurisdictional, sub-watershed, or watershed scale by one or more Copermittees, not specifically required under Provision E, which are designed to achieve the interim and final numeric goals identified in Provisions B.2.e.(1) and B.2.e.(2);

(3) Copermittees may elect to develop their Water Quality Improvement Plan to serve as an iterative, implementation-based compliance mechanism for the discharge prohibitions (A.1), receiving water limitations (A.2), and effluent limitations (A.3). To utilize the Water Quality Improvement Plan-based compliance option, Permittees shall conduct a Reasonable Assurance Analysis. The objective of the Reasonable Assurance Analysis shall be to demonstrate the strategies and activities of the Water Quality Improvement Plan will ultimately result in attainment of the discharge prohibitions (A.1), receiving water limitations (A.2), and effluent limitations (A.3).

In order for a Copermittee to utilize the Water Quality Improvement Plan-based compliance option, the Regional Board Executive Officer must determine the following conditions are met:

(a) The Copermittee requests that the Water Quality Improvement Plan be approved as the basis for compliance with the discharge prohibitions (A.1), receiving water limitations (A.2), and/or effluent limitations (A.3) in the letter of submittal to the San Diego Water Board as described in Provision F.1.(a); AND

(b) The submitted Water Quality Improvement Plan includes a Reasonable Assurance Analysis that demonstrates that the strategies and activities in the Water Quality Improvement Plan will attain the applicable discharge prohibitions (A.1), receiving water limitations (A.2), and/or effluent limitations (A.3); AND

(c) The submitted Water Quality Improvement Plan includes a schedule as outlined in Provision B.3.b that provides sufficient detail regarding the strategies and activities to be implemented to allow the Regional Board to use the schedule for compliance determination in a clear, specific, measurable, and enforceable manner.

If a Water Quality Improvement Plan-based compliance option is approved by the Regional Board Executive Officer, then in instances when the discharge prohibitions (A.1), receiving water limitations (A.2), and/or effluent limitations (A.3) are not met, the implementation of the strategies and activities contained in the Water Quality Improvement Plan will be used for determination of compliance with Provision A. That is, any determination of a

Copermittee's compliance with Provision A shall be based on the following conditions:

(a) The strategies and activities of the Water Quality Improvement Plan are implemented per the approved schedule outlined pursuant to Provision B.3.b and adapted pursuant to Provisions B.5, F.1, and F.2; AND

(b) If exceedances persist notwithstanding implementations of the strategies and activities in the approved Water Quality Improvement Plan, then Responsible Copermittees revise the Water Quality Improvement Plan pursuant to Provision A.4.a, and implement the revised Water Quality Improvement Plan including additional or alternative activities per the schedule submitted with the revised Water Quality Improvement Plan.

For cases when applicable discharge prohibitions (A.1), receiving water limitations (A.2), or effluent limitations (A.3) are not attained during the time period between a Copermittee's notification of intent to utilize a Water Quality Improvement Plan-based compliance option, pursuant to Provision F.1.(a), and Regional Board Executive Officer approval of the submitted Water Quality Improvement Plan, determination of a Copermittee's compliance with Provision A shall be based on the following conditions:

(a) All deadlines for development of a Water Quality Improvement Plan pursuant to Provision F.1.(a) and (b) are met; AND

(b) The Water Quality Improvement Plan ultimately receives final approval.

b. IMPLEMENTATION SCHEDULES

(1) The Copermittees must develop schedules for implementing the water quality improvement strategies identified under Provision B.3.a to achieve the interim and final numeric goals identified under Provision B.2.e.(1) and B.2.e.(2). Schedules must be developed for both the water quality improvement strategies implemented by each Copermittee within its jurisdiction and for strategies that the Copermittees choose to implement on a collaborative basis.

(2) The Copermittees must incorporate the implementation compliance schedules for any ASBS subject to the provisions of Attachment B to State Water Board Resolution No. 2012-0012 (see Attachment A).

4. Water Quality Improvement Monitoring and Assessment Program

a. The Copermittees in each Watershed Management Area must develop and incorporate an integrated monitoring and assessment program into the Water Quality Improvement Plan that assesses: 1) the progress toward achieving the numeric goals and schedules, 2) the progress toward addressing the highest priority water quality conditions for each Watershed Management Area, and 3) each Copermittee's overall efforts to implement the Water Quality Improvement Plan.

b. The monitoring and assessment program must incorporate the monitoring and assessment requirements of Provision D, which may allow the Copermittees to modify the program to be consistent with and focus on the highest priority water quality conditions for each Watershed Management Area.

c. For Watershed Management Areas with applicable TMDLs, the monitoring and assessment program must incorporate the specific monitoring and assessment requirements of Attachment E.

d. For Watershed Management Areas with any ASBS, the water quality monitoring and assessment program must incorporate the monitoring requirements of Attachment B to State Water Board Resolution No. 2012-0012 (see Attachment A).

5. Iterative Approach and Adaptive Management Process

The Copermittees in each Watershed Management Area must implement the iterative approach pursuant to Provision A.4 to adapt the Water Quality Improvement Plan, monitoring and assessment program, and jurisdictional runoff management programs to become more effective toward achieving compliance with Provisions A.1.a, A.1.c and A.2.a, and must include the following:

a. RE-EVALUATION OF PRIORITY WATER QUALITY CONDITIONS

The priority receiving water quality conditions, and numeric goals and corresponding schedules, included in the Water Quality Improvement Plan pursuant to Provisions B.2.c and B.2.e, may be re-evaluated by the Copermittees as needed during the term of this Order as part of the Annual Report. Re-evaluation and recommendations for modifications to the priority water quality conditions, and numeric goals and corresponding schedules must be provided in the Report of Waste Discharge, and must consider the following:

(1) Achieving the outcome of improved water quality in MS4 discharges and receiving waters through implementation of the water quality improvement strategies identified in the Water Quality Improvement Plan;

(2) Progress toward achieving interim and final numeric goals in receiving waters and/or MS4 discharges for the highest priority water quality conditions in the

Watershed Management Area,

(3) Progress toward achieving outcomes according to established schedules;

(4) New information developed when the requirements of Provisions B.2.a-c have been re-evaluated;

(5) New policies or regulations that may affect identified numeric goals;

(6) Spatial and temporal accuracy of monitoring data collected to inform prioritization of water quality conditions and implementation strategies to address the highest priority water quality conditions;

(7) Availability of new information and data from sources other than the jurisdictional runoff management programs within the Watershed Management Area that informs the effectiveness of the actions implemented by the Copermittees;

(8) San Diego Water Board recommendations; and

(9) Recommendations for modifications solicited through a public participation process.

b. ADAPTATION OF STRATEGIES AND SCHEDULES

The water quality improvement strategies and schedules, included in the Water Quality Improvement Plan pursuant to Provisions B.3, must be re-evaluated and adapted as new information becomes available to result in more effective and efficient measures to achieve the numeric goals established pursuant to Provision B.2.e. Re-evaluation of and modifications to the water quality improvement strategies must be provided in the Annual Report, and must consider the following:

(1) Modifications to the priority water quality conditions, and numeric goals and corresponding schedules based on Provision B.5.a;

(2) Measurable or demonstrable reductions of non-storm water discharges to ~~and from~~ each Copermittee's MS4;

(3) Measurable or demonstrable reductions of pollutants in ~~storm water~~ discharges from each Copermittee's MS4 to the MEP;

(4) New information developed when the requirements of Provisions B.2.b and B.2.d have been re-evaluated;

(5) Efficiency in implementing the Water Quality Improvement Plan;

(6) San Diego Water Board recommendations; and

(7) Recommendations for modifications solicited through a public participation process.

c. ADAPTATION OF MONITORING AND ASSESSMENT PROGRAM

The water quality improvement monitoring and assessment program, included in the Water Quality Improvement Plan pursuant to Provisions B.4, must be re-evaluated and adapted when new information becomes available. Re-evaluation and recommendations for modifications to the monitoring and assessment program, pursuant to the requirements of Provision D, may be provided in the Annual Report, but must be provided in the Report of Waste Discharge.

6. Water Quality Improvement Plan Submittal, Updates, and Implementation

a. The Copermittees must submit the Water Quality Improvement Plans in accordance with the requirements of Provision F.1.

b. The Copermittees must submit proposed updates to the Water Quality Improvement Plan for acceptance by the San Diego Water Board Executive Officer in accordance with the requirements of Provision F.2.c.

c. The Copermittees must commence with implementation of the Water Quality Improvement Plans immediately after acceptance by the San Diego Water Board, in accordance with the schedules, or subsequently updated schedules, within the Water Quality Improvement Plan.

C. ACTION LEVELS

The purpose of this provision is for the Copermittees to incorporate numeric action levels in the Water Quality Improvement Plans. The goal of the action levels is to guide Water Quality Improvement Plan implementation efforts and measure progress towards the protection of water quality and designated beneficial uses of waters of the state from adverse impacts caused or contributed to by MS4 discharges. This goal will be accomplished through monitoring and assessing the quality of the MS4 discharges during the implementation of the Water Quality Improvement Plans.

1. Non-Storm Water Action Levels[8]

The Copermittees must develop and incorporate numeric non-storm water action levels (NALs) into the Water Quality Improvement Plan to: 1) support the development and prioritization of water quality improvement strategies for addressing non-storm water discharges to and from the MS4s, 2) assess the effectiveness of the water quality improvement strategies toward addressing MS4 non-storm water discharges, required pursuant to Provision D.4.b.(1), and 3) support the detection and elimination of non-storm water and illicit discharges to and from the MS4, required pursuant to Provision E.2.[9]

a. The following NALs must be incorporated if the Copermittees do not establish numeric action levels within the Water Quality Improvement Plan based on watershed priorities:

(1) Non-Storm Water Discharges from MS4s to Ocean Surf Zone

Table C-1. Non-Storm Water Action Levels for Discharges from MS4s to Ocean Surf Zone

Parameter	Units	AMAL	MDAL	Instantaneous Maximum	Basis
Total Coliform	MPN/100 ml	1,000	-	10,000/1,000[1]	OP
Fecal Coliform	MPN/100 ml	200[2]	-	400	OP
Enterococci	MPN/100 ml	35	-	104[3]	OP

Abbreviations/Acronyms
AMAL – average monthly action level
MDAL – maximum daily action level
OP – Ocean Plan water quality objective
MPN/100 ml – most probable number per 100 milliliters

Notes:
1. Total coliform density NAL is 1,000 MPN/100 ml when the fecal/total coliform ratio exceeds 0.1.
2. Fecal coliform density NAL is 200 MPN per 100 ml during any 30 day period.
3. This value has been set to the Basin Plan water quality objective for saltwater “designated beach areas.”

[8] NALs are not considered ~~by the San Diego Water Board~~ to be enforceable limitations.
[9] The Copermittees may utilize NALs or other benchmarks currently established by the Copermittees as interim NALs until the Water Quality Improvement Plans are accepted by the San Diego Water Board Executive Officer.

(2) Non-Storm Water Discharges from MS4s to Bays, Harbors, and Lagoons/Estuaries

Table C-2. Non-Storm Water Action Levels for Discharges from MS4s to Bays, Harbors, and Lagoons/Estuaries

Parameter	Units	AMAL	MDAL	Instantaneous Maximum	Basis
Turbidity	NTU	75	-	225	OP
pH	Units	Within limit of 6.0 to 9.0 at all times			OP
Fecal Coliform	MPN/100 ml	200[1]	-	400[2]	BP
Enterococci	MPN/100 ml	35	-	104[3]	BP
Priority Pollutants	ug/L	See Table C-3			

Abbreviations/Acronyms:
AMAL – average monthly action level
MDAL – maximum daily action level
OP – Ocean Plan water quality objective
BP – Basin Plan water quality objective
NTU – Nephelometric Turbidity Units
MPN/100 ml – most probable number per 100 milliliters
ug/L – micrograms per liter

Notes:
1. Based on a minimum of not less than five samples for any 30-day period.
2. The NAL is reached if more than 10 percent of total samples exceed 400 MPN per 100 ml during any 30 day period.
3. This value has been set to the Basin Plan water quality objective for saltwater "designated beach areas" and is not applicable to waterbodies that are not designated with the water contact recreation (REC-1) beneficial use.

Table C-3. Non-Storm Water Action Levels for Priority Pollutants

Parameter	Units	Freshwater (CTR)		Saltwater (CTR)	
		MDAL	AMAL	MDAL	AMAL
Cadmium	ug/L	**	**	16	8
Copper	ug/L	*	*	5.8	2.9
Chromium III	ug/L	**	**	-	-
Chromium VI	ug/L	16	8.1	83	41
Lead	ug/L	*	*	14	2.9
Nickel	ug/L	**	**	14	6.8
Silver	ug/L	*	*	2.2	1.1
Zinc	ug/L	*	*	95	47

Abbreviations/Acronyms:
CTR – California Toxic Rule
ug/L – micrograms per liter
AMAL – average monthly action level
MDAL – maximum daily action level

Notes:
* Action levels developed on a case-by-case basis (see below)
** Action levels developed on a case-by-case basis (see below), but calculated criteria are not to exceed Maximum Contaminant Levels (MCLs) under the California Code of Regulations, Title 22, Division 4, Chapter 15, Article 4, Section 64431

The Cadmium, Copper, Chromium (III), Lead, Nickel, Silver and Zinc NALs for MS4 discharges to freshwater receiving waters will be developed on a case-by-case basis because the freshwater criteria are based on site-specific water quality data (receiving water hardness). For these priority pollutants, refer to ~~the following equations (~~40 CFR 131.38.b.2~~) will be required~~ for details:

~~Cadmium (Total Recoverable) = exp(0.7852[ln(hardness)] - 2.715)~~
~~Chromium III (Total Recoverable) = exp(0.8190[ln(hardness)] + 0.6848)~~
~~Copper (Total Recoverable) = exp(0.8545[ln(hardness)] - 1.702)~~
~~Lead (Total Recoverable) = exp(1.273[ln(hardness)] - 4.705)~~
~~Nickel (Total Recoverable) = exp(.8460[ln(hardness)] + 0.0584)~~
~~Silver (Total Recoverable) = exp(1.72[ln(hardness)] - 6.52)~~
~~Zinc (Total Recoverable) = exp(0.8473[ln(hardness)] + 0.884)~~

(3) Non-Storm Water Discharges from MS4s to Inland Surface Waters

Table C-4. Non-Storm Water Action Levels for Discharges from MS4s to Inland Surface Waters

Parameter	Units	AMAL	MDAL	Instantaneous Maximum	Basis
Dissolved Oxygen	mg/L	Not less than 5.0 in WARM waters and not less than 6.0 in COLD waters			BP
Turbidity	NTU	-	20	See MDAL	BP
pH	Units	Within limit of 6.5 to 8.5 at all times			BP
Fecal Coliform	MPN/100 ml	200[1]	-	400[2]	BP
Enterococci	MPN/100 ml	33	-	61[3]	BP
Total Nitrogen	mg/L	-	1.0	See MDAL	BP
Total Phosphorus	mg/L	-	0.1	See MDAL	BP
MBAS	mg/L	-	0.5	See MDAL	BP
Iron	mg/L	-	0.3	See MDAL	BP
Manganese	mg/L	-	0.05	See MDAL	BP
Priority Pollutants	ug/L	See Table C-3			

Abbreviations/Acronyms:
AMAL – average monthly action level
BP – Basin Plan water quality objective
COLD – cold freshwater habitat beneficial use
NTU – Nephelometric Turbidity Units
mg/L – milligrams per liter
MDAL – maximum daily action level
WARM – warm freshwater habitat beneficial use
MBAS – Methylene Blue Active Substances
MPN/100 ml – most probable number per 100 milliliters
ug/L – micrograms per liter

Notes:
1. Based on a minimum of not less than five samples for any 30-day period.
2. The NAL is reached if more than 10 percent of total samples exceed 400 MPN per 100 ml during any 30 day period.
3. This value has been set to the Basin Plan water quality objective for freshwater "designated beach areas" and is not applicable to waterbodies that are not designated with the water contact recreation (REC-1) beneficial use.

b. ~~If not identified in Provision C.1.a,~~ NALs must be identified, developed and incorporated in the Water Quality Improvement Plan for any pollutants or waste constituents that cause or contribute, or are threatening to cause or contribute to a condition of pollution or nuisance in waters of the state associated with the highest priority water quality conditions related to non-storm water discharges from the MS4s. NALs must be based on:

(1) Applicable water quality standards which may be dependent upon site-specific or receiving water-specific conditions or assumptions to be identified by the Copermittees; or

(2) Applicable numeric WQBELs required to meet the WLAs established for the TMDLs in Attachment E to this Order.

c. For the NALs incorporated into the Water Quality Improvement Plan, the Copermittees may develop and incorporate secondary NALs specific to the Watershed Management Area at levels greater than the NALs required by Provisions C.1.a and C.1.b which can be utilized to further refine the prioritization and assessment of water quality improvement strategies for addressing non-storm water discharges to and from the MS4s, as well as the detection and elimination of non-storm water and illicit discharges to and from the MS4. The secondary NALs may be developed using an approach acceptable to the San Diego Water Board.

d. Dry weather monitoring data from MS4 outfalls collected in accordance with Provision D.2.b may be utilized to develop or revise NALs based on watershed-specific data, subject to San Diego Water Board Executive Officer approval.

2. Storm Water Action Levels[10]

The Copermittees must develop and incorporate numeric storm water action levels (SALs) in the Water Quality Improvement Plans to: 1) support the development and prioritization of water quality improvement strategies for reducing pollutants in storm water discharges from the MS4s, and 2) assess the effectiveness of the water quality improvement strategies toward reducing pollutants in storm water discharges, required pursuant to Provision D.4.b.(2).[11]

a. The following SALs for discharges of storm water from the MS4 must be incorporated if the Copermittees do not establish numeric action levels within the Water Quality Improvement Plan based on watershed priorities:

Table C-5. Storm Water Action Levels for Discharges from MS4s to Receiving Waters

Parameter	Units	Action Level
Turbidity	NTU	126
Nitrate & Nitrite (Total)	mg/L	2.6
Phosphorus (Total P)	mg/L	1.46
Cadmium (Total Cd)*	µg/L	3.0
Copper (Total Cu)*	µg/L	127
Lead (Total Pb)*	µg/L	250
Zinc (Total Zn)*	µg/L	976

Abbreviations/Acronyms:
NTU – Nephelometric Turbidity Units
mg/L – milligrams per liter
ug/L – micrograms per liter

Notes:
* The sampling must include a measure of receiving water hardness at each MS4 outfall. If a total metal concentration exceeds the corresponding metals SAL in Table C-5, that concentration must be compared to the California Toxics Rule criteria and the USEPA 1-hour maximum concentration for the detected level of receiving water hardness associated with that sample. If it is determined that the sample's total metal concentration for that specific metal exceeds that SAL, but does not exceed the applicable USEPA 1-hour maximum concentration criterion for the measured level of hardness, then the sample result will not be considered above the SAL for that measurement.

b. ~~If not identified in Provision C.2.a,~~ SALs must be identified, developed and incorporated in the Water Quality Improvement Plan for pollutants or waste

[10] SALs are not considered ~~by the San Diego Water Board~~ to be enforceable limitations.
[11] The Copermittees may utilize SALs or other benchmarks currently established by the Copermittees as interim SALs until the Water Quality Improvement Plans are accepted by the San Diego Water Board Executive Officer.

constituents that cause or contribute, or are threatening to cause or contribute to a condition of pollution or nuisance in waters of the state associated with the highest water quality priorities related to storm water discharges from the MS4s. SALs must be based on:

(1) Federal and State water quality guidance and/or water quality standards; and

(2) Site-specific or receiving water-specific conditions; or

(3) Applicable numeric WQBELs required to meet the WLAs established for the TMDLs in Attachment E to this Order.

c. For the SALs incorporated into the Water Quality Improvement Plan, the Copermittees may develop and incorporate secondary SALs specific to the Watershed Management Area at levels greater than the SALs required by Provisions C.2.a and C.2.b which can be utilized to further refine the prioritization and assessment of water quality improvement strategies for reducing pollutants in storm water discharges from the MS4s. The secondary SALs may be developed based on the approaches recommended by the State Water Board's Storm Water Panel[12] or using an approach acceptable to the San Diego Water Board.

d. Wet weather monitoring data from MS4 outfalls collected in accordance with Provision D.2.c may be used to develop or revise SALs based upon watershed-specific data, subject to San Diego Water Board Executive Officer approval.

[12] Storm Water Panel Recommendations to the California State Water Resources Control Board: The Feasibility of Numeric Effluent Limits Applicable to Discharges of Storm Water Associated with Municipal, Industrial and Construction Activities (June 2006)

D. MONITORING AND ASSESSMENT PROGRAM REQUIREMENTS

The purpose of this provision is for the Copermittees to monitor and assess the impact on the chemical, physical, and biological conditions of receiving waters caused by discharges from the Copermittees' MS4s under wet weather and dry weather conditions. The goal of the monitoring and assessment program is to inform the Copermittees about the nexus between the health of receiving waters and the water quality condition of the discharges from their MS4s. This goal will be accomplished through monitoring and assessing the conditions of the receiving waters, discharges from the MS4s, pollutant sources and/or stressors, and effectiveness of the water quality improvement strategies implemented as part of the Water Quality Improvement Plans.

1. Receiving Water Monitoring Requirements

The Copermittees must develop and conduct a program to monitor the condition of the receiving waters in each Watershed Management Area during dry weather and wet weather. Following acceptance of the Water Quality Improvement Plans and schedule for implementation of monitoring for each Watershed Management Area, the Copermittees must conduct long-term receiving water monitoring during implementation of the Water Quality Improvement Plan to assess the long term trends and determine if conditions in receiving waters are improving. Any available monitoring data not collected specifically for this Order that meet the quality assurance criteria of the Copermittees and the monitoring requirements of this Order may be utilized by the Copermittees. The Copermittees must conduct the following receiving water monitoring procedures:

a. TRANSITIONAL RECEIVING WATER MONITORING

Until the monitoring requirements and implementation schedule for monitoring of Provisions D.1.b-e are incorporated into a Water Quality Improvement Plan that is accepted by the San Diego Water Board pursuant to Provision F.1, the Copermittees must conduct the following receiving water monitoring in the Watershed Management Area:

(1) Continue the receiving water monitoring programs required in Order Nos. R9-2007-0001 (Attachment A, Section II. A. 1-5), R9-2009-0002, and R9-2010-0016;

(2) Continue the monitoring in the Hydromodification Management Plans approved by the San Diego Water Board;

(3) Participate in the following regional receiving water monitoring programs, as applicable to the Watershed Management Area:

(a) Storm Water Monitoring Coalition Regional Monitoring,

(b) Southern California Bight Regional Monitoring, and

(c) Sediment Quality Monitoring;

(4) Implement the monitoring programs developed as part of any implementation plans or load reduction plans (e.g. Bacteria Load Reduction Plans, Comprehensive Load Reduction Plans) for the TMDLs in Attachment E to this Order; and

(5) For Watershed Management Areas with ASBS, implement the monitoring requirements of Attachment B to State Water Board Resolution No. 2012-0012, included in Attachment A to this Order.

b. LONG-TERM RECEIVING WATER MONITORING STATIONS

The Copermittees must select at least one long-term receiving water monitoring station from among the existing mass loading stations, temporary watershed assessment stations, bioassessment stations, and stream assessment stations previously established by the Copermittees to be representative of the receiving water quality in the Watershed Management Area. Additional long-term receiving water monitoring stations must be selected where necessary to support the implementation and adaptation of the Water Quality Improvement Plan.

c. DRY WEATHER RECEIVING WATER MONITORING

During the term of the Order, the Copermittees must perform monitoring during at least three dry weather monitoring events at each of the long-term receiving water monitoring stations. At least one monitoring event must be conducted during the dry season (May 1 – September 30) and at least one monitoring event must be conducted during a dry weather period during the wet season (October 1 – April 30), after the first wet weather event of the season, with an antecedent dry period of at least 72 hours following a storm event producing measureable rainfall of greater than 0.1 inch.

(1) Dry Weather Receiving Water Field Observations

For each dry weather monitoring event, the Copermittees must record field observations consistent with Table D-1 at each long-term receiving water monitoring station.

Table D-1. Field Observations for Receiving Water Monitoring Stations

Field Observations

• Station identification and location
• Presence of flow, or pooled or ponded water
• If flow is present:
  - Flow estimation (i.e. width of water surface, approximate depth of water, approximate flow velocity, flow rate)
  - Flow characteristics (i.e. presence of floatables, surface scum, sheens, odor, color)
• If pooled or ponded water is present:
  - Characteristics of pooled or ponded water (i.e. presence of floatables, surface scum, sheens, odor, color)
• Station description (i.e. deposits or stains, vegetation condition, structural condition, and observable biology)
• Presence and assessment of trash in and around station

(2) Dry Weather Receiving Water Field Monitoring

For each dry weather monitoring event, if conditions allow the collection of the data, the Copermittees must monitor and record the parameters in Table D-2 at each long-term receiving water monitoring station.

Table D-2. Field Monitoring Parameters for Receiving Water Monitoring Stations

Parameters
• pH • Temperature • Specific conductivity • Dissolved oxygen • Turbidity

(3) Dry Weather Receiving Water Analytical Monitoring

For each dry weather monitoring event, the Copermittees must collect and analyze samples from each long-term receiving water monitoring station as follows:

(a) Analytes that are field measured are not required to be analyzed by a laboratory;

(b) The Copermittees must implement consistent sample collection methods for regional comparability of data, unless site-specific conditions indicate the need for alternate methods;

(c) Grab samples may be collected for pH, temperature, specific conductivity, dissolved oxygen, turbidity, hardness, and indicator bacteria;

(d) For all other constituents, composite samples must be collected for a duration adequate to be representative of changes in pollutant concentrations and runoff flows using one of the following techniques:

(i) Time-weighted composites composed of 24 discrete hourly samples, which may be collected through the use of automated equipment, or

(ii) Flow-weighted composites collected over a typical 24-hour period, which may be collected through the use of automated equipment;

(e) Only one analysis of the composite of aliquots is required;

(f) Analysis for the following constituents is required:

(i) Constituents contributing to the highest priority water quality conditions identified in the Water Quality Improvement Plan,

(ii) Constituents listed as a cause for impairment of receiving waters in the Watershed Management Area listed on the CWA section 303(d) List,

(iii) Constituents for implementation plans or load reduction plans (e.g. Bacteria Load Reduction Plans, Comprehensive Load Reduction Plans) developed for watersheds where the Copermittees are listed responsible parties under the TMDLs in Attachment E to this Order,

(iv) Applicable NAL constituents, and

(v) Constituents listed in Table D-3.

Table D-3. Analytical Monitoring Constituents for Receiving Water Monitoring Stations

Conventionals, Nutrients	Metals (Total and Dissolved)	Pesticides	Indicator Bacteria
• Total Dissolved Solids • Total Suspended Solids • Turbidity • Total Hardness • Total Organic Carbon • Dissolved Organic Carbon • Sulfate • Methylene Blue Active Substances (MBAS) • Total Phosphorus • Orthophosphate • Nitrite[1] • Nitrate[1] • Total Kjeldhal Nitrogen • Ammonia	• Arsenic • Cadmium • Chromium • Copper • Iron • Lead • Mercury • Nickel • Selenium • Thallium • Zinc	• Organophosphate Pesticides • Pyrethroid Pesticides	• Total Coliform • Fecal Coliform[2] • *Enterococcus*

Notes:
1. Nitrite and nitrate may be combined and reported as nitrite+nitrate.
2. *E. Coli* may be substituted for Fecal Coliform.

(4) Dry Weather Receiving Water Toxicity Monitoring

For each dry weather monitoring event, the Copermittees must collect grab or composite samples from each long-term receiving water monitoring station to be analyzed for toxicity in accordance with Table D-4:

Table D-4. Dry Weather Toxicity Testing for Receiving Water Monitoring Stations

Freshwater Organism	Test Approach	USEPA Protocol[2]
Pimephales promelas	1 acute 1 chronic[1]	EPA-821-R-02-012
Hyalella Azteca	1 acute 1 chronic[1]	EPA-821-R-02-012
Psuedokirchneriella subcapitata	1 acute 1 chronic[1]	EPA-821-R-02-013

Notes:
1. Chronic toxicity testing is not required at receiving water monitoring stations located at mass loading stations if the channel flows are diverted year-round during dry weather conditions to the sanitary sewer for treatment.
2. USEPA protocols must be utilized for toxicity testing unless alternate toxicity testing protocols have been approved by the San Diego Water Board.

(5) Dry Weather Receiving Water Bioassessment Monitoring

Bioassessment monitoring for each long-term receiving water monitoring station is required at least once during the term of this Order. The Copermittees must conduct bioassessment monitoring during at least one dry weather monitoring event at each long-term receiving water monitoring station as follows:

(a) The following bioassessment samples and measurements must be collected:

(i) Macroinvertebrate samples must be collected in accordance with the "Reachwide Benthos (Multihabitat) Procedure" in the most current Surface Water Ambient Monitoring Program (SWAMP) Bioassessment Standard Operating Procedures (SOP), and amendments, as applicable;[13]

(ii) The "Full" suite of physical habitat characterization measurements must be collected in accordance with the most current SWAMP Bioassessment SOP, and as summarized in the SWAMP Stream Habitat Characterization Form – Full Version;[14] and

(iii) Freshwater algae samples must be collected in accordance with the SWAMP Standard Operating Procedures for Collecting Algae

[13] Ode, P.R.. 2007. Standard operating procedures for collecting macroinvertebrate samples and associated physical and chemical data for ambient bioassessments in California. California State Water Resources Control Board Surface Water Ambient Monitoring Program (SWAMP) Bioassessment SOP 001. http://www.swrcb.ca.gov/water_issues/programs/swamp/tools.shtml#monitoring
[14] Available at:
http://www.waterboards.ca.gov/water_issues/programs/swamp/docs/reports/fieldforms_fullversion052908.pdf

Samples.[15] Analysis of samples must include algal taxonomic composition (diatoms and soft algae) and algal biomass.

(b) The bioassessment samples, measurements, and appropriate water chemistry data must be used to calculate the following:

(i) An Index of Biological Integrity (IBI) for macroinvertebrates for each monitoring station where bioassessment monitoring was conducted, based on the most current calculation method;[16] and

(ii) An IBI for algae for each monitoring station where bioassessment monitoring was conducted, when a calculation method is developed.[17]

(c) In lieu of the requirements of Provision D.1.c.(5)(a), the Copermittees may conduct the bioassessment monitoring in accordance with the "Triad" assessment approach[18] to calculate the IBIs required for Provision D.1.c.(5)(b). The Copermittees must conduct sampling, analysis, and reporting of specified in-stream biological and habitat data according to the protocols specified in the SCCWRP Technical Report No. 539, or subsequent protocols, if developed.

(6) Dry Weather Receiving Water Hydromodification Monitoring

In addition to the hydromodification monitoring conducted as part of the Copermittees' Hydromodification Management Plans, hydromodification monitoring for each long-term receiving water monitoring station is required at least once during the term of this Order. The Copermittees must collect the following hydromodification monitoring observations and measurements within an appropriate domain of analysis during at least one dry weather monitoring event for each long-term receiving water monitoring station:

(a) Channel conditions, including:

(i) Channel dimensions,

[15] Fetscher et al. 2009. Standard Operating Procedures for Collecting Stream Algae Samples and Associated Physical Habitat and Chemical Data for Ambient Bioassessments in California.
[16] The most current calculation method at the time the Order was adopted is outlined in "A Quantitative Tool for Assessing the Integrity of Southern California Coastal Streams" (Ode, et al. 2005. Environmental Management. Vol. 35, No. 1, pp. 1-13). If an updated or new calculation method is developed, either both (i.e. current and updated/new) methods must be used, or historical IBIs must be recalculated with the updated or new calculation method.
[17] When a calculation method is developed, IBIs must be calculated for all available and appropriate historical data.
[18] Stormwater Monitoring Coalition Model Monitoring Technical Committee, 2004. Model Monitoring Program for Municipal Separate Storm Sewer Systems in Southern California. Technical Report #419. August 2004.

(ii) Hydrologic and geomorphic conditions, and

(iii) Presence and condition of vegetation and habitat;

(b) Location of discharge points;

(c) Habitat integrity;

(d) Photo documentation of existing erosion and habitat impacts, with location (i.e. latitude and longitude coordinates) where photos were taken;

(e) Measurement or estimate of dimensions of any existing channel bed or bank eroded areas, including length, width, and depth of any incisions; and

(f) Known or suspected cause(s) of existing downstream erosion or habitat impact, including flow, soil, slope, and vegetation conditions, as well as upstream land uses and contributing new and existing development.

d. WET WEATHER RECEIVING WATER MONITORING

During the term of the Order, the Copermittees must perform monitoring during at least three wet weather monitoring events at each long-term receiving water monitoring station. At least one wet weather monitoring event must be conducted during the first wet weather event of the wet season (October 1 – April 30), and at least one wet weather monitoring event during a wet weather event that occurs after February 1.

(1) Wet Weather Receiving Water Field Observations

For each wet weather monitoring event, the following narrative descriptions and observations must be recorded at each long-term receiving water monitoring station:

(a) A narrative description of the station that includes the location, date and duration of the storm event(s) sampled, rainfall estimates of the storm event, and the duration between the storm event sampled and the end of the previous measurable (greater than 0.1 inch rainfall) storm event;

(b) The flow rates and volumes measured or estimated (data from nearby USGS gauging stations may be utilized, or flow rates may be measured or estimated in accordance with the USEPA Storm Water Sampling Guidance Document (EPA-833-B-92-001), section 3.2.1, or other method proposed by the Copermittees that is acceptable to the San Diego Water Board);

(c) Station condition (i.e. deposits or stains, vegetation condition, structural condition, observable biology); and

(d) Presence and assessment of trash in and around station.

(2) Wet Weather Receiving Water Field Monitoring

For each wet weather monitoring event, the Copermittees must monitor and record the parameters in Table D-2 at each long-term receiving water monitoring station.

(3) Wet Weather Receiving Water Analytical Monitoring

For each wet weather monitoring event, the Copermittees must collect and analyze samples from each long-term receiving water monitoring station as follows:

(a) Analytes that are field measured are not required to be analyzed by a laboratory;

(b) The Copermittees must implement consistent sample collection methods for regional comparability of data, unless site-specific conditions indicate the need for alternate methods;

(c) Grab samples may be collected for pH, temperature, specific conductivity, dissolved oxygen, turbidity, hardness, and indicator bacteria;

(d) For all other constituents, composite samples must be collected for a duration adequate to be representative of changes in pollutant concentrations and runoff flows using one of the following techniques:

(i) Time-weighted composites composed of 24 discrete hourly samples, which may be collected through the use of automated equipment, or

(ii) Flow-weighted composites collected over the length of the storm event or a typical 24-hour period, which may be collected through the use of automated equipment;

(e) Only one analysis of the composite of aliquots is required;

(f) Analysis for the following constituents is required:

(i) Constituents contributing to the highest priority water quality conditions identified in the Water Quality Improvement Plan,

(ii) Constituents listed as a cause for impairment of receiving waters in the Watershed Management Area listed on the CWA section 303(d) List,

(iii) Constituents for implementation plans or load reduction plans (e.g. Bacteria Load Reduction Plans, Comprehensive Load Reduction Plans) developed for watersheds where the Copermittees are listed responsible parties under the TMDLs in Attachment E to this Order,

(iv) Applicable SAL constituents, and

(v) Constituents listed in Table D-3.

(4) Wet Weather Receiving Water Toxicity Monitoring

For each wet weather monitoring event, the Copermittees must collect grab or composite samples from each long-term receiving water monitoring station to be analyzed for toxicity in accordance with Table D-5:

Table D-5. Wet Weather Toxicity Testing for Receiving Water Monitoring Stations

Freshwater Organism	Test Approach	USEPA Protocol[1]
Pimephales promelas	1 acute	EPA-821-R-02-012
Hyalella Azteca	1 acute	EPA-821-R-02-012
Psuedokirchneriella subcapitata	1 acute	EPA-821-R-02-013

Notes:
1. USEPA protocols must be utilized for toxicity testing unless alternate toxicity testing protocols have been approved by the San Diego Water Board.

e. OTHER RECEIVING WATER MONITORING REQUIREMENTS

(1) Regional Monitoring

The Copermittees must participate in the following regional receiving waters monitoring programs, as applicable to the Watershed Management Area:

(a) Storm Water Monitoring Coalition Regional Monitoring; and

(b) Southern California Bight Regional Monitoring.

(2) Sediment Quality Monitoring

The Copermittees must perform sediment monitoring to assess compliance with sediment quality receiving water limits applicable to MS4 discharges to enclosed bays and estuaries. The monitoring may be performed either by individual or multiple Copermittees to assess compliance with receiving water limits, or through participation in a water body monitoring coalition. The Copermittees must identify sediment sampling stations that are spatially representative of the sediment within the water body segment or region of interest. Sediment quality monitoring must be conducted in conformance with the monitoring requirements set forth in the State Water Board Sediment Quality Control Plan.

(3) ASBS Monitoring

For Watershed Management Areas with ASBS, the Copermittees must implement the monitoring requirements of Attachment B to State Water Board Resolution No. 2012-0012, included in Attachment A to this Order.

f. ALTERNATIVE WATERSHED MONITORING REQUIREMENTS

The San Diego Water Board may direct the Copermittees to participate in an effort to develop alternative watershed monitoring with other regulated entities, other interested parties, and the San Diego Water Board to refine, coordinate, and implement regional monitoring and assessment programs to determine the status and trends of water quality conditions in 1) coastal waters, 2) enclosed bays, harbors, estuaries, and lagoons, and 3) streams.

2. MS4 Outfall Discharge Monitoring Requirements

The Copermittees must develop and conduct a program to monitor the discharges from the MS4 outfalls in each Watershed Management Area during dry weather and wet weather. Following acceptance of the Water Quality Improvement Plans and schedule for implementation of monitoring for each Watershed Management Area, the Copermittees must conduct MS4 outfall discharge monitoring during implementation of the Water Quality Improvement Plan to assess the effectiveness of their jurisdictional runoff management programs toward effectively prohibiting non-storm water discharges and reducing pollutants in storm water discharges to and from their MS4s. Any available monitoring data not collected specifically for this Order that meet the quality assurance criteria of the Copermittees and the monitoring requirements of this Order may be utilized by the Copermittees. The Copermittees must conduct the following MS4 outfall monitoring procedures:

a. TRANSITIONAL MS4 OUTFALL DISCHARGE MONITORING

Until the monitoring requirements of Provisions D.2.b-c are incorporated into a Water Quality Improvement Plan and schedule for implementation of monitoring that is accepted by the San Diego Water Board pursuant to Provision F.1, the Copermittees must conduct the following MS4 outfall discharge monitoring in the Watershed Management Area:

(1) MS4 Outfall Discharge Monitoring Station Inventory

Each Copermittee must identify all major MS4 outfalls that discharge directly to receiving waters within its jurisdiction and geo-locate those outfalls on a map of the MS4 pursuant to Provision E.2.b.(1). This information must be compiled into a MS4 outfall discharge monitoring station inventory, and must include the following information:

(a) Latitude and longitude of MS4 outfall point of discharge;

(b) Watershed Management Area;

(c) Hydrologic subarea;

(d) Outlet size;

(e) Accessibility (i.e. safety and without disturbance of critical habitat);

(f) Approximate drainage area; and

(g) Classification of whether the MS4 outfall is known to have persistent dry weather flows, transient dry weather flows, no dry weather flows, or unknown dry weather flows.

(2) Transitional Dry Weather MS4 Outfall Discharge Field Screening Monitoring

Until the monitoring requirements and the monitoring implementation schedule described in ~~of~~ Provision D.2.b are incorporated into a Water Quality Improvement Plan that is accepted by the San Diego Water Board pursuant to Provision F.1, each Copermittee must perform dry weather MS4 outfall field screening monitoring to identify non-storm water and illicit discharges within its jurisdiction in accordance with Provision E.2.c, to determine which discharges are transient flows and which are persistent flows, and prioritize the dry weather MS4 discharges that will be investigated and eliminated in accordance with Provision E.2.d. Each Copermittee must conduct the following dry weather MS4 outfall discharge field screening monitoring within its jurisdiction:

(a) Transitional Dry Weather MS4 Outfall Discharge Field Screening Monitoring Frequency

Each Copermittee must field screen the MS4 outfalls in its inventory developed pursuant to Provision D.2.a.(1) as follows:

(i) For Copermittees with less than 125 major MS4 outfalls that discharge to receiving waters within a Watershed Management Area, at least 80 percent of the outfalls must be visually inspected two times per year during dry weather conditions. For Copermittees with jurisdiction in more than one WMA, this requirement is limited to 500 inspections annually per Provision D.2.a.(2)(a)(iv).

(ii) For Copermittees with 125 major MS4 outfalls or more, but less than or equal to 500, that discharge to receiving waters within a Watershed Management Area all the outfalls must be visually inspected at least annually during dry weather conditions. For Copermittees with jurisdiction in more than one WMA, this requirement is limited to 500 inspections annually per Provision D.2.a.(2)(a)(iv).

(iii) For Copermittees with more than 500 major MS4 outfalls that discharge to receiving waters within a Watershed Management Area, at least 500 outfalls must be visually inspected at least annually during dry weather conditions. Copermittees with more than 500 major MS4 outfalls within a Watershed Management Area must identify and prioritize at least 500 outfalls to be inspected considering the following:

[a] Assessment of connectivity of the discharge to a flowing receiving water;
[b] Reported exceedances of NALs in water quality monitoring data;
[c] Surrounding land uses;
[d] Presence of constituents listed as a cause for impairment of receiving waters in the Watershed Management Area listed on the CWA section 303(d) List; and
[e] Flow rate.

For Copermittees with jurisdiction in more than one WMA, this requirement is limited to 500 inspections annually, per Provision D.2.a.(2)(a)(iv).

(iv) For Copermittees with more than 500 major MS4 outfalls within its jurisdiction that are located in more than one Watershed Management Area, at least 500 major MS4 outfalls within its inventory must be visually inspected at least annually during dry weather conditions. Copermittees with more than 500 major MS4 outfalls in more than one Watershed Management Area must identify and prioritize at least 500 outfalls to be inspected considering the following:

[a] Assessment of connectivity of the discharge to a flowing receiving water;
[b] Reported exceedances of NALs in water quality monitoring data;
[c] Surrounding land uses;
[d] Presence of constituents listed as a cause for impairment of receiving waters in the Watershed Management Area listed on the CWA section 303(d) List; and
[e] Flow rate.

(v) Inspections of major MS4 outfalls conducted in response to public reports and staff or contractor reports and notifications may count toward the required visual inspections of MS4 outfall discharge monitoring stations.

(b) Transitional Dry Weather MS4 Outfall Discharge Field Screening Visual Observations

(i) An antecedent dry period of at least 72 hours following any storm event producing measurable rainfall greater than 0.1 inch is required prior to conducting field screening visual observations during a field screening monitoring event.

(ii) During the field screening monitoring event, each Copermittee must record visual observations consistent with Table D-6 at each MS4 outfall discharge monitoring station inspected.

Table D-6. Field Screening Visual Observations for MS4 Outfall Discharge Monitoring Stations

Field Observations
• Station identification and location • Presence of flow, or pooled or ponded water • If flow is present: - Flow estimation (i.e. width of water surface, approximate depth of water, approximate flow velocity, flow rate) - Flow characteristics (i.e. presence of floatables, surface scum, sheens, odor, color) - Flow source(s) suspected or identified from non-storm water source investigation - Flow source(s) eliminated during non-storm water source identification • If pooled or ponded water is present: - Characteristics of pooled or ponded water (i.e. presence of floatables, surface scum, sheens, odor, color) - Known or suspected source(s) of pooled or ponded water • Station description (i.e. deposits or stains, vegetation condition, structural condition, observable biology) • Presence and assessment of trash in and around station • Evidence or signs of illicit connections or illegal dumping

(iii) Each Copermittee must implement the requirements of Provisions E.2.d.(2)(c)-(e) based on the field observations.

(iv) Each Copermittee must evaluate field observations together with existing information available from prior reports, inspections and monitoring results to determine whether any observed flowing, pooled, or ponded waters are likely to be transient or persistent flow.[19]

(c) Transitional Dry Weather MS4 Outfall Discharge Field Screening Monitoring Records

[19] Persistent flow is defined as the presence of flowing, pooled, or ponded water more than 72 hours after a measureable rainfall event of 0.1 inch or greater during three consecutive monitoring and/or inspection events. All other flowing, pooled, or ponded water is considered transient.

Based upon the results of the transitional dry weather MS4 outfall discharge field screening monitoring conducted pursuant to Provisions D.2.a.(2)(a)-(b), each Copermittee must update its MS4 outfall discharge monitoring station inventory, compiled pursuant to Provision D.2.a.(1), with any new information on the classification of whether the MS4 outfall produces persistent flow, transient flow, or no dry weather flow.

(3) Transitional Wet Weather MS4 Outfall Discharge Monitoring

Until the monitoring requirements and the monitoring implementation schedule described in~~requirements of~~ Provision D.2.c are incorporated into a Water Quality Improvement Plan that is accepted by the San Diego Water Board pursuant to Provision F.1, the Copermittees must conduct the following wet weather MS4 outfall discharge monitoring within the Watershed Management Area:

(a) Transitional Wet Weather MS4 Outfall Discharge Monitoring Stations

The Copermittees must select at least five wet weather MS4 outfall discharge monitoring stations from the inventories developed pursuant to Provision D.2.a.(1) that are representative of storm water discharges from areas consisting primarily of residential, commercial, industrial, and typical mixed-use land uses present within the Watershed Management Area.

The County of San Diego shall select at least two (2) transitional wet weather MS4 outfall discharge monitoring stations for the portion of the Santa Margarita River Watershed Management Area within its jurisdiction until the Riverside Copermittees are enrolled under this Order. After the Riverside Copermittees are enrolled, the Watershed Management Area Copermittees shall select at least five (5) transitional wet weather MS4 outfall discharge monitoring stations consistent with the requirements above.

(b) Transitional Wet Weather MS4 Outfall Discharge Monitoring Frequency

Each wet weather MS4 outfall discharge monitoring station selected pursuant to Provision D.2.a.(3)(a) must be monitored twice during the wet season (October 1 – April 30) in the transitional period. ~~One~~ The wet weather monitoring events shall be selected to be representative of the range of hydrological conditions experienced in the region. At least 10% of samples must be conducted during the first wet weather event of the wet season, to include at least one such sample in each Watershed Management Area~~and one wet weather monitoring event at least a month after the first wet weather event of the wet season~~.

(c) Transitional Wet Weather MS4 Outfall Discharge Field Observations

For each wet weather monitoring event, the following narrative descriptions and observations must be recorded at each wet weather MS4 outfall discharge monitoring station:

(i) A narrative description of the station that includes the location, date and duration of the storm event(s) sampled, rainfall estimates of the storm event, and the duration between the storm event sampled and the end of the previous measurable (greater than 0.1 inch rainfall) storm event; and

(ii) The flow rates and volumes measured or estimated (data from nearby USGS gauging stations may be utilized, or flow rates may be measured or estimated in accordance with the USEPA Storm Water Sampling Guidance Document (EPA-833-B-92-001), section 3.2.1, or other method proposed by the Copermittees that is acceptable to the San Diego Water Board);

(iii) Station condition (i.e. deposits or stains, vegetation condition, structural condition, observable biology); and

(iv) Presence and assessment of trash in and around station.

(d) Transitional Wet Weather MS4 Outfall Discharge Field Monitoring

For each wet weather monitoring event, the Copermittees must monitor and record the parameters in Table D-2 at each wet weather MS4 outfall discharge monitoring station.

(e) Transitional Wet Weather MS4 Outfall Discharge Analytical Monitoring

For each wet weather monitoring event, the Copermittees must collect and analyze samples from each wet weather MS4 outfall discharge monitoring station as follows:

(i) Analytes that are field measured are not required to be analyzed by a laboratory;

(ii) The Copermittees must implement consistent sample collection methods for regional comparability of data, unless site-specific conditions indicate the need for alternate methods;

(iii) Grab samples may be collected for pH, temperature, specific conductivity, dissolved oxygen, turbidity, and indicator bacteria;

(iv) For all other constituents, composite samples must be collected for a duration adequate to be representative of changes in pollutant concentrations and runoff flows using one of the following techniques:

[a] Time-weighted composites composed of 24 discrete hourly samples, which may be collected through the use of automated equipment, or
[b] Flow-weighted composites collected over the length of the storm event or a typical 24 hour period, whichever is shorter, which may be collected through the use of automated equipment, or
[c] If automated compositing is not feasible, a composite sample may be collected using a minimum of 4 grab samples, collected during the first 24 hours of the storm water discharge, or for the entire storm water discharge if the storm event is less than 24 hours;

(v) Only one analysis of the composite of aliquots is required;

(vi) The samples must be analyzed for the following constituents:

[a] Constituents listed as a cause for impairment of receiving waters in the Watershed Management Area listed on the CWA section 303(d) List,
[b] Constituents for implementation plans or load reduction plans (e.g. Bacteria Load Reduction Plans, Comprehensive Load Reduction Plans) developed for watersheds where the Copermittees are listed responsible parties under the TMDLs in Attachment E to this Order, and
[c] Constituents listed in ~~in~~ Table D-7.

Table D-7. Analytical Monitoring Constituents for Wet Weather MS4 Outfall Discharge Monitoring Stations

Conventionals, Nutrients	Metals (Total and Dissolved)	Indicator Bacteria
• Total Dissolved Solids • Total Suspended Solids • Turbidity • Total Hardness • Total Organic Carbon • Dissolved Organic Carbon • Sulfate • Methylene Blue Active Substances (MBAS) • Total Phosphorus • Orthophosphate • Nitrite[1] • Nitrate[1] • Total Kjeldhal Nitrogen • Ammonia	• Arsenic • Cadmium • Chromium • Copper • Iron • Lead • Nickel • Selenium • Thallium • Zinc	• Total Coliform • Fecal Coliform[2] • *Enterococcus*

Notes:
1. Nitrite and nitrate may be combined and reported as nitrite+nitrate.
2. *E. Coli* may be substituted for Fecal Coliform.

(f) Other Transitional Wet Weather MS4 Outfall Discharge Monitoring

The San Diego County Copermittees must continue the wet weather MS4 outfall monitoring program developed under Order No. R9-2007-0001, as approved by the San Diego Water Board, through its planned completion.

b. DRY WEATHER MS4 OUTFALL DISCHARGE MONITORING

Each Copermittee must perform dry weather MS4 outfall monitoring to identify non-storm water and illicit discharges within its jurisdiction pursuant to Provision E.2.c, and to prioritize the dry weather MS4 discharges that will be investigated and eliminated pursuant to Provision E.2.d. Each Copermittee must conduct the following dry weather MS4 outfall discharge monitoring within its jurisdiction:

(1) Dry Weather MS4 Outfall Discharge Field Screening Monitoring

Each Copermittee must continue to perform the dry weather MS4 outfall discharge field screening monitoring in accordance with the requirements of Provision D.2.a.(2). The Copermittee may adjust the field screening monitoring frequencies and locations for the MS4 outfalls in its inventory, as needed, to identify and eliminate sources of persistent flow non-storm water discharges in accordance with the highest priority water quality conditions identified in the Water Quality Improvement Plan, provided the number of visual inspections performed is equivalent to the number of visual inspections required under Provision D.2.a.(2)(a).

(2) Non-Storm Water Persistent Flow MS4 Outfall Discharge Monitoring

Each Copermittee must perform non-storm water persistent flow MS4 outfall discharge monitoring to determine which persistent non-storm water discharges contain concentrations of pollutants below NALs, and which persistent non-storm water discharges impact receiving water quality during dry weather. Each Copermittee must conduct the following non-storm water persistent flow MS4 outfall discharge monitoring within its jurisdiction:

(a) Prioritization of Non-Storm Water Persistent Flow MS4 Outfalls

Based upon the dry weather MS4 outfall discharge field screening monitoring records developed pursuant to Provision D.2.a.(2)(c), each Copermittee must identify and prioritize the MS4 outfalls with persistent flows based on the highest priority water quality conditions identified in the Water Quality Improvement Plan and any additional criteria developed by the Copermittee, which may include historical data and data from sources other than what the Copermittee collects.

(b) Non-Storm Water Persistent Flow MS4 Outfall Discharge Monitoring Frequency

(i) Based on the prioritization of major MS4 outfalls developed under Provision D.2.b.(2)(a), each Copermittee must identify, at a minimum, the ~~10~~ 5 highest priority major MS4 outfalls with non-storm water persistent flows that the Copermittee will monitor within each Watershed Management Area within its jurisdiction. If a Copermittee has less than 5 major outfalls within a WMA, the Copermittee shall monitor all of its major outfalls with persistent flows within that WMA. The location of the highest priority non-storm water persistent flow MS4 outfall monitoring stations must be identified on the map required pursuant to Provision E.2.b.(1).

(ii) Each of the highest priority non-storm water persistent flow MS4 outfall monitoring stations identified pursuant to Provision D.2.b.(2)(b)(i) must be monitored under dry weather conditions at least semi-annually until one of the following occurs:

[a] The non-storm water discharges have been effectively eliminated (i.e. no flowing, pooled, or ponded water) for three consecutive dry weather monitoring events; or

[b] The source(s) of the persistent flows has been identified as a category of non-storm water discharges that does not require an NPDES permit and does not have to be addressed as an illicit discharge because it was not identified as a source of pollutants (i.e. constituents in non-storm water discharge do not exceed

NALs), and the persistent flow can be re-prioritized to a lower priority; or

[c] The constituents in the persistent flow non-storm water discharge do not exceed NALs, and the persistent flow can be re-prioritized to a lower priority; or

[d] The source(s) of the persistent flows has been identified as a non-storm water discharge authorized by a separate NPDES permit.

(iii) Where the criteria under Provision D.2.b.(2)(c)(ii) are not met, but the threat to water quality has been reduced by the Copermittee, the highest priority persistent flow MS4 outfall monitoring stations may be reprioritized accordingly for continued dry weather MS4 outfall discharge field screening monitoring required pursuant to Provision D.2.b.(1).

(iv) Each Copermittee must document removal or re-prioritization of the highest priority persistent flow MS4 outfall monitoring stations identified under Provision D.2.b.(2)(b) in the Annual Report. Persistent flow MS4 outfall monitoring stations that have been removed must be replaced with the next highest prioritized major MS4 ~~major~~ outfall in the Watershed Management Area within its jurisdiction, unless there are no remaining qualifying major MS4 outfalls within the Copermittee's jurisdiction in the Watershed Management Area.

(c) Non-Storm Water Persistent Flow MS4 Outfall Discharge Field Observations

During each semi-annual monitoring event, each Copermittee must record field observations consistent with Table D-6 at each of the highest priority persistent flow MS4 outfall monitoring stations within its jurisdiction.

(d) Non-Storm Water Persistent Flow MS4 Outfall Discharge Field Monitoring

During each semi-annual monitoring event, if conditions allow the collection of the data, each Copermittee must monitor and record the parameters in Table D-2 at each of the highest priority persistent flow MS4 outfall monitoring stations within its jurisdiction.

(e) Non-Storm Water Persistent Flow MS4 Outfall Discharge Analytical Monitoring

During each semi-annual monitoring event in which measurable flow is present, each Copermittee must collect and analyze samples from each of the highest priority persistent flow MS4 outfall monitoring stations within its jurisdiction as follows:

(i) Analytes that are field measured are not required to be analyzed by a laboratory;

(ii) The Copermittees must implement consistent sample collection methods for regional comparability of data, unless site-specific conditions indicate the need for alternate methods;

(iii) During development of the Water Quality Improvement Plan, for each WMA, consider the following sources to select constituents for ~~C~~collection of grab or composite samples to be analyzed at a qualified analytical laboratory~~for the following constituents~~:

[a] Constituents contributing to the highest priority water quality conditions identified in the Water Quality Improvement Plan,
[b] Constituents listed as a cause for impairment of receiving waters in the Watershed Management Area listed on the CWA section 303(d) List,
[c] Constituents for implementation plans or load reduction plans (e.g. Bacteria Load Reduction Plans, Comprehensive Load Reduction Plans) developed for watersheds where the Copermittees are listed responsible parties under the TMDLs in Attachment E to this Order,
[d] Applicable NAL constituents, and
[e] Constituents listed in Table D-8~~, unless the~~

(iv) Copermittees may adjust the analytical list for a given WMA in successive monitoring events ~~Copermittee has~~ to add or eliminate constituents based on ~~historical~~ data that can demonstrate or provide justification ~~that~~ regarding the need or lack of need for analysis of ~~the~~ specific constituents~~ is not necessary~~.

Table D-8. Analytical Monitoring Constituents for Persistent Flow MS4 Outfall Discharge Monitoring Stations

Conventionals, Nutrients	Metals (Total and Dissolved)	Indicator Bacteria
• Total Dissolved Solids • Total Suspended Solids • Total Hardness • Total Phosphorus • Orthophosphate • Nitrite[1] • Nitrate[1] • Total Kjeldhal Nitrogen • Ammonia	• Cadmium • Copper • Lead • Zinc	• Total Coliform • Fecal Coliform[2] • *Enterococcus*

Notes:
1. Nitrite and nitrate may be combined and reported as nitrite+nitrate.
2. *E. Coli* may be substituted for Fecal Coliform.

(v) If the Copermittee identifies and eliminates the source of the persistent flow non-storm water discharge, analysis of the sample is not required.

c. WET WEATHER MS4 OUTFALL DISCHARGE MONITORING

The Copermittees must perform wet weather MS4 outfall monitoring to identify ~~sources of~~ pollutants in storm water discharges from the MS4s in the Watershed Management Area, and provide information to help guide source identification efforts. The Copermittees must conduct the following wet weather MS4 outfall discharge monitoring within the Watershed Management Area:

(1) Wet Weather MS4 Outfall Discharge Monitoring Stations

The Copermittees may adjust the wet weather MS4 outfall discharge monitoring locations and frequencies in the Watershed Management Area, as needed, to identify ~~sources of~~ pollutants in storm water discharges from MS4s in the Watershed Management Area in accordance with the highest priority water quality conditions identified in the Water Quality Improvement Plan, provided the number of stations is at least equivalent to the number of stations required under Provision D.2.a.(3)(a).

(2) Wet Weather MS4 Outfall Discharge Monitoring Frequency

The Copermittees must monitor the wet weather MS4 outfall discharge monitoring stations in the Watershed Management Area at an appropriate frequency to identify ~~sources of~~ pollutants in storm water discharges from the MS4s causing or contributing to the highest priority water quality conditions identified in the Water Quality Improvement Plan.

(3) Wet Weather MS4 Outfall Discharge Field Observations

For each wet weather monitoring event, the following narrative descriptions and observations must be recorded at each wet weather MS4 outfall discharge monitoring station:

(a) A narrative description of the station that includes the location, date and duration of the storm event(s) sampled, rainfall estimates of the storm event, and the duration between the storm event sampled and the end of the previous measurable (greater than 0.1 inch rainfall) storm event; and

(b) The flow rates and volumes measured or estimated (data from nearby USGS gauging stations may be utilized, or flow rates may be measured or estimated in accordance with the USEPA Storm Water Sampling Guidance Document (EPA-833-B-92-001), section 3.2.1, or other method proposed by the Copermittees that is acceptable to the San Diego Water Board);

(c) Station condition (i.e. deposits or stains, vegetation condition, structural condition, observable biology); and

(d) Presence and assessment of trash in and around station.

(4) Wet Weather MS4 Outfall Discharge Field Monitoring

For each wet weather monitoring event, the Copermittees must monitor and record the parameters in Table D-2 at each wet weather MS4 outfall discharge monitoring station.

(5) Wet Weather MS4 Outfall Discharge Analytical Monitoring

For each wet weather monitoring event, the Copermittees must collect and analyze samples from each wet weather MS4 outfall discharge monitoring station as follows:

(a) Analytes that are field measured are not required to be analyzed by a laboratory;

(b) The Copermittees must implement consistent sample collection methods for regional comparability of data, unless site-specific conditions indicate the need for alternate methods;

(c) Grab samples may be collected for pH, temperature, specific conductivity, dissolved oxygen, turbidity, hardness, and indicator bacteria;

(d) For all other constituents, composite samples must be collected for a duration adequate to be representative of changes in pollutant concentrations and runoff flows using one of the following techniques:

(i) Time-weighted composites composed of 24 discrete hourly samples, which may be collected through the use of automated equipment, or

(ii) Flow-weighted composites collected over the length of the storm event or a typical 24 hour period, whichever is shorter, which may be collected through the use of automated equipment, or

(iii) If automated compositing is not feasible, a composite sample may be collected using a minimum of 4 grab samples, collected during the first 24 hours of the storm water discharge, or for the entire storm water discharge if the storm event is less than 24 hours.

(e) Only one analysis of the composite of aliquots is required;

(f) Analysis for the following constituents is required:

(i) Constituents contributing to the highest priority water quality conditions identified in the Water Quality Improvement Plan,

(ii) Constituents listed as a cause for impairment of receiving waters in the Watershed Management Area listed on the CWA section 303(d) List,

(iii) Constituents for implementation plans or load reduction plans (e.g. Bacteria Load Reduction Plans, Comprehensive Load Reduction Plans) developed for watersheds where the Copermittees are listed responsible parties under the TMDLs in Attachment E to this Order, and

(iv) Applicable SAL constituents.

3. Special Studies

a. Within the term of this Order, the Copermittees must ~~develop and implement~~initiate the following special studies:

(1) At least two ~~three~~ special studies in each Watershed Management Area to address pollutant and/or stressor data gaps and/or develop information necessary to more effectively address the pollutants and/or stressors that cause or contribute to highest priority water quality conditions identified in the Water Quality Improvement Plan.

(2) At least one ~~two~~ special stud~~ies~~y for the San Diego Region to address pollutant and/or stressor data gaps and/or develop information necessary to more effectively address the pollutants and/or stressors that are impacting receiving waters on a regional basis in the San Diego Region.

(3) One of the two ~~three~~ special studies in each Watershed Management Area may be replaced by a special study implemented pursuant to Provision D.3.a.(2).

b. The special studies must, at a minimum, be in conformance with the following criteria:

(1) The special studies must be related to the highest priority water quality conditions identified by the Copermittees in the Watershed Management Area and/or for the entire San Diego Region;

(2) The special studies developed pursuant to Provision D.3.a.(1) must:

(a) Be implemented within the applicable Watershed Management Area, and

(b) Require some form of participation by all the Copermittees within the Watershed Management Area;

(3) The special studies developed pursuant to Provision D.3.a.(2) must:

(a) Be implemented within the San Diego Region, and

(b) Require some form of participation by all Copermittees covered under the requirements of this Order.

c. Special studies developed to identify sources of pollutants and/or stressors should be pollutant and/or stressor specific and based on historical monitoring data and monitoring performed pursuant to Provisions D.1 and D.2. Development of source identification special studies should include the following:

(1) A compilation of known information on the specific pollutant and/or stressor, including data on potential sources and movement of the pollutant and/or stressor within the watershed. Data generated by the Copermittees and others, as well as information available from a literature research on the pollutant and/or stressor should be compiled and analyzed as appropriate.

(2) An identification of data gaps, based on the compiled information generated on the specific pollutant and/or stressor in Provision D.3.d.(1). Source identification special studies should be developed to fill identified data gaps.

(3) A monitoring plan that will collect and provide data the Copermittees can utilize to do the following:

(a) Quantify the relative loading or impact of a pollutant and/or stressor from a particular source or pollutant generating activity;

(b) Improve understanding of the fate of a pollutant and/or stressor in the environment;

(c) Develop an inventory of known and suspected sources of a pollutant and/or stressor in the Watershed Management Area; and/or

(d) Prioritize known and suspected sources of a pollutant and/or stressor based on relative magnitude in discharges, geographical distribution (i.e., regional or localized), frequency of occurrence in discharges, human health risk, and controllability.

d. Special studies initiated prior to the ~~acceptance of the Water Quality Improvement Plan~~term of this Order that meet the requirements of Provision D.3.b and are ~~completed~~ implemented during the term of this Order may be utilized to fulfill the special study requirements of Provision D.3.a.

e. The Copermittees must submit the monitoring plans for the special studies in the Water Quality Improvement Plans required pursuant to Provision F.1.

f. The Copermittees are encouraged to share the results of the special studies regionally among the Copermittees to provide information useful in improving and adapting the management of non-storm water and storm water runoff through the implementation of the Water Quality Improvement Plans.

4. Assessment Requirements

Each Copermittee must evaluate the data collected pursuant to Provisions D.1, D.2 and D.3, and information collected during the implementation of the jurisdictional runoff management programs required pursuant to Provision E, to assess the progress of the water quality improvement strategies in the Water Quality Improvement Plan toward achieving compliance with Provisions A.1.a, A.1.c and A.2.a. Assessments must be performed as described in the following provisions:

a. RECEIVING WATERS ASSESSMENTS

(1) The Copermittees must assess and report the conditions of the receiving waters in the Watershed Management Area as follows:

(a) Based on data collected pursuant to Provision D.1.a, the assessments under Provision D.4.a.(2) must be included in the first Annual Report required pursuant to Provision F.3.b.(1).

(b) Based on the data collected pursuant to Provisions D.1.a-e, the assessments required under Provision D.4.a.(2) must be included in the Report of Waste Discharge required pursuant to Provision F.5.b.

(2) The Copermittees must assess the status and trends of receiving water quality conditions in 1) coastal waters, 2) enclosed bays, harbors, estuaries, and lagoons, and 3) streams under dry weather and wet weather conditions. For each of the three types of receiving waters in each Watershed Management Area the Copermittees must:

(a) Determine whether or not the conditions of the receiving waters are protective of the designated beneficial uses;

(b) Identify the most critical beneficial uses that must be protected or restored to ensure overall health of the receiving water;

(c) Determine whether or not those critical beneficial uses are being protected and where those beneficial used must be restored;

(d) Identify short-term and/or long-term improvements or degradation of those critical beneficial uses;

(e) Identify data gaps in the monitoring data necessary to assess Provisions D.4.a.(2)(a)-(d).

b. MS4 OUTFALL DISCHARGES ASSESSMENTS

(1) Non-Storm Water Discharges Reduction Assessments

(a) Each Copermittee must assess and report the progress of its illicit discharge detection and elimination program, required to be implemented pursuant to Provision E.2, toward reducing and effectively prohibiting non-storm water and illicit discharges into the MS4 within its jurisdiction as follows:

(i) Based on data collected pursuant to Provisions D.2.a.(2), the assessments under Provision D.4.b.(1)(b) must be included in the first Annual Report required pursuant to Provision F.3.b.(1).

(ii) Based on the data collected pursuant to Provisions D.2.b, the assessments required under Provision D.4.b.(1)(c) must be included when complete in the first Annual Report required pursuant to Provision F.3.b.(1), and annually thereafter.

(iii) Based on the data collected pursuant to Provisions D.2.b, the assessment required under Provision D.4.b.(1)(c) must be included in the Report of Waste Discharge required pursuant to F.5.b.

(b) Based on the transitional dry weather MS4 outfall discharge field screening monitoring required pursuant to Provision D.2.a.(2), each Copermittee must assess and report the following:

(i) Identify the known and suspected controllable sources (e.g. facilities, areas, land uses, pollutant generating activities) of transient and persistent flows within the Copermittee's jurisdiction in the Watershed Management Area;

(ii) Identify sources of transient and persistent flows within the Copermittee's jurisdiction in the Watershed Management Area that have been reduced or eliminated; and

(iii) Identify modifications to the field screening monitoring locations and frequencies for the MS4 outfalls in its inventory necessary to identify and eliminate sources of persistent flow non-storm water discharges pursuant to Provision D.2.b.(1).

(c) Based on the dry weather MS4 outfall discharge field screening monitoring required pursuant to Provision D.2.b, each Copermittee must assess and report the following:

(i) The assessments required pursuant to Provision D.4.b.(1)(b);

(ii) Based on the data collected and applicable NALs in the Water Quality Improvement Plan, rank the MS4 outfalls in the Copermittee's jurisdiction according to potential threat to receiving water quality, and produce a prioritized list of major MS4 outfalls for follow-up action to update the Water Quality Improvement Plan, with the goal of eliminating persistent flow non-storm water discharges and/or pollutant loads in order of the ranked priority list through targeted programmatic actions and source investigations;

(iii) For the highest priority major MS4 outfalls with persistent flows that are in exceedance of NALs, identify the known and suspected sources within the Copermittee's jurisdiction in the Watershed Management Area that may cause or contribute to the NAL exceedances;

(iv) Each Copermittee must analyze the data collected pursuant to Provision D.2.b, and utilize a model or other method, to calculate or estimate the non-storm water volumes and pollutant loads collectively discharged from all the major MS4s outfalls in its jurisdiction identified as having persistent dry weather flows during the monitoring year. These calculations or estimates must be updated annually. ~~Each Copermittee must calculate or estimate:~~

[a] Each Copermittee must calculate or estimate: Annual non-storm water volumes and pollutant loads collectively discharged from the Copermittee's major MS4 outfalls to receiving waters within the Copermittee's jurisdiction~~, with an estimate of the percent contribution from each known and suspected source for each MS4 outfall~~;

[b] Each Copermittee must ~~Annual non-storm water volumes and pollutant loads~~ identify and quantify, where feasible, sources of non-stormwater flows ~~from areas or facilities subject to~~ not subject to the Copermittee's legal authority that are discharged from the Copermittee's major MS4 outfalls to downstream receiving waters.

(v) Each Copermittee must review the data collected pursuant to Provision D.2.b and findings from the assessments required pursuant to Provision D.4.b.(1)(c)(i)-(iv) ~~on an annual basis to~~ once per Permit term to:

[a] Identify reductions and progress in achieving reductions in non-storm water and illicit discharges to the Copermittee's MS4 in the Watershed Management Area;

[b] Assess the effectiveness of water quality improvement strategies being implemented by the Copermittees within the Watershed Management Area toward reducing or eliminating non-storm water and pollutant loads discharging from the MS4 to receiving waters within its jurisdiction, with an estimate, if possible, of the non-storm water volume and/or pollutant load reductions attributable to specific water quality strategies implemented by the Copermittee; and

[c] Identify modifications necessary to increase the effectiveness of the water quality improvement strategies implemented by the Copermittee in the Watershed Management Area toward reducing or eliminating non-storm water and pollutant loads discharging from the MS4 to receiving waters within its jurisdiction.

(vi) Identify data gaps in the monitoring data necessary to assess Provisions D.4.b.(2)(c)(i)-(v).

(2) Storm Water Pollutant Discharges Reduction Assessments

(a) The Copermittees must assess and report the progress of the water quality improvement strategies, required to be implemented pursuant to Provisions B and E, toward reducing pollutants in storm water discharges from the MS4s within the Watershed Management Area as follows:

(i) Based on data collected pursuant to Provisions D.2.a.(3), the assessments under Provision D.4.b.(2)(b) must be included in the first Annual Report required pursuant to Provision F.3.b.(1).

(ii) Based on the data collected pursuant to Provisions D.2.c, the assessments required under Provisions D.4.b.(2)(c)(i) and (ii) must be included when complete in the ~~first~~ Annual Report required pursuant to Provision F.3.b.(1), and annually thereafter.

(iii) Based on the data collected pursuant to Provisions D.2.c, the assessment required under Provisions D.4.b.(2)(c)-(d) must be included in the Report of Waste Discharge required pursuant to F.5.b.

(b) Based on the transitional wet weather MS4 outfall discharge monitoring required pursuant to Provision D.2.a.(3) the Copermittees must assess and report the following:

(i) ~~The Copermittees must a~~Analyze the monitoring data collected pursuant to Provision D.2.a.(3), and utilize a watershed model or other method, to calculate or estimate storm water volumes and pollutant loads discharged from the MS4s in each Copermittee's jurisdiction within the Watershed Management Area. The Copermittees must calculate or estimate the following for each monitoring year:

[a] The average storm water runoff coefficient for each land use type within the Watershed Management Area;

[b] The volume of storm water and pollutant loads discharged from each of the Copermittee's ~~major~~ monitored MS4 outfalls in its jurisdiction to receiving waters within the Watershed Management Area for each storm event with measurable rainfall greater than 0.1 inch;

~~[c] The pollutant loads discharged from each of the Copermittee's major MS4 outfalls in its jurisdiction to receiving waters within the Watershed Management Area for each storm event with measurable rainfall greater than 0.1 inch; and~~

~~[d] The percent contribution of storm water volumes and pollutant loads discharged from each land use type within the drainage basin to each of the Copermittee's major MS4 outfalls in its jurisdiction to receiving waters within the Watershed Management Area for each storm event with measurable rainfall greater than 0.1 inch.~~

[c] The total flow volume and pollutant loadings discharged from the Copermittee's jurisdiction within the Watershed Management Area over the course of the wet season, extrapolated from the data produced from the monitored outfalls.

(ii) Identify modifications to the wet weather MS4 outfall discharge monitoring locations and frequencies necessary to identify ~~sources~~ pollutants in storm water discharges from the MS4s in the Watershed Management Area pursuant to Provision D.2.c.(1).

(c) Based on the wet weather MS4 outfall discharge monitoring required pursuant to Provision D.2.c the Copermittees must assess and report the following:

(i) The assessments required pursuant to Provision D.4.b.(2)(b);

(ii) Based on the data collected and applicable SALs in the Water Quality Improvement Plan, analyze and compare the monitoring data to the analyses and assumptions used to develop the Water Quality Improvement Plans, including strategies developed per Provision B.3, and evaluate whether those analyses and assumptions should be updated as a component of the adaptive management efforts under Provision B.5,~~rank the MS4 outfalls in the Watershed Management Area according to potential threat to receiving water quality, and produce a prioritized list of major MS4 outfalls~~ for follow-up action to update the Water Quality Improvement Plan;

(iii) The Copermittees must review the data collected pursuant to Provision D.2.c and findings from the assessments required pursuant to Provisions D.4.b.(2)(c)(i)-(ii) ~~on an annual basis~~ once per Permit term to:

[a] Identify reductions and progress in achieving reductions in pollutant concentrations and/or pollutant loads from different land uses and/or drainage areas discharging from the Copermittees' MS4s in the Watershed Management Area;

[b] Assess the effectiveness of water quality improvement strategies being implemented by the Copermittees within the Watershed Management Area toward reducing pollutants in storm water discharges from the MS4s to receiving waters within the Watershed Management Area to the MEP, with an estimate, if possible, of the pollutant load reductions attributable to specific water quality strategies implemented by the Copermittees; and

[c] Identify modifications necessary to increase the effectiveness of the water quality improvement strategies implemented by the Copermittees in the Watershed Management Area toward reducing pollutants in storm water discharges from the MS4s to receiving waters in the Watershed Management Area to the MEP.

(iv) Identify data gaps in the monitoring data necessary to assess Provisions D.4.b.(2)(c)(i)-(iii).

(d) The Copermittees must evaluate all the data collected pursuant to Provision D.2.c, and incorporate new outfall monitoring data into time series plots for each long-term monitoring constituent for the Watershed Management Area, and perform statistical trends analysis on the cumulative long-term wet weather MS4 outfall discharge water quality data set.

c. SPECIAL STUDIES ASSESSMENTS

The Copermittees must annually evaluate the results and findings from the special studies developed and implemented pursuant to Provision D.3, and assess their relevance to the Copermittees' efforts to characterize receiving water conditions, understand sources of pollutants and/or stressors, and control and reduce the discharges of pollutants from the MS4 outfalls to receiving waters in the Watershed Management Area. The Copermittees must report the results of the special studies assessments applicable to the Watershed Management Area, and identify any necessary modifications or updates to the Water Quality Improvement Plan based on the results in the Annual Reports required pursuant to Provision F.3.b.

d. INTEGRATED ASSESSMENT OF WATER QUALITY IMPROVEMENT PLAN

As part of the iterative approach and adaptive management process required for the Water Quality Improvement Plan pursuant to Provision B.5, the Copermittees in each Watershed Management Area must integrate the data collected pursuant to Provisions D.1-D.3, the findings from the assessments required pursuant to Provisions D.4.a-c, and information collected during the implementation of the jurisdictional runoff management programs required pursuant to Provision E to assess the effectiveness of, and identify necessary modifications to, the Water Quality Improvement Plan as follows:

(1) The Copermittees must re-evaluate the priority water quality conditions and numeric goals for the Watershed Management Area, as needed, during the term of this Order pursuant to Provision B.5.a. The re-evaluation and recommendations for modifications to the priority water quality conditions, and/or numeric goals and corresponding schedules may be provided in the Annual Reports required pursuant to Provision F.3.b, but must at least be provided in the Report of Waste Discharge pursuant to Provision F.5.b. The priority water quality conditions and numeric goals for the Watershed Management Area must be re-evaluated as follows:

(a) Re-evaluate the receiving water conditions in the Watershed Management Area in accordance with Provision B.2.a;

(b) Re-evaluate the impacts on receiving waters in the Watershed Management Area from MS4 discharges in accordance with Provision B.2.b;

(c) Re-evaluate the identification of MS4 sources of pollutants and/or stressors in accordance with Provision B.2.d;

(d) Identify beneficial uses of the receiving waters that are protected or must be restored in accordance with Provision D.4.a;

(e) Evaluate the progress toward achieving the interim and final numeric goals for restoring impacted beneficial uses in the receiving waters.

(2) The Copermittees must re-evaluate the water quality improvement strategies for the Watershed Management Area during the term of this Order pursuant to Provision B.5.b. The re-evaluation and recommendations for modifications to the water quality improvement strategies and schedules must be provided in the ~~Annual Reports required pursuant to Provision F.3.b, and provided in the~~ Report of Waste Discharge pursuant to Provision F.5.b. The water quality improvement strategies for the Watershed Management Area must be re-evaluated as follows:

(a) Identify the non-storm water and storm water pollutant loads from the Copermittees’ MS4 outfalls in the Watershed Management Area, calculated or estimated pursuant to Provisions D.4.b;

(b) Identify the non-storm water and storm water pollutant load reductions, or other improvements to receiving water or water quality conditions, that are necessary to attain the interim and final numeric goals for restoring impacted beneficial uses in the receiving waters;

(c) Identify the non-storm water and storm water pollutant load reductions, or other improvements to the quality of MS4 discharges, that are necessary for the Copermittees to demonstrate that non-storm water and storm water discharges from their MS4s are not causing or contributing to exceedances of receiving water limitations;

(d) Evaluate the progress of the water quality improvement strategies toward achieving the interim and final numeric goals for restoring impacted beneficial uses in the receiving waters.

(3) The Copermittees must re-evaluate and adapt the water quality monitoring and assessment program for the Watershed Management Area when new information becomes available to improve the monitoring and assessment program pursuant to Provision B.5.c. The re-evaluation and recommendations for modifications to the monitoring and assessment program may be provided in the Annual Reports required pursuant to Provision F.3.b, but must at least be provided in the Report of Waste Discharge pursuant to Provision F.5.b. Modifications to the water quality monitoring and assessment program must be consistent with the requirements of Provision D.1-D.3. The re-evaluation of the water quality monitoring and assessment program for the Watershed Management Area must consider the data gaps identified by the assessments required pursuant to Provisions D.4.a-b, and results of the special studies implemented pursuant to Provision D.4.c.

5. Monitoring Provisions

Each Copermittee must comply with all the monitoring, reporting, and recordkeeping provisions of the Standard Permit Provisions and General Provisions contained in Attachment B to this Order.

E. JURISDICTIONAL RUNOFF MANAGEMENT PROGRAMS

The purpose of this provision is for each Copermittee to implement a program to control the contribution of pollutants to and the discharges from the MS4 within its jurisdiction. The goal of the jurisdictional runoff management programs is to implement strategies that effectively prohibit non-storm water discharges to the MS4 and reduce the discharge of pollutants from the MS4~~in storm water~~ to the MEP. This goal will be accomplished through implementing the jurisdictional runoff management programs in accordance with the strategies identified in the Water Quality Improvement Plans. For the Santa Margarita River Watershed Management Area, the County of San Diego shall use the water quality priorities in the Santa Margarita River Watershed Urban Runoff Management Plan (developed pursuant to Order No. R9-2007-0001) to guide jurisdictional runoff management program implementation until notified by the San Diego Water Board that the Water Quality Improvement Plan developed in conjunction with the Riverside Copermittees has been approved.

Each Copermittee must update its jurisdictional runoff management program document, in accordance with Provision F.2.a, to incorporate all the requirements of Provision E. Until the Copermittee has updated its jurisdictional runoff management program document with the requirements of Provision E, the Copermittee must continue implementing its current jurisdictional runoff management program.

Modification of Jurisdictional Runoff Management Program Requirements

Modifications shall be considered and where selected, proposed according to the process in Provision B.5. Proposed modifications may increase, decrease, and/or replace minimum requirements identified in Provision E.

1. Legal Authority Establishment and Enforcement

a. Each Copermittee must establish, maintain, and enforce adequate legal authority within its jurisdiction to control pollutant discharges ~~into and~~ from its MS4 through statute, ordinance, permit, contract, order, or similar means. This legal authority must, at a minimum, authorize the Copermittee to:

(1) Effectively ~~P~~prohibit and eliminate all illicit discharges and illicit connections to its MS4;

(2) Control the contribution of pollutants in discharges of runoff associated with industrial and construction activity to its MS4 and control the quality of runoff from industrial and construction sites that do not~~, including industrial and construction sites which~~ have coverage under the statewide General Permit for Discharges of Storm Water Associated with Industrial Activities (Industrial General Permit) or General Permit for Discharges of Storm Water Associated with Construction Activities (Construction General Permit)~~, as well as to those sites which do not~~;

(3) Control the discharge of spills, dumping, or disposal of materials other than storm water into its MS4;

~~(4)~~ Coordinate, as possible, with other agencies to minimize the contribution of pollutant discharges from the Copermittee's portion of the MS4 to portions of the MS4 under another agency's jurisdiction and from other agency's portions of the MS4 to the portion of the MS4 under the Copermittee's jurisdiction~~Control through interagency agreements among Copermittees the contribution of pollutants from one portion of the MS4 to another portion of the MS4;~~

~~Control, by coordinating and cooperating with other owners of the MS4 such as Caltrans, the U.S. federal government, or sovereign Native American Tribes through interagency agreements, where possible, the contribution of pollutants from their portion of the MS4 to the portion of the MS4 within the Copermittee's jurisdiction~~;

~~(5)~~(4) Require compliance with conditions in its statutes, ordinances, permits, contracts, orders, or similar means to hold dischargers to its MS4 accountable for their contributions of pollutants and flows;

~~(6)~~(5) Require the use of BMPs to prevent or reduce the discharge of pollutants in ~~storm water~~ from its MS4 to the MEP;

~~(7)~~(6) Require documentation on the effectiveness of BMPs implemented to prevent or reduce the discharge of pollutants ~~in storm water~~ from its MS4 to the MEP;

~~(8)~~(7) Utilize enforcement mechanisms to require compliance with its statutes, ordinances, permits, contracts, orders, or similar means; and

~~(9)~~(8) Carry out all inspections, surveillance, and monitoring procedures necessary to determine compliance and noncompliance with its statutes, ordinances, permits, contracts, orders, or similar means and with the requirements of this Order, including the effective prohibition of illicit discharges and connections to its MS4; the Copermittee must also have authority to enter, monitor, inspect, take measurements, review and copy records, and require regular reports from industrial facilities, including construction sites, discharging into its MS4.

b. With the first Annual Report required pursuant to Provision F.3.b, each Copermittee must submit a statement certified by its Principal Executive Officer, Ranking Elected Official, or Duly Authorized Representative that the Copermittee has taken the necessary steps to obtain and maintain full legal authority within its jurisdiction to implement and enforce each of the requirements contained in this Order.

2. Illicit Discharge Detection and Elimination

Each Copermittee must implement a program to actively detect and eliminate illicit discharges and improper disposal into the MS4, or otherwise require the discharger to apply for and obtain a separate NPDES permit. The illicit discharge detection and elimination program must be implemented in accordance with the strategies identified in the Water Quality Improvement Plan and include, at a minimum, the following requirements:

a. NON-STORM WATER DISCHARGES

To the extent allowable by law, ~~E~~each Copermittee must address all non-storm water discharges as illicit discharges, where the likelihood exists that they are a source of pollutants to waters of the U.S., unless a non-storm water discharge is either identified as a discharge authorized by a separate NPDES permit, or identified as a category of non-storm water discharges or flows that must be addressed pursuant to the following requirements:

(1) Discharges of non-storm water to the MS4 from uncontaminated pumped groundwater ~~the following categories~~ must be addressed as illicit discharges where there is evidence that suggests that they are the source of pollutants to waters of the U.S., unless the discharge has coverage under NPDES Permit No. CAG919001 (Order No. R9-2007-0034, or subsequent order) for discharges to San Diego Bay, or NPDES Permit No. CAG919002 (Order No. R9-2008-0002, or subsequent order) for discharges to surface waters other than San Diego Bay~~:~~.

~~(a) Uncontaminated pumped ground water;~~

~~(b) Discharges from foundation drains;[20]~~

~~(c) Water from crawl space pumps; and~~

~~(d) Water from footing drains.[19]~~

(2) Discharges of non-storm water from water line flushing and water main breaks to the MS4 must be addressed as illicit discharges unless the discharge has coverage under a valid NPDES Permit ~~No. CAG 679001 (Order No. R9-2010-0003~~, ~~(~~Order No. R9-2010-0003, or a subsequent order). This category includes water line flushing and water main break discharges from water purveyors under the Copermittee's jurisdiction that have been issued a water supply permit by the California Department of Public Health or

~~[20] Provision E.2.a.(1) only applies to this category on non-storm water if the system is designed to be located at or below the highest historical groundwater table to actively or passively extract groundwater during any part of the year.~~

federal military installations. Discharges from recycled or reclaimed water lines to the MS4 must be addressed as illicit discharges, unless the discharges have coverage under a separate NPDES permit.

(3) Discharges of non-storm water to the MS4 from the following categories must be addressed by the Copermittee as illicit discharges only if the Copermittee or the San Diego Water Board identifies the discharge as a source of pollutants to receiving waters:

(a) Diverted stream flows;

(b) Rising ground waters;

(c) Uncontaminated ground water infiltration to MS4s;

(d) Springs;

(e) Flows from riparian habitats and wetlands;

(f) Discharges from potable water sources;

(g) Discharges from foundation drains;~~[21]~~ ~~and~~

(h) Discharges from footing drains~~.~~; ~~[20]~~ and

~~(h)~~(i) Water from crawl space pumps.

(4) Discharges of non-storm water to the MS4 from the following categories must be controlled by the requirements given below through statute, ordinance, permit, contract, order, or similar means where the Copermittees or the San Diego Water Board identifies those discharges are a source of pollutants to waters of the U.S. Discharges of non-storm water to the MS4 from the following categories not controlled by the requirements given below through statute, ordinance, permit, contract, order, or similar means must be addressed by the Copermittee as illicit discharges.

(a) Air conditioning condensation

The discharge of air conditioning condensation ~~must~~ should be directed to landscaped areas, ~~or~~ other pervious surfaces where feasible, or to the sanitary sewer.

(b) Individual residential vehicle washing

~~[21] Provision E.2.a.(3) only applies to this category of non-storm water discharge if the system is designed to be located above the highest historical groundwater table at all times of the year, and the system is only expected to discharge non-storm water under unusual circumstances.~~

~~(i)~~ The discharge of wash water must be encouraged through public outreach and education;

(i) to be directed to landscaped areas or other pervious surfaces where feasible; and

(ii) to mMinimize the use of water for vehicle washing, use as little washing detergent and other vehicle wash products as possible, wash vehicles at commercial wash facilities, and implement other practices or behaviors that will prevent the discharge of pollutants associated with individual residential vehicle washing from entering the MS4.

(c) Dechlorinated swimming pool discharges should be managed as to:

(i) Eliminate residual chlorine, algaecide, filter backwash, or other pollutants from swimming pools prior to discharging to the MS4; and

(ii) The discharge of saline swimming pool water must be directed to the sanitary sewer, landscaped areas, or other pervious surfaces that can accommodate the volume of water, unless the saline swimming pool water can be discharged via a pipe or concrete channel directly to a naturally saline water body (e.g. Pacific Ocean).

(5) Firefighting discharges to the MS4 must be addressed by the Copermittee as illicit discharges only if the Copermittee or the San Diego Water Board identifies the discharge as a significant source of pollutants to receiving waters. Firefighting discharges to the MS4 not identified as a significant source of pollutants to receiving waters, must be addressed, at a minimum, as follows:

(a) Non-emergency firefighting discharges

(i) Building fire suppression system maintenance discharges (e.g., sprinkler line flushing) to the MS4 must be addressed as illicit discharges unless BMPs are implemented to prevent the discharge of pollutants to the MS4.

(ii) Non-emergency firefighting discharges (i.e., discharges from controlled or practice blazes, firefighting training, and maintenance activities not associated with building fire suppression systems) must be addressed by a program, to be developed and implemented by the Copermittee, to reduce or eliminate pollutants in such discharges from entering the MS4.

(b) Emergency firefighting discharges

Each Copermittee should develop and encourage implementation of BMPs to reduce or eliminate pollutants in emergency firefighting discharges to the MS4s and receiving waters within its jurisdiction. During emergency situations, priority of efforts should be directed toward life, property, and the environment (in descending order). BMPs should not interfere with immediate emergency response operations or impact public health and safety.

(6) If the Copermittee or San Diego Water Board identifies any category of non-storm water discharges listed under Provisions E.2.a.(1)-(4) as a source of pollutants to receiving waters, the category must be ~~prohibit~~effectively prohibited through ordinance, order, or similar means and addressed as an illicit discharge.

(7) Each Copermittee must, where feasible, reduce or effectively eliminate non-storm water discharges listed under Provisions E.2.a.(1)-(4) into its MS4 ~~whether or not the non-storm water discharge has been identified as an illicit discharge~~, unless a non-storm water discharge is identified as a discharge authorized by a separate NPDES permit.

b. PREVENT AND DETECT ILLICIT DISCHARGES AND CONNECTIONS

Each Copermittee must include the following measures within its program to prevent and detect illicit discharges to the MS4:

(1) Each Copermittee must maintain an updated map of its entire MS4 and the corresponding drainage areas. The accuracy of the MS4 map must be confirmed during the field screening required pursuant to Provision E.2.c. The MS4 map must be included as part of the jurisdictional runoff management program document. Any geographic information system (GIS) layers or files used by the Copermittee to maintain the MS4 map must be made available to the San Diego Water Board upon request. The MS4 map must identify the following:

(a) All segments of the MS4 owned, operated, and maintained by the Copermittee;

(b) All known locations of inlets that discharge and/or collect runoff into the Copermittee's MS4;

(c) All known locations of connections with other MS4s not owned or operated by the Copermittee (e.g. Caltrans MS4s);

(d) All known locations of Major MS4 outfalls and private outfalls that discharge runoff collected from areas within the Copermittee's jurisdiction;

(e) All segments of receiving waters within the Copermittee's jurisdiction that receive and convey runoff discharged from the Copermittee's MS4 outfalls;

(f) Locations of the MS4 outfalls, identified pursuant to Provision D.2.a.(1), within its jurisdiction; and

(g) Locations of the non-storm water persistent flow MS4 outfall discharge monitoring stations, identified pursuant to Provision D.2.b.(2)(b), within its jurisdiction.

(2) Each Copermittee must use Copermittee personnel and contractors to assist in identifying and reporting illicit discharges and connections during their daily employment activities.

(3) Each Copermittee must promote, publicize, and facilitate public reporting of the presence of illicit discharges or water quality impacts associated with discharges to or from the MS4, including the following methods for public reporting:

(a) Operate a public hotline, which can be Copermittee-specific or shared by the Copermittees, and must be capable of receiving reports in both English and Spanish 24 hours per day and seven days per week; and

(b) Designate an e-mail address for receiving electronic reports from the public, which can be Copermittee-specific or shared by the Copermittees, and must be prominently displayed on the Copermittee's webpage and the Regional Clearinghouse required pursuant to Provision F.4.

(4) Each Copermittee must implement practices and procedures (including a notification mechanism) to prevent, respond to, contain, and clean up any spills that may discharge into the MS4 within its jurisdiction from any source. The Copermittee must coordinate, to the extent possible, with spill response teams to prevent entry of spills into the MS4, and prevent contamination of surface waters of the U.S.~~water, ground water, and soil.~~ The Copermittee must coordinate spill prevention, containment, and response activities throughout all appropriate Copermittee departments, programs, and agencies.

(5) Each Copermittee must implement practices and procedures to prevent and limit infiltration of seepage from sanitary sewers (including private laterals and failing septic systems) to the MS4.

(6) Each Copermittee ~~must~~ shall coordinate, when necessary, with upstream Copermittees and/or entities to prevent illicit discharges from upstream sources into the MS4 within its jurisdiction.

c. FIELD SCREENING

Each Copermittee must conduct field screening (i.e. visual observations, field testing, and/or analytical testing) of MS4 outfalls and other portions of its MS4 within its jurisdiction to detect non-storm water and illicit discharges and connections to the MS4 in accordance with the dry weather MS4 outfall discharge monitoring requirements in Provisions D.2.a.(2) and D.2.b.(1).

d. INVESTIGATE AND ELIMINATE ILLICIT DISCHARGES AND CONNECTIONS

Each Copermittee must include the following measures within its program to investigate and eliminate illicit discharges to the MS4:

(1) Each Copermittee must prioritize and determine when follow-up investigations will be performed in response to visual observations and/or water quality monitoring data collected during an investigation of a detected non-storm water or illicit discharge to or from the MS4. The criteria for prioritizing investigations must consider the following:

(a) Pollutants identified as causing or contributing to the highest water quality priorities identified in the Water Quality Improvement Plan;

(b) Pollutants identified as causing or contributing, or threatening to cause or contribute to impairments in water bodies on the 303(d) List and/or in environmentally sensitive areas (ESAs), located within its jurisdiction;

(c) Pollutants identified from sources or land uses known to exist within the area, drainage basin, or watershed that discharges to the portion of the MS4 within its jurisdiction included in the investigation;

(d) Pollutants identified as causing or contributing to an exceedance of a NAL in the Water Quality Improvement Plan where the source has not been identified as natural; and

(e) Pollutants identified as a threat to human health or the environment.

(2) Each Copermittee must implement procedures to investigate and inspect portions of its MS4 that, based on reports or notifications, field screening, or other appropriate information, indicate a reasonable potential of ~~receiving, containing, or~~ discharging pollutants due to illicit discharges, illicit connections, or other sources of non-storm water. The procedures must include the following:

(a) Each Copermittee must develop criteria to:

(i) Assess the validity of each report or notification received; and

(ii) Prioritize the response to each report or notification received.

(b) Each Copermittee must prioritize and respond to each valid report or notification (e.g., public reports, staff or contractor reports and notifications, etc.) of an incident in a timely manner.

(c) In accordance with the procedures defined in Provision E.2.d.(1), ~~E~~each Copermittee must investigate and seek to identify the source(s) of discharges of non-storm water where flows are observed in and from the MS4 during the field screening required pursuant to Provision D.2.b.(1) as follows:

(i) Obvious illicit discharges (i.e., unusual color or odor) must be immediately investigated to identify the source(s) of non-storm water discharges;

(ii) The investigation must include field investigations to identify sources or potential sources for the discharge, unless the source or potential source has already been identified during previous investigations; and

(iii) The investigation may include follow-up field investigations and/or reviewing Copermittee inventories and other land use data to identify potential sources of the discharge.

(d) Each Copermittee must maintain records and a database of the following information:

(i) Location of incident, including hydrologic subarea, portion of MS4 receiving the non-storm water or illicit discharge, and point of discharge or potential discharge from MS4 to receiving water;

(ii) Source of information initiating the investigation (e.g., public reports, staff or contractor reports and notifications, field screening, etc.);

(iii) Date the information used to initiate the investigation was received;

(iv) Date the investigation was initiated;

(v) Dates of follow-up investigations;

(vi) Identified or suspected source of the illicit discharge or connection, if determined;

(vii) Known or suspected related incidents, if any;

(viii) Result of the investigation; and

(ix) If a source cannot be identified and the investigation is not continued, document the response per the requirements of Provision E.2.d.(3) ~~a rationale for why a discharge does not pose a threat to water quality~~

~~and/or does not require additional investigation~~.

(e) Each Copermittee must ~~track~~ document and, if readily identifiable in accordance with Provision E.2.d.(1) procedures, seek to identify the source(s) of non-storm water discharges from the MS4 where there is evidence of non-storm water having been discharged into or from the MS4 (e.g., ~~pooled~~ flowing water), in accordance with MS4 outfall discharge monitoring requirements in Provisions D.2.a.(2) and D.2.b.

(3) Each Copermittee must initiate the implementation of procedures, in a timely manner, to eliminate all detected and identified illicit discharges and connections within its jurisdiction. The procedures must include the following responses:

(a) Each Copermittee must enforce its legal authority, as required under Provision E.1, to eliminate illicit discharges and connections to the MS4.

(b) If the Copermittee identifies the source as a controllable source of non-storm water or illicit discharge or connection, the Copermittee must implement its Enforcement Response Plan pursuant to Provision E.6 and enforce its legal authority to effectively prohibit and eliminate illicit discharges and connections to its MS4.

(c) If the Copermittee identifies the source of the discharge as a category of non-storm water discharges in Provision E.2.a, and the discharge is in exceedance of NALs in the Water Quality Improvement Plan, then the Copermittee must determine if: (1) this is an isolated incident or set of circumstances that will be addressed through its Enforcement Response Plan pursuant to Provision E.6, or (2) the category of discharge must be addressed through the effective prohibition of that category of discharge as an illicit discharge pursuant to Provision E.2.a.(6).

(d) If the Copermittee suspects the source of the non-storm water discharge as natural in origin (i.e. non-anthropogenically influenced) and in conveyance into the MS4, then the Copermittee must document and provide the data and evidence necessary to demonstrate to the San Diego Water Board that it is natural in origin and does not require further investigation.

(e) If the Copermittee is unable to identify and document the source of a recurring non-storm water discharge to or from the MS4, then the Copermittee must address the discharge as an illicit discharge and update its jurisdictional runoff management program to address the common and suspected sources of the non-storm water discharge within its jurisdiction in accordance with the Copermittee's priorities.

(4) Each Copermittee must submit a summary of the non-storm water discharges

and illicit discharges and connections investigated and eliminated within its jurisdiction with each Annual Report required under Provision F.3.b of this Order.

e. STRATEGIES TO ADDRESS THE HIGHEST PRIORITY WATER QUALITY CONDITIONS

Each Copermittee must describe in its jurisdictional runoff management program document the strategies and/or activities that will be implemented as part of the illicit discharge detection and elimination program to address non-storm water and illicit discharges and connections that the Copermittee has identified as potential sources of pollutants and/or stressors that contribute to the highest priority water quality conditions in the Watershed Management Area as follows:

(1) Provide specific details about how the strategies and/or activities will be implemented (e.g. designate additional BMPs, focus education, and/or increase/decrease frequency of inspections in specific areas); and

(2) The strategies and/or activities must be consistent with the requirements of Provisions E.2.a-d and the strategies identified in the Water Quality Improvement Plan.

3. Development Planning

Each Copermittee~~ ~~, within their respective jurisdictions and to the extent that they may lawfully impose requirements, must ~~use their land use and planning authorities to~~ implement a development planning program in accordance with the strategies identified in the Water Quality Improvement Plan and includes, at a minimum, the following requirements:

a. BMP REQUIREMENTS FOR ALL DEVELOPMENT PROJECTS

Each Copermittee, as practical and feasible, must prescribe the following BMP requirements during the planning process (i.e. prior to project approval and issuance of local permits) for all development projects (regardless of project type or size), where local permits are issued, including unpaved roads and flood management projects, except emergency projects implemented for the protection of persons and property:

(1) General Requirements

(a) Onsite BMPs must be located so as to remove pollutants from runoff prior to its discharge to any receiving waters, and as close to the source as possible; and

(b) Structural BMPs must not be constructed within a water~~s~~ of the U.S. unless authorized by the San Diego Water Board Executive Officer~~or~~

~~waters of the state~~.

(2) Source Control BMP Requirements

The following source control BMPs must be implemented at all development projects where applicable and feasible:

(a) Prevention of illicit discharges into the MS4;

(b) Storm drain system stenciling or signage;

(c) Properly designed outdoor material storage areas;

(d) Properly designed outdoor work areas;

(e) Properly designed trash storage areas; and

(f) Any additional BMPs necessary to minimize pollutant generation at each project.

(3) Low Impact Development (LID) BMP Requirements

The following LID BMPs must be implemented at all development projects where applicable and feasible:

(a) Maintenance or restoration of natural storage reservoirs and drainage corridors (including topographic depressions, areas of permeable soils, natural swales, and ephemeral and intermittent streams);[22]

(b) Buffer zones for natural water bodies (where buffer zones are technically infeasible, require project applicant to include other buffers such as trees, access restrictions, etc.);

(c) Conservation of natural areas within the project footprint including existing trees, other vegetation, and soils;

(d) Construction of streets, sidewalks, or parking lot aisles to the minimum widths necessary, provided public safety is not compromised;

(e) Minimization of the impervious footprint of the project;

(f) Minimization of soil compaction to landscaped areas;

[22] Development projects proposing to dredge or fill materials in waters of the U.S. must obtain a CWA Section 401 Water Quality Certification. Projects proposing to dredge or fill waters of the state must obtain waste discharge requirements.

(g) Disconnection of impervious surfaces through distributed pervious areas;

(h) Landscaped or other pervious areas designed and constructed to effectively receive and infiltrate, retain and/or treat runoff from impervious areas, prior to discharging to the MS4;

(i) Small collection strategies located at, or as close as possible to, the source (i.e. the point where storm water initially meets the ground) to minimize the transport of runoff and pollutants to the MS4 and receiving waters;

(j) Use of permeable materials for projects with low traffic areas and appropriate soil conditions;

(k) Landscaping with native or drought tolerant species; and

(l) Harvesting and using precipitation.

b. PRIORITY DEVELOPMENT PROJECTS

(1) Definition of Priority Development Project

Priority Development Projects include the following:

(a) All new development projects that fall under the Priority Development Project categories listed under Provision E.3.b.(2) (where a new development project feature, such as a parking lot, falls into a Priority Development Project category, the entire project footprint is subject to Priority Development Project requirements); and

(b) Those redevelopment projects that create, add, or replace at least 5,000 square feet of impervious surfaces on an already developed site, and the redevelopment project is a Priority Development Project category listed under Provision E.3.b.(2) (where redevelopment results in an increase of less than fifty percent of the impervious surfaces of a previously existing development and was not subject to previous Priority Project Development requirements, and the existing development was not subject to Priority Development Project requirements, the performance requirements of Provisions E.3.c.(1) and E.3.c.(2) apply only to the addition or replacement, and not to the entire development; where redevelopment results in an increase of more than fifty percent of the impervious surfaces of a previously existing development, the performance requirements of Provisions E.3.c.(1) and E.3.c.(2) apply to the entire development).

~~(b)~~(c) Projects where redevelopment results in an increase of more than fifty percent of impervious surfaces of a previously existing development, and the existing development was subject to previous Priority Project Development Requirements, only the altered portion of development is subject to the new Priority Development Project requirements.

(2) Priority Development Project Categories

(a) New development projects that create 10,000 square feet or more of impervious surfaces (collectively over the entire project site). This category includes commercial, industrial, residential, mixed-use, and public development projects on public or private land which fall under the planning and building authority of the Copermittee.

~~(b) Automotive repair shops. This category is defined as a facility that is categorized in any one of the following Standard Industrial Classification (SIC) codes: 5013, 5014, 5541, 7532-7534, or 7536-7539.~~

~~(c) Restaurants. This category is defined as a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC code 5812), where the land area for development is 5,000 square feet or more.~~

~~(d) Hillside development projects. This category includes any development which creates 5,000 square feet or more of impervious surface which is located in an area with known erosive soil conditions, where the development will grade on any natural slope that is twenty-five percent or greater.~~

~~(e) Environmentally sensitive areas (ESAs). This category includes any development located within, directly adjacent to, or discharging directly to an ESA, which either creates 2,500 square feet of impervious surface on a proposed project site or increases the area of imperviousness of a proposed project site to 10 percent or more of its naturally occurring condition. "Directly adjacent to" means situated within 200 feet of the ESA. "Discharging directly to" means outflow from a drainage conveyance system that collects runoff from the subject development or redevelopment site and terminates at or in receiving waters within the ESA.~~

~~(f) Parking lots. This category is defined as a land area or facility for the temporary parking or storage of motor vehicles used personally, for business, or for commerce that has 5,000 square feet or more of impervious surface.~~

~~(g) Streets, roads, highways, freeways, and driveways. This category is defined as any paved impervious surface that is 5,000 square feet or more~~

~~used for the transportation of automobiles, trucks, motorcycles, and other vehicles.~~

~~(h) Retail gasoline outlets (RGOs). This category includes RGOs that meet the following criteria: (a) 5,000 square feet or more or (b) a projected Average Daily Traffic (ADT) of 100 or more vehicles per day.~~

(b) Development projects that create 5,000 square feet or more of impervious surfaces (collectively over the entire project site), and support one or more of the following uses (see Appendix C for definitions):

(i) Automotive repair shop

(ii) Restaurant

(iii) Parking lot

(iv) Street, road, highway, freeway and driveway

(v) Retail gasoline outlet (RGO)

~~(i)~~(c) Development projects that create 2,500 square feet or more of impervious surfaces (collectively over the entire project site) and where the project will directly discharge to an Environmentally Sensitive Area (see Appendix C for definitions).

~~(j)~~(d) Large development projects. This category includes any post-construction pollutant-generating new development projects that result in the disturbance of one acre or more of land.

(3) Priority Development Project Exemptions

Each Copermittee has the discretion to exempt the following projects from being defined as Priority Development Projects:

(a) New paved sidewalks, bicycle lanes, driveways, or trails that meet the following criteria:

(i) Designed and constructed to direct storm water runoff to adjacent vegetated areas, or other non-erodible permeable areas; OR

(ii) Designed and constructed to be hydraulically disconnected from paved streets or roads; OR

(iii) Designed and constructed with permeable pavements or surfaces in accordance with USEPA Green Streets guidance.[23]

[23] See "Managing Wet Weather with Green Infrastructure – Municipal Handbook: Green Streets" (USEPA, 2008).

(b) Any paved impervious surface that is 5,000 square feet or more used for the transportation of automobiles, trucks, motorcycles, and other vehicles that follows the USEPA guidance regarding Managing Wet Weather with Green Infrastructure: Green Streets, or equivalent standards, to the maximum extent practicable.

~~(b) Retrofitting of existing paved alleys, streets or roads that meet the following criteria:~~

~~(i) Must be two lanes or less; AND~~

~~(ii) Must be a retrofitting project implemented as part of an alternative compliance project option under Provision E.3.c.(3)(b)(v) to achieve the performance requirements of Provisions E.3.c.(1) and/or E.3.c.(2) for a Priority Development Project; AND~~

~~(iii) Designed and constructed in accordance with the USEPA Green Streets guidance.~~[24]

(c) New single family residences that meet the following criteria:

(i) Must not be constructed as part of a larger development or proposed subdivision; AND

(ii) Designed and constructed to meet requirements for certification ~~to be certified~~ under the U.S. Green Building Council (USGCB) Leadership in Energy and Environmental Design (LEED) for Homes green building certification program, receiving at least four (4) Surface Water Management credits under the Sustainable Sites category~~;~~,[25] or other locally accepted certification of equivalent effectiveness; OR

(iii) Designed and constructed with ~~structural~~ BMPs that will achieve ~~the~~ equivalent performance to the requirements of Provisions E.3.c.(1) and E.3.c.(2) onsite, OR

~~(iii)~~(iv) Designed and constructed with structural BMPs that meet minimum performance standards, as outlined in the BMP Design Manual.

(d) Redevelopment of existing single family residences that meet the following criteria:

(i) Designed and constructed to meet requirements for certification ~~to be certified~~ under the USGCB LEED for Homes green building certification program, receiving at least four (4) Surface Water

~~[24] Ibid.~~
[25] See LEED for Homes rating system at http://www.usgbc.org

Management credits under the Sustainable Sites category~~;~~,[26] or other locally accepted certification of equivalent effectiveness; OR

(ii) Designed and constructed with ~~structural~~ BMPs that will achieve ~~the~~ equivalent performance to the requirements of Provisions E.3.c.(1) and E.3.c.(2) onsite; OR

(iii) Designed and constructed with structural BMPs that meet minimum performance standards, as outlined in the BMP Design Manual.

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c. PRIORITY DEVELOPMENT PROJECT STRUCTURAL BMP PERFORMANCE REQUIREMENTS

In addition to the BMP requirements listed for all development projects under Provision E.3.a, Priority Development Projects must also implement structural BMPs that conform to performance requirements below. Alternatively, watershed-specific performance requirements may be developed as part of a Water Quality Improvement Plan; these requirements would replace the general performance requirements below. Watershed-specific requirements must provide at least equivalent protection as the general performance requirement below.

(1) Storm Water Pollutant Control BMP Requirements

Each Copermittee must require each Priority Development Project to implement onsite structural BMPs to control pollutants in storm water that may be discharged from a project as follows:

(a) Each Priority Development Project must be required to implement LID BMPs that are designed to retain (i.e. intercept, store, infiltrate, evaporate, and evapotranspire) onsite the pollutants contained in the design capture volume. The design capture volume is equivalent to:

(i) The volume of storm water produced from a 24-hour 85th percentile storm event;[27] OR

(ii) The volume of storm water that would be retained onsite prior to the project~~if the site was fully undeveloped and naturally vegetated~~, as determined using continuous simulation modeling or other techniques based on site-specific soil conditions and ~~typical native~~ vegetative cover.

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[26] See LEED for Homes rating system at http://www.usgbc.org

[27] This volume is not a single volume to be applied to all areas covered by this Order. The size of the 85th percentile storm event is different for various parts of the San Diego Region. The Copermittees are encouraged to calculate the 85th percentile storm event for each of its jurisdictions using local rain data pertinent to its particular jurisdiction. In addition, isopluvial maps may be used to extrapolate rainfall data to areas where insufficient data exists in order to determine the volume of the local 85th percentile storm event in such areas. Where the Copermittees will use isopluvial maps to determine the 85th percentile storm event in areas lacking rain data, the Copermittees must describe their method for using isopluvial maps in its BMP Design Manuals. The volume is a single event-based volume that occurs after an extended dry period.

(b) A Priority Development Project may be allowed to utilize alternative compliance under Provision E.3.c.(3) to comply with the storm water pollutant control BMP performance requirements of Provision E.3.c.(1)(a).

(c) If a Priority Development project is allowed to utilize alternative compliance pursuant to Provisions E.3.c.(1)(b), flow-thru conventional treatment control BMPs must be implemented to treat the portion of the design capture volume that is not retained onsite. Additionally, project applicants must mitigate for the portion of the pollutant load in the design capture volume that is not retained onsite through one or more alternative compliance options under Provision E.3.c.(3). Conventional treatment control BMPs must be sized and designed to:

(i) Remove pollutants from storm water to the MEP;

(ii) Filter or treat either: 1) the maximum flow rate of runoff produced from a rainfall intensity of 0.2 inch of rainfall per hour, for each hour of a storm event, or 2) the maximum flow rate of runoff produced by the 85th percentile hourly rainfall intensity (for each hour of a storm event), as determined from the local historical rainfall record, multiplied by a factor of two;

(iii) Be ranked with high or medium pollutant removal efficiency for the Priority Development Project's most significant pollutants of concern. Conventional treatment control BMPs with a low removal efficiency ranking must only be approved by a Copermittee when a feasibility analysis has been conducted which exhibits that implementation of conventional treatment control BMPs with high or medium removal efficiency rankings are infeasible for a Priority Development Project or portion of a Priority Development Project.

(2) Hydromodification Management BMP Requirements

Each Copermittee must require each Priority Development Project to implement onsite structural BMPs to manage hydromodification that may be caused by storm water runoff discharged from a project as follows:

(a) Post-project runoff flow rates and durations must not exceed pre-project~~development (naturally occurring)~~ runoff flow rates and durations by more than 10 percent (for the range of flows that result in increased potential for erosion, or degraded instream habitat conditions downstream of Priority Development Projects).

(i) In evaluating the range of flows that results in increased potential for erosion of natural (non-hardened) channels, the lower boundary must correspond with the critical channel flow that produces the critical shear stress that initiates channel bed movement or that erodes the toe of channel banks.

~~(ii) For artificially hardened channels, analysis to identify the lower boundary must use characteristics of a natural stream segment similar to that found in the watershed. The lower boundary must correspond with the critical channel flow that produces the critical shear stress that initiates channel bed movement or erodes the toe of the channel banks.~~

~~(iii)~~(ii) The Copermittees may use monitoring results collected pursuant to Provision D.1.a.(2) to re-define the range of flows resulting in increased potential for erosion, or degraded instream habitat conditions, as warranted by the data.

(b) In accordance with the BMP Design Manual, projects shall preserve or provide compensation for significant losses of sediment supply anticipated as a result of development. ~~Post-project runoff flow rates and durations must compensate for the loss of sediment supply due to the development project, should loss of sediment supply occur as a result of the development project.~~

(c) A Priority Development Project may be allowed to utilize alternative compliance under Provision E.3.c.(3) to comply with the performance requirements of Provisions E.3.c.(2)(a)-(b).

(d) Exemptions

Each Copermittee has the discretion to exempt a Priority Development Project from the hydromodification management BMP performance requirements of Provisions E.3.c.(2)(a)-(b) where the project:

(i) Discharges storm water runoff into existing underground storm drains discharging directly to water storage reservoirs, lakes, enclosed embayments, tidally influenced waters, or the Pacific Ocean;

(ii) Discharges stormwater runoff into conveyance channels whose bed and bank are stabilized (e.g. concrete lined, an engineering interlocking paver, gabion system, etc.) all the way from the point of discharge to water storage reservoirs, lakes, enclosed embayments, tidally influenced waters, or the Pacific Ocean;

~~(ii)~~(iii) Is a redevelopment Priority Development Project that meets the alternative compliance requirements of Provision E.3.c.(3)(b)(ii); or

~~(iii)~~(iv) Discharges storm water runoff into other areas identified by the San Diego Water Board as exempt, including those exemptions recognized in the 2010 San Diego Hydromodification Plan, approved by the San Diego Water Board Resolution No. R9-2010-0066, from the requirements of Provisions E.3.c.(2)(a)-(b).

(3) Alternative Compliance to Onsite Structural BMP Performance Requirements

Alternative compliance is an optional program for each jurisdiction to utilize if it is determined to provide an equivalent or greater benefit to the watershed than onsite compliance. Where alternative compliance is allowed, the determination of the responsible party to execute the onsite alternative compliance is at the jurisdiction's discretion and in accordance with policies set in place in the individual jurisdiction or in coordination with other jurisdictions, agencies, or Copermittees:

(a) Applicability

At the discretion of each Copermittee, Priority Development Projects may be allowed to utilize an alternative option to comply with the onsite structural BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2) under the following conditions:

(i) The Copermittee must determine that implementation of the alternative compliance option will have an equal or greater overall water quality benefit for the Watershed Management Area than fully complying with the performance requirements of Provisions E.3.c.(1) and E.3.c.(2) onsite;

(ii) The alternative compliance options must be designed by a registered professional engineer, geologist, architect, biologist, hydrologist, or landscape architect, or other appropriate certified professional;

(iii) The alternative compliance options must be implemented within the same ~~hydrologic unit~~ Watershed Management Area as the Priority Development Project, and preferably within the same hydrologic subarea;

~~(iv) Receiving waters must not be utilized to convey storm water runoff to the alternative compliance options;~~

~~(v) The pollutants in storm water runoff from the Priority Development Project must be treated to the MEP by the alternative compliance options prior to being discharged to receiving waters;~~

~~(vi)~~(iv) Unless otherwise allowed by Provision E.3.c.(3)(b), the alternative compliance options must have a net result of at least the same level of pollutant removal as would have been achieved if the Priority Development Project had fully complied with the storm water pollutant control BMP performance requirements of Provision E.3.c.(1) onsite;

~~(vii)~~(v) Unless otherwise allowed by Provision E.3.c.(3)(b), the alternative compliance options must have a net result of at least the same level of protection from potential downstream and upstream erosion in the receiving water as would have been achieved if the Priority

Development Project had fully complied with the hydromodification management BMP performance requirements of Provision E.3.c.(2) onsite; and

~~(viii)~~(vi) The alternative compliance options utilized by the Priority Development Project to comply with the performance requirements of Provisions E.3.c.(1) and E.3.c.(2) must have reliable sources of funding for operation and maintenance.

(b) Alternative Compliance Project Options

The Copermittee may allow implementation of one or more of the following project options as part of an alternative approach to complying with the onsite structural BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2):

(i) *Onsite LID Biofiltration Treatment Control BMPs*

The Copermittee may allow Priority Development Projects to utilize onsite LID biofiltration treatment control BMPs to comply with the storm water pollutant control BMP performance requirements of Provision E.3.c.(1). Onsite LID biofiltration treatment control BMPs must be sized and designed to:

[a] Remove pollutants from storm water to the MEP; AND
[b] Have an appropriate surface loading rate to prevent erosion, scour and channeling within the BMP; AND
[c] Biofilter at least 1.5 times the design capture volume that is not reliably retained onsite; OR
[d] Biofilter up to the design capture volume that is not reliably retained onsite, AND 1) treat the remaining portion of the design capture volume not retained onsite with conventional treatment control BMPs in accordance with Provision E.3.c.(1)(c), and 2) if necessary, mitigate for the portion of the pollutant load in the design capture volume not retained onsite through one or more alternative compliance project, in-lieu fee and/or water quality credit system options below.

(ii) *LEED Certified Redevelopment Projects*

The Copermittee may ~~allow~~ exempt redevelopment Priority Development Projects ~~to comply with~~ from the hydromodification management BMP performance requirements of Provision E.3.c.(2) where the project is designed and constructed to be certified under the USGCB LEED for New Construction and Major Renovations green building certification program or other locally accepted certification of equivalent effectiveness. The Priority Development Project must receive at least one (1) Site Design credit and two (2)

Stormwater Design credits under the Sustainable Sites category.[28] In addition, the existing and future configuration of the receiving water must not be unnaturally altered or adversely impacted by storm water flow rates and durations discharged from the site.

(iii) *Watershed-Based Planned Development Projects*

The Copermittee may allow Priority Development Projects greater than 100 acres in total project size (or smaller than 100 acres in size yet part of a larger common plan of development that is over 100 acres) to comply with the onsite structural BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2) under~~. The Priority Development Project must comply with~~ the following conditions:

[a] The Priority Development Project was planned utilizing watershed and/or subwatershed based water quality, hydrologic, and fluvial geomorphologic planning principles that implement regional LID BMPs in accordance with the performance and location criteria of this Order and acceptable to the San Diego Water Board;
[b] Regional LID BMPs may be used provided that the BMPs capture and retain the volume of runoff produced from the design capture volume defined in Provision E.3.c.(1)(a)(i) and that such controls are located upstream of receiving waters;
[c] Regional LID BMPs must clearly exhibit that they will not result in a net impact from pollutant loadings over and above the impact caused by capture and retention of the design capture volume;
[d] Any portion of the design capture volume that is not retained by the regional LID BMPs must be treated using biofiltration BMPs; and
[e] Where regional LID BMPs are demonstrated to the Copermittee as technically infeasible to retain the entire design capture volume, any volume up to and including the design capture volume not retained by regional LID BMPs, nor treated by biofiltration BMPs, must be treated using conventional treatment control BMPs and the project applicant must implement additional alternative compliance project, in-lieu fee and/or water quality credit system options below.

(iv) *Offsite Regional BMPs*

[a] The Copermittee may allow Priority Development Projects to utilize offsite regional BMPs to comply with the storm water pollutant control BMP performance requirements of Provision E.3.c.(1) if the offsite regional BMPs have the capacity to receive and retain at least 1.1 times the design capture volume that is not reliably retained onsite.

[28] See LEED for New Construction and Major Renovations rating system at http://www.usgbc.org

[b] The Copermittee may allow Priority Development Projects to utilize offsite regional BMPs to comply with the hydromodification management BMP performance requirements of Provision E.3.c.(2) if the offsite regional BMPs ~~have the capacity to manage the storm water flows rates and durations from the site such that the receiving waters are protected from the potential for increased erosion that would be caused if the unmanaged portion of the runoff was discharged from the site~~will have a greater overall receiving water benefit within the Watershed Management Area than implementation of the hydromodification controls onsite.

(v) *Offsite Retrofitting Projects*

The Copermittee may allow Priority Development Projects to utilize offsite retrofitting projects to comply with the storm water pollutant control and hydromodification management BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2) if the retrofitting projects have been identified within the strategies included in the Water Quality Improvement Plan, or identified as potential retrofitting projects by the Copermittee pursuant to Provision E.5.

(vi) *Offsite Channel, Stream, or Habitat Rehabilitation Projects*

The Copermittee may allow Priority Development Projects to utilize offsite channel, stream, or habitat rehabilitation projects to comply with the hydromodification management BMP performance requirements of Provision E.3.c.(2) if the rehabilitation projects have been identified within the strategies included in the Water Quality Improvement Plan, or identified as potential channel rehabilitation projects by the Copermittee pursuant to Provision E.5. The channel, stream, or habitat rehabilitation project cannot be utilized for pollutant treatment ~~except~~ unless constructed with an artificial wetland.~~where artificial wetlands are constructed and located upstream of receiving waters~~.

(vii) *Offsite Regional Water Supply Augmentation Projects*

The Copermittee may allow Priority Development Projects to utilize offsite regional water supply augmentation projects (i.e. groundwater recharge, recycled water, storm water harvesting) to comply with the storm water pollutant control and hydromodification management BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2) if the projects have been identified within the strategies included in the Water Quality Improvement Plan.

(viii) *Project Applicant Proposed Alternative Compliance Projects*

The Copermittee may allow one or more Priority Development Project applicant(s) to propose and implement alternative compliance projects to comply with the storm water pollutant control and hydromodification management BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2) if the alternative compliance projects are consistent with, and will address the highest water quality priorities of the Water Quality Improvement Plan, and comply with the requirements of Provision E.3.c.(3)(a).

(c) Alternative Compliance In-Lieu Fee Option

The Copermittee may develop and implement an alternative compliance in-lieu fee option, individually or with other Copermittees and/or entities, as a means for designing, developing, constructing, operating and/or maintaining offsite alternative compliance projects under Provision E.3.c.(3)(b). Priority Development Projects allowed to utilize the alternative compliance in-lieu fee option must comply with the following conditions:

(i) The in-lieu fee must be transferred to the Copermittee (for public projects) or an escrow account (for private projects) prior to the construction initiation date ~~construction~~ of the Priority Development Project~~ is initiated~~.

(ii) If the in-lieu fee is applied to the development, design, ~~and~~ construction, operation and maintenance of offsite alternative compliance projects, the following conditions must be met:

[a] The offsite alternative compliance projects must allow the Priority Development Project to comply with the onsite BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2);

[b] The offsite alternative compliance projects must be constructed as soon as possible, but no later than ~~4~~ 8 years after the certificate of occupancy is granted for the first Priority Development Project that contributed funds toward the construction of the offsite alternative compliance projects, unless a longer period of time is authorized by the San Diego Water Board Executive Officer;

~~[c] The in-lieu fee for the Priority Development Project must include mitigation of the pollutant loads and increased storm water flow rates and durations that are allowed to discharge from the site before the offsite alternative compliance projects are constructed; and~~

[d] The in-lieu fee must ~~also~~ include the cost to operate and maintain the offsite alternative compliance projects for the anticipated life of the constructed priority development project.

(iii) If the in-lieu fee ~~is applied~~ applies only to the operation and maintenance of offsite alternative compliance projects that have already been constructed, the offsite alternative compliance projects must allow the Priority Development Project to comply with the onsite structural BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2).

(d) Alternative Compliance Water Quality Credit System Option

The Copermittee may develop and implement an alternative compliance water quality credit system option, individually or with other Copermittees and/or entities, provided that such a credit system clearly exhibits that it will not allow discharges from Priority Development Projects to cause or contribute to a net impact over and above the impact caused by projects meeting the onsite structural BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2). Any credit system that a Copermittee chooses to implement must be submitted to the San Diego Water Board Executive Officer for review and acceptance as part of the Water Quality Improvement Plan.

~~(3)~~(4) Long-Term Structural BMP Maintenance

Each Copermittee must require the project applicant to submit proof of the mechanism under which ongoing long-term maintenance of all structural BMPs will be conducted.

~~(4)~~(5) Infiltration and Groundwater Protection

(a) Structural BMPs designed to primarily function as large, centralized infiltration devices (such as large infiltration trenches and infiltration basins) must not cause or contribute to an exceedance of an applicable groundwater quality objective. At a minimum, such infiltration BMPs must be in conformance with the design criteria listed below, unless the development project applicant demonstrates to the Copermittee that one or more of the specific design criteria listed below are not necessary to protect groundwater quality. The design criteria listed below do not apply to small infiltration systems dispersed throughout a development project.

(i) Runoff must undergo pretreatment such as sedimentation or filtration prior to infiltration;

(ii) Pollution prevention and source control BMPs must be implemented at a level appropriate to protect groundwater quality at sites where infiltration BMPs are to be used;

(iii) Infiltration BMPs must be adequately maintained to remove pollutants in storm water to the MEP;

(iv) The vertical distance from the base of any infiltration BMP to the seasonal high groundwater mark must be at least 10 feet. Where groundwater basins do not support beneficial uses, this vertical distance criteria may be reduced, provided groundwater quality is maintained;

(v) The soil through which infiltration is to occur must have physical and chemical characteristics (e.g., appropriate cation exchange capacity, organic content, clay content, and infiltration rate) which are adequate for proper infiltration durations and treatment of runoff for the protection of groundwater beneficial uses;

(vi) Infiltration BMPs must not be used for areas of industrial or light industrial activity, and other high threat to water quality land uses and activities as designated by each Copermittee, unless runoff does not exceed Basin Plan water quality standards or runoff is first treated or filtered to remove pollutants prior to infiltration; and

(vii) Infiltration BMPs must be located a minimum of 100 feet horizontally from any water supply wells.

(b) The Copermittee may develop, individually or with other Copermittees, alternative mandatory design criteria to that listed above for infiltration BMPs which are designed to primarily function as centralized infiltration devices. Before implementing the alternative design criteria in the development planning process the Copermittee(s) must:

(i) Notify the San Diego Water Board of the intent to implement the alternative design criteria submitted; and

(ii) Comply with any conditions set by the San Diego Water Board.

d. BMP DESIGN MANUAL UPDATE

Each Copermittee must update its BMP Design Manual[29] pursuant to Provision F.2.b. Until the Copermittee has updated its BMP Design Manual with the requirements of Provisions E.3.a-c, the Copermittee must continue implementing its current BMP Design Manual. Unless directed otherwise by the San Diego Water Board, the Copermittee must implement the BMP Design Manual within 180 days of completing the update. The update of the BMP Design Manual must include the following:

(1) Updated procedures to determine the nature and extent of storm water requirements applicable to a potential development or redevelopment projects. These procedures must inform project applicants of the storm water management requirements applicable to their project including, but not limited to, general requirements for all development projects, structural BMP design procedures and requirements, hydromodification management requirements, requirements specific to phased projects, and procedures specific to private

[29] The BMP Design Manual was formerly known as the Standard Storm Water Mitigation Plan under Order Nos. R9-2007-0001, R9-2009-0002, and R9-2010-0016.

developments and public improvement projects;

(2) Updated procedures to identify pollutants and conditions of concern for selecting the most appropriate structural BMPs that consider, at a minimum, the following:

(a) Receiving water quality (including pollutants for which receiving waters are listed as impaired under the CWA section 303(d) List);

(b) Pollutants, stressors, and/or receiving water conditions that cause or contribute to the highest priority water quality conditions identified in the Water Quality Improvement Plan;

(c) Land use type of the project and pollutants associated with that land use type; and

(d) Pollutants expected to be present onsite.

(3) Updated procedures for designing structural BMPs, including any updated performance requirements to be consistent with the requirements of Provision E.3.c for all structural BMPs listed in the BMP Design Manual;

(4) Long-term maintenance criteria for each structural BMP listed in the BMP Design Manual; and

(5) Alternative compliance criteria, in accordance with the requirements under Provision E.3.c.(3), if the Copermittee elects to allow Priority Development Projects within its jurisdiction to utilize alternative compliance.

e. PRIORITY DEVELOPMENT PROJECT BMP IMPLEMENTATION AND OVERSIGHT

Each Copermittee must implement a program that requires and confirms structural BMPs on all Priority Development Projects are designed, constructed, and maintained to remove pollutants in storm water to the MEP.

(1) Structural BMP Approval and Verification Process

(a) Each Copermittee must require and confirm that for all Priority Development Project applications that have not received prior lawful approval by the Copermittee by 18 months after the commencement of coverage under this Order, the requirements of Provision E.3 are implemented. For project applications that have received prior lawful approval by 18 months after the commencement of coverage under this Order, the Copermittee may allow previous land development requirements to apply.

(b) Each Copermittee must identify the roles and responsibilities of various municipal departments in implementing the structural BMP requirements, including each stage of a project from application review and approval through BMP maintenance and inspections.

(c) Each Copermittee must require and confirm that appropriate easements and ownerships are properly recorded in public records~~ and the information is conveyed to all appropriate parties when there is a change in project or site ownership~~.

(d) Each Copermittee must require and confirm that prior to occupancy and/or intended use of any portion of the Priority Development Project, each structural BMP is inspected to verify that it has been constructed and is operating in compliance with all of its specifications, plans, permits, ordinances, and the requirements of this Order.

(2) Priority Development Project Inventory and Prioritization

(a) Each Copermittee must develop, maintain, and update ~~ at least annually~~regularly, a watershed-based database to track and inventory all Priority Development Projects and associated structural BMPs within its jurisdiction. Inventories must be accurate and complete beginning from January 2002 for the San Diego County Copermittees, February 2003 for the Orange County Copermittees, and July 2005 for the Riverside County Copermittees, where data is available. The use of an automated database system, such as GIS, is highly recommended. The database must include, at a minimum, the following information:

(i) Priority Development Project location (address and hydrologic subarea);

(ii) Descriptions of structural BMP type(s);

(iii) Date(s) of construction;

(iv) Party responsible for structural BMP maintenance;

(v) Dates and findings of structural BMP maintenance verifications; and

(vi) Corrective actions and/or resolutions when applicable.

(b) Each Copermittee must prioritize the Priority Development Projects with structural BMPs within its jurisdiction. The designation of Priority Development Projects as high priority must consider the following:

(i) The highest water quality priorities identified in the Water Quality Improvement Plan;

(ii) Receiving water quality;

(iii) Number and sizes of structural BMPs;

(iv) Recommended maintenance frequency of structural BMPs;

(v) Likelihood of operation and maintenance issues of structural BMPs;

(vi) Land use and expected pollutants generated; and

(vii) Compliance record.

(3) Structural BMP Maintenance Verifications and Inspections

Each Copermittee is required to verify that structural BMPs on each Priority Development Project are adequately maintained, and continue to operate effectively to remove pollutants in storm water to the MEP through inspections, self-certifications, surveys, or other equally effective approaches.

(a) All (100 percent) of the structural BMPs at Priority Development Projects that are designated as high priority must be inspected directly by the Copermittee annually prior to each rainy season;

(b) For verifications performed through a means other than direct Copermittee inspection, adequate documentation must be required by the Copermittee to provide assurance that the required maintenance of structural BMPs at each Priority Development Project has been completed; and

(c) Appropriate follow-up measures (including re-inspections, enforcement, etc.) must be conducted to ensure that structural BMPs at each Priority Development Project continue to reduce pollutants in storm water to the MEP as originally designed.

f. DEVELOPMENT PROJECT ENFORCEMENT

Each Copermittee must enforce its legal authority established pursuant to Provision E.1 for all development projects, as necessary, to achieve compliance with the requirements of this Order, in accordance with its Enforcement Response Plan pursuant to Provision E.6.

g. STRATEGIES TO ADDRESS THE HIGHEST PRIORITY WATER QUALITY CONDITIONS

Each Copermittee must describe in its jurisdictional runoff management program document the strategies and/or activities that will be implemented as part of the development planning program to address development and redevelopment projects that may become sources of pollutants and/or stressors that contribute to the highest priority water quality conditions in the Watershed Management Area as follows:

(1) Provide specific details about how the strategies and/or activities will be implemented (e.g. designate additional BMPs, focus education, increase frequency of verifications and/or inspections, alternative compliance options);

(2) Each Copermittee must identify areas within its jurisdiction where Priority

Development Projects may be allowed or should be encouraged to implement or contribute toward the implementation of alternative compliance retrofitting and/or stream, channel, or habitat rehabilitation projects;

(3) Each Copermittee should collaborate and cooperate with other Copermittees and/or entities in the Watershed Management Area to identify regional alternative compliance projects that Priority Development Projects may be allowed or should be encouraged to implement or participate in implementing; and

(4) The strategies and/or activities must be consistent with the requirements of Provisions E.3.a-c and E.3.e-f and the strategies identified in the Water Quality Improvement Plan.

4. Construction Management

Each Copermittee must implement a construction management program in accordance with the strategies identified in the Water Quality Improvement Plan and includes, at a minimum, the following requirements:

a. Construction Program Management

Each Copermittee must define in the Jurisdictional Runoff Management Plan the following:

(1) Define construction sites to be inventoried, such as sites that involve any ground disturbance or soil disturbing activities.

(2) Define a process for confirming adequate construction BMP implementation for non-inventoried sites. Non-inventoried sites involve minor construction activities that are not anticipated to create storm water pollution such as interior improvements, plumbing, electrical and mechanical work.

~~a.~~ b. Project Approval Process

Prior to issuance of any local permit(s) that allows the commencement of construction projects that involve ground disturbance or soil disturbing activities that can potentially generate pollutants in storm water runoff, each Copermittee must:

(1) Require a site-specific Pollution Control, construction BMP, and/or erosion and sediment control plan, to be submitted by the project applicant to the Copermittee;

(2) Confirm the Pollution Control, construction BMP, and/or erosion and sediment control plan, complies with the local grading ordinance, other applicable local

ordinances, and the requirements of this Order;

(3) Confirm the Pollution Control, construction BMP, and/or erosion and sediment control plan, includes seasonally appropriate and effective BMPs and management measures described in Provision E.4.c, as applicable to the project; and

(4) Verify that the project applicant has obtained coverage under ~~applicable permits, including, but not limited to~~ the Construction General Permit~~, Clean Water Act Section 401 Water Quality Certification and Section 404 Permit, and California Department of Fish and Game Streambed Alteration Agreement~~.

~~i.~~c. **CONSTRUCTION SITE INVENTORY AND TRACKING**

(1) Each Copermittee must maintain, and update at least monthly, a watershed-based inventory of all construction projects issued a local permit that allows ground disturbance or soil disturbing activities that can potentially generate pollutants in storm water runoff. The use of an automated database system, such as GIS, is highly recommended. The inventory must include:

(a) Relevant contact information for each site (e.g., name, address, phone, and email for the owner and contractor);

(b) The basic site information including location (address and hydrologic subarea), Waste Discharge Identification (WDID) number (if applicable), size of the site, and approximate area of disturbance;

(c) Whether or not the site is considered a high threat to water quality, as defined in Provision E.4.b.(2) below;

(d) The project start and ~~anticipated completion~~ completed dates;

(e) Current construction phase;

(f) The required inspection frequency, as defined in the Copermittee's jurisdictional runoff management program document;

(g) The date the Copermittee accepted and/or approved the site-specific pollution control, construction BMP, and/or erosion and sediment control plan; and

(h) Whether or not there are ongoing enforcement actions administered to the site.

(2) Each Copermittee must identify all construction sites within its jurisdiction that represent a high threat to downstream surface water quality. The designation of construction sites as high threat to water quality must consider the

following:

(a) Sites located within a hydrologic subarea where sediment is known or suspected to contribute to the highest priority water quality conditions identified in the Water Quality Improvement Plan;

(b) Sites located within the same hydrologic subarea and tributary to a water body segment listed as impaired for sediment on the CWA section 303(d) List;

(c) Sites located within, directly adjacent to, or discharging directly to a receiving water within an ESA; and

(d) Other sites determined by the Copermittees or the San Diego Water Board as a high threat to water quality.

~~j.~~d. CONSTRUCTION SITE BMP IMPLEMENTATION

Each Copermittee must implement, or require the implementation of effective BMPs to reduce discharges of pollutants in storm water from construction sites to the MEP, and prevent non-storm water discharges from construction sites into the MS4. These BMPs must be site specific, seasonally appropriate, and construction phase appropriate. BMPs must be implemented at each construction site year round. Dry season BMP implementation must plan for and address unseasonal rain events that may occur during the dry season (May 1 through September 30). Copermittees must implement, or require the implementation of, BMPs in the following categories:

(1) Project Planning;

(2) Good Site Management “Housekeeping”, including waste management;

(3) Non-storm Water Management;

(4) Erosion Control;

(5) Sediment Control;

(6) Run-on and Run-off Control; and

(7) Active/Passive Sediment Treatment Systems, where applicable.

~~k.~~e. CONSTRUCTION SITE INSPECTIONS

Each Copermittee must conduct construction site inspections to require and confirm compliance with its local permits and applicable local ordinances, and the requirements of this Order. Priority for site inspections must consider threat to water quality pursuant to Provision E.4.b as well as the nature of the construction activity, topography, and the characteristics of soils and receiving water quality.

(1) Inspection Frequency

(a) Each Copermittee must conduct inspections at all inventoried sites, including high threat to water quality sites, at an appropriate frequency for each phase of construction to ~~ensure~~ confirm the site reduces the discharge of pollutants in storm water from construction sites to the MEP, and prevents non-storm water discharges from entering the MS4.

(b) Each Copermittee must establish appropriate inspection frequencies for high threat to water quality sites, and all other sites, for each phase of construction. Inspection frequencies appropriate for addressing the highest water quality priorities identified in the Water Quality Improvement Plan, and for complying with the requirements of this Order must be identified in each Copermittee's jurisdictional runoff management program document.

(c) Based upon inspection findings, each Copermittee must implement all follow-up actions (i.e., re-inspection, enforcement) necessary to require and confirm site compliance with its local permits and applicable local ordinances, and the requirements of this Order.

(2) Inspection Content

Inspections of construction sites by the Copermittee must include, at a minimum:

(a) Verification of coverage under the Construction General Permit (Notice of Intent (NOI) and/or WDID number) during initial inspections, when applicable;

(b) Assessment of compliance with its local permits and applicable local ordinances related to pollution prevention, including the implementation and maintenance of applicable BMPs;

(c) Assessment of BMP adequacy and effectiveness;

(d) Visual observations of actual non-storm water discharges;

(e) Visual observations of actual or potential discharge of sediment and/or construction related materials from the site;

(f) Visual observations of actual or potential illicit connections; and

(g) If any violations are found and BMP corrections are needed, inspectors must take and document appropriate actions in accordance with the

Enforcement Response Plan pursuant to Provision E.6.

(3) Inspection Tracking and Records

Each Copermittee must track all inspections and re-inspections at all inventoried construction sites. The Copermittee must retain all inspection records in an electronic database or tabular format, which must be made available to the San Diego Water Board upon request. Inspection records must include, at a minimum:

(a) Site name, location (address and hydrologic subarea), and WDID number (if applicable);

(b) Inspection date;

(c) ~~Approximate amount of rainfall since last inspection~~Weather condition during inspection;

(d) Description of problems observed with BMPs and indication of need for BMP addition/repair/replacement and any scheduled re-inspection, and date of re-inspection;

(e) Descriptions of any other specific inspection comments which must, at a minimum, include rationales for longer compliance time;

(f) Description of enforcement actions issued in accordance with the Enforcement Response Plan pursuant to Provision E.6; and

(g) Resolution of problems noted and date problems fixed.

~~l.~~f. CONSTRUCTION SITE ENFORCEMENT

Each Copermittee must enforce its legal authority established pursuant to Provision E.1 for all its inventoried construction sites, as necessary, to achieve compliance with the requirements of this Order, in accordance with its Enforcement Response Plan pursuant to Provision E.6.

~~m.~~g. STRATEGIES TO ADDRESS THE HIGHEST PRIORITY WATER QUALITY CONDITIONS

Each Copermittee must describe in its jurisdictional runoff management program document the strategies and/or activities that will be implemented as part of the construction management program to address construction sites that the Copermittee has identified as potential sources of pollutants and/or stressors that contribute to the highest priority water quality conditions in the Watershed Management Area as follows:

(1) Provide specific details about how the strategies and/or activities will be

implemented (e.g. designate additional BMPs, focus education, and/or increase/decrease frequency of inspections for specific types of sites and/or activities); and

(2) The strategies and/or activities must be consistent with the requirements of Provisions E.4.c-e and the strategies identified in the Water Quality Improvement Plan.

5. Existing Development Management

Each Copermittee must implement an existing development management program in accordance with the strategies identified in the Water Quality Improvement Plan and includes, at a minimum, the following requirements:

a. Existing Development Inventory and Tracking

Each Copermittee must maintain, and update at least annually, a watershed-based inventory of the existing development within its jurisdiction that ~~may~~ has the reasonable potential to discharge a pollutant load to and from the MS4. The use of an automated database system, such as GIS, is highly recommended. The inventory must, at a minimum, include:

(1) Name, location (hydrological subarea and address, if applicable) of the following types of existing development with its jurisdiction:

(a) Commercial facilities or areas;

(b) Industrial facilities;

(c) Municipal facilities, including:

(i) MS4 and related structures,[30]

(ii) Roads, streets, and highways,

(iii) Parking facilities,

(iv) Municipal airfields,

(v) Parks and recreation facilities,

(vi) Flood management and flood control devices and structures,

(vii) Operating or closed municipal landfills,

(viii) Publicly owned treatment works (including water and wastewater treatment plants) and sanitary sewer collection systems,

[30] The inventory may refer to the MS4 map required to be maintained pursuant to Provision E.2.b.(1).

(ix) Corporate yards, including maintenance and storage yards for materials, waste, equipment, and vehicles,

(x) Hazardous waste collection facilities,

(xi) Other treatment, storage or disposal facilities for municipal waste, and

(xii) Other municipal facilities that the Copermittee determines may contribute a significant pollutant load to the MS4; and

(d) Residential areas, which may be designated by one or more of the following:

(i) Residential management area,

(ii) Drainage basin or area,

(iii) Land use (e.g., single family, multi-family, rural),

(iv) Neighborhood,

(v) Common Interest Area,

(vi) Home Owner Association, and/or

~~(vii) Mobile home park, and/or~~

~~(viii)~~(vii) Other designations accepted by the San Diego Water Board Executive Officer.

(2) A description of the facility or area, including the following information:

(a) Classification as commercial, industrial, municipal, or residential;

(b) Status of facility or area as active or inactive;

(c) Identification if a business is a mobile business;

(d) SIC Code or NAICS Code, if applicable;

(e) Industrial General Permit NOI and/or WDID number, if applicable;

(f) ~~Identification if a residential area is or includes a~~ Common Interest Areas (CIAs) / Home Owner Associations (HOAs)~~, or mobile home park~~;

(g) Identification of pollutants generated and potentially generated by the facility or area;

(h) Whether the facility or area is adjacent to an ESA;

(i) Whether the facility or area is tributary to and within the same hydrologic subarea as a water body segment listed as impaired on the CWA section 303(d) List and generates pollutants for which the water body segment is impaired; and

(j) Whether the facility or area contributes or potentially contributes to the highest priority water quality conditions identified in the Water Quality Improvement Plan.

(3) An annually updated map showing the location of inventoried existing development, watershed boundaries, and water bodies.

b. EXISTING DEVELOPMENT BMP IMPLEMENTATION AND MAINTENANCE

Each Copermittee must designate a minimum set of BMPs required for all inventoried existing development with the reasonable potential to discharge pollutant loads to their MS4, including special event venues. The designated minimum BMPs must be specific to facility or area types and pollutant generating activities, as appropriate.

(1) Commercial, Industrial, and Municipal Facilities and Areas

(a) Pollution Prevention

Each Copermittee must ~~require~~ promote the use of pollution prevention methods by the commercial, industrial, and municipal facilities and areas in its inventoried existing development through public outreach.

(b) BMP Implementation

Each Copermittee must implement, or require the implementation of, designated BMPs at commercial facilities and areas, industrial facilities, and municipal facilities in its inventoried existing development.

(c) BMP Operation and Maintenance

(i) Each Copermittee must properly operate and maintain, or require the proper operation and maintenance of designated BMPs at commercial facilities and areas, industrial facilities, and municipal facilities in its inventoried existing development.

(ii) Each Copermittee must implement a schedule of operation and maintenance activities for its MS4 and related structures (including but not limited to catch basins, storm drain inlets, detention basins, etc.), and verify proper operation of all its municipal structural treatment controls designed to reduce pollutants (including floatables) in storm water discharges to or from its MS4s and related drainage structures. Operation and maintenance activities may include, but is not limited to, the following:

[a] Inspections of the MS4 and related structures;
[b] Cleaning of the MS4 and related structures; and
[c] Proper disposal of materials removed from cleaning of the MS4 and related structures.

(iii) Each Copermittee must implement a schedule of operation and maintenance for public streets, unpaved roads, paved roads, and paved highways and freeways within its jurisdiction to minimize pollutants that can be discharged in storm water.

(iv) Each Copermittee must implement controls to prevent infiltration of sewage into the MS4 from leaking sanitary sewers. Copermittees that operate both a municipal sanitary sewer system and a MS4 must implement controls and measures to prevent and eliminate seeping sewage from infiltrating the MS4. Copermittees that do not operate both a municipal sanitary sewer system and a MS4 must coordinate with sewering agencies to keep themselves informed of relevant and appropriate maintenance activities and sanitary sewage projects in their jurisdiction that may cause or contribute to seepage of sewage into the MS4.

(d) Pesticides, Herbicides, and Fertilizers BMPs

Each Copermittee must implement BMPs, or require the implementation of BMPs, to reduce pollutants in storm water discharges to the MEP and effectively prohibit non-storm water discharges associated with the application, storage, and disposal of pesticides, herbicides and fertilizers from commercial facilities and areas, industrial facilities, and municipal facilities in its inventoried existing development. Such BMPs must include, as appropriate, educational activities, permits, certifications and other measures for applicators and distributors.

(2) Residential Areas

(a) Pollution Prevention

Each Copermittee must promote and encourage the use of pollution prevention methods, where appropriate, by the residential areas in its inventoried existing development.

(b) BMP Implementation

Each Copermittee must promote and encourage the implementation of designated BMPs at residential areas in its inventoried existing development.

(c) BMP Operation and Maintenance

Each Copermittee must properly operate and maintain, or require the proper operation and maintenance of designated BMPs at residential areas in its inventoried existing development.

(d) Pesticides, Herbicides, and Fertilizers BMPs

Each Copermittee must promote and encourage the implementation of BMPs to reduce pollutants in storm water discharges to the MEP and effectively prohibit non-storm water discharges associated with the application, storage, and disposal of pesticides, herbicides and fertilizers from residential areas in its inventoried existing development.

c. EXISTING DEVELOPMENT INSPECTIONS

Each Copermittee must conduct inspections of inventoried existing development that have been identified by the Copermittee as having the reasonable potential to discharge pollutant loads from their MS4 to ensure compliance with applicable local ordinances and permits, and the requirements of this Order.

(1) Inspection Frequency

(a) Each Copermittee must establish appropriate inspection frequencies for inventoried existing development in accordance with the following requirements:

(i) At a minimum, inventoried existing development that has been identified by the Copermittee as having the reasonable potential to discharge pollutant loads to and from their MS4 must be inspected once during the permit term ~~every five years~~ utilizing one or more of the following methods:

[a] Drive-by inspections by Copermittee municipal and contract staff,
[b] Onsite inspections by Copermittee municipal and contract staff, and/or
[c] Inspections by volunteer monitoring or patrol programs trained by the Copermittee;

(ii) The frequency of inspections must be appropriate to confirm that BMPs are being implemented to reduce the discharge of pollutants in storm water from the MS4 to the MEP and effectively prohibit non-storm water discharges to the MS4;

(iii) The frequency of inspections must be based on the potential for a facility or area to discharge non-storm water and pollutants in storm water, and should reflect the priorities set forth in the Water Quality Improvement Plan;

(iv) Each Copermittee must annually perform onsite inspections of an equivalent of at least 20 percent of the commercial facilities and areas, industrial facilities, and municipal facilities in its inventoried existing development;[31] and

(v) Inventoried existing development must be inspected by the Copermittee, as needed, in response to valid public complaints and findings from the Copermittee's municipal and contract staff ~~or volunteer monitoring or patrol program~~ inspections.

(b) Based upon inspection findings, each Copermittee must implement all follow-up actions (i.e. education and outreach, re-inspection, enforcement) necessary to require and confirm compliance with its applicable local ordinances and permits and the requirements of this Order, in accordance with its Enforcement Response Plan pursuant to Provision E.6.

(2) Inspection Content

(a) Inspections of existing development by the Copermittee or volunteer monitoring or patrol programs must include, at a minimum:

(i) Visual inspections for actual non-storm water discharges, if present;

(ii) Visual inspections for actual or potential discharge of pollutants, if present;

(iii) Visual inspections for actual or potential illicit connections, if present; and

(iv) Verification that the description of the facility or area in the inventory, required pursuant to Provision E.5.a.(2), has not changed.

(b) Onsite inspections of existing development by the Copermittee must include, at a minimum:

(i) Assessment of compliance with its applicable local ordinances and permits related to non-storm water and storm water discharges and runoff;

(ii) Assessment of the implementation of the designated BMPs;

(iii) Verification of coverage under the Industrial General Permit, when applicable; and

(iv) If any problems or violations are found, inspectors must take and document appropriate actions in accordance with the Enforcement Response Plan pursuant to Provision E.6.

[31] If any commercial, industrial, or municipal facilities or areas require multiple onsite inspections during any given year, those additional inspection may count toward the total annual inspection requirement. This requirement excludes linear municipal facilities (i.e., MS4, streets, roads and highways).

(3) Inspection Tracking and Records

Each Copermittee must track all inspections and re-inspections at all inventoried existing development. The Copermittee must retain all inspection records in an electronic database or tabular format, which must be made available to the San Diego Water Board upon request. Inspection records must include, at a minimum:

(a) Name and location of facility or area (address and hydrologic subarea) consistent with the inventory name and location, pursuant to Provision E.5.a.(1);

(b) Inspection and re-inspection date(s);

(c) Inspection method(s) (i.e. drive-by, onsite);

(d) Observations and findings from the inspection(s);

(e) For onsite inspections of existing development by Copermittee municipal or contract staff, the records must also include, as applicable:

(i) Description of any problems or violations found during the inspection(s),

(ii) Description of enforcement actions issued in accordance with the Enforcement Response Plan pursuant to Provision E.6, and

(iii) The date problems or violations were resolved.

d. EXISTING DEVELOPMENT ENFORCEMENT

Each Copermittee must enforce its legal authority established pursuant to Provision E.1 for all its inventoried existing development identified by the Copermittee as having the reasonable potential to discharge pollutant loads from the MS4 within their jurisdiction, as necessary, to achieve compliance with the requirements of this Order, in accordance with its Enforcement Response Plan pursuant to Provision E.6.

e. STRATEGIES TO ADDRESS THE HIGHEST PRIORITY WATER QUALITY CONDITIONS

Each Copermittee must implement the water quality improvement strategies, where necessary, to address areas of existing development within its jurisdiction that are identified as sources of pollutants and/or stressors contributing to the highest priority water quality conditions in the Watershed Management Area. For the existing development management program, the following strategies must be implemented:

(1) Specific Existing Development Management Program Strategies

Each Copermittee must describe in its jurisdictional runoff management program document the strategies and/or activities that will be implemented within its jurisdiction to address areas of existing development that the Copermittee has identified as sources of pollutants and/or stressors that contribute to the highest priority water quality conditions in the Watershed Management Area as follows:

(a) Provide specific details about how the strategies and/or activities will be implemented (e.g. designate additional BMPs, focus education, and/or increase/decrease frequency of inspections for specific types of facilities, areas and/or activities);

(b) The facilities and/or areas within the Copermittee's jurisdiction where the strategies and/or activities will be implemented; and

(c) The strategies and/or activities must be consistent with the requirements of Provisions E.5.b-d and the strategies identified in the Water Quality Improvement Plan.

(2) Retrofitting Areas of Existing Development

Each Copermittee must describe in its jurisdictional runoff management program document, a program to retrofit areas of existing development within its jurisdiction to address identified sources of pollutants and/or stressors that contribute to the highest priority water quality conditions in the Watershed Management Area. The program must be implemented as follows:

(a) Each Copermittee must identify areas of existing development as candidates for retrofitting, focusing on areas where retrofitting will address pollutants and/or stressors that contribute to the highest priority water quality conditions identified in the Water Quality Improvement Plan;

(b) Candidates for retrofitting projects may be utilized to reduce pollutants that may be discharged in storm water from areas of existing development, and/or address storm water runoff flows and durations from areas of existing development that cause or contribute to hydromodification in receiving waters;

(c) Each Copermittee must develop a strategy to facilitate the implementation of retrofitting projects in areas of existing development identified as candidates;

(d) Each Copermittee should identify areas of existing development where Priority Development Projects may be allowed or should be encouraged to implement or contribute toward the implementation of alternative compliance retrofitting projects; and

(e) Where retrofitting projects within specific areas of existing development are determined to be infeasible to address the highest priority water quality conditions in the Water Quality Improvement Plan, the Copermittee should collaborate and cooperate with other Copermittees and/or entities in the Watershed Management Area to identify, develop, and implement regional retrofitting projects (i.e. projects that can receive and/or treat storm water from one or more areas of existing development and will result in a net benefit to water quality and the environment) adjacent to and/or downstream of the areas of existing development.

(3) Stream, Channel and/or Habitat Rehabilitation in Areas of Existing Development

Each Copermittee must describe in its jurisdictional runoff management program document, a program to rehabilitate streams, channels, and/or habitats in areas of existing development within its jurisdiction to address the highest priority water quality conditions in the Watershed Management Area. The program must be implemented as follows:

(a) Each Copermittee must identify streams, channels, and/or habitats in areas of existing development as candidates for rehabilitation, focusing on areas where stream, channel, and/or habitat rehabilitation projects will address the highest priority water quality conditions identified in the Water Quality Improvement Plan;

(b) Candidates for stream, channel, and/or habitat rehabilitation projects may be utilized to address storm water runoff flows and durations from areas of existing development that cause or contribute to hydromodification in receiving waters, rehabilitate channelized or hydromodified streams, restore wetland and riparian habitat, restore watershed functions, and/or restore beneficial uses of receiving waters;

(c) Each Copermittee must develop a strategy to facilitate the implementation of stream, channel, and/or habitat rehabilitation projects in areas of existing development identified as candidates;

(d) Each Copermittee should identify areas of existing development where Priority Development Projects may be allowed or should be encouraged to implement or contribute toward the implementation of alternative compliance stream, channel, and/or habitat rehabilitation projects; and

(e) Where stream, channel, and/or habitat rehabilitation projects within specific areas of existing development are determined to be infeasible to address the highest priority water quality conditions in the Water Quality

Improvement Plan, the Copermittee should collaborate and cooperate with other Copermittees and/or entities in the Watershed Management Area to identify, develop, and implement regional stream, channel, and/or habitat rehabilitation projects (i.e. projects that can receive storm water from one or more areas of existing development and will result in a net benefit to water quality and the environment).

(4) Upon Regional Board approval and in lieu of monitoring during any given year, the Copermittees may reallocate resources originally authorized for water quality monitoring for retrofit and/or rehabilitation project(s), if those projects occur at a location where monitoring is conducted, for a maximum of two nonconsecutive years during the permit term.

6. Enforcement Response Plans

Each Copermittee must develop and implement an Enforcement Response Plan as part of its jurisdictional runoff management program document. The Enforcement Response Plan must describe the applicable approaches and options to enforce its legal authority established pursuant to Provision E.1, as necessary, to achieve compliance with the requirements of this Order. The Enforcement Response Plan must include the following:

a. Enforcement Response Plan Components

The Enforcement Response Plan must include the following individual components:

(1) Illicit Discharge Detection and Elimination Enforcement Component;

(2) Development Planning Enforcement Component;

(3) Construction Management Enforcement Component; and

(4) Existing Development Enforcement Component.

b. Enforcement Response Approaches and Options

Each component of the Enforcement Response Plan must describe the enforcement response approaches that the Copermittee will implement to compel compliance with its statutes, ordinances, permits, contracts, orders, or similar means, and the requirements of this Order. The description must include the protocols for implementing progressively stricter enforcement responses. The enforcement response approaches must include appropriate sanctions to compel compliance, including, at a minimum, the following tools or their equivalent:

(1) Verbal and written notices of violation;

(2) Cleanup requirements;

(3) Fines;

(4) Bonding requirements;

(5) Administrative and criminal (if intentional or criminally negligent) penalties;

(6) Liens;

(7) Stop work orders; and

(8) Permit and occupancy denials.

c. CORRECTION OF VIOLATIONS

(1) Violations must be corrected in a timely manner with the goal of correcting the violations within 30 calendar days after the violations are discovered, or prior to the next predicted rain event, whichever is sooner.

(2) If more than 30 calendar days are required to achieve compliance, then a rationale must be recorded in the applicable electronic database or tabular system used to track violations.

d. ESCALATED ENFORCEMENT

(1) The Enforcement Response Plan must include a definition of "escalated enforcement." Escalated enforcement must include any enforcement scenario where a violation or other non-compliance is determined to cause or contribute to the highest priority water quality conditions identified in the Water Quality Improvement Plan. Escalated enforcement may be defined differently for development planning, construction sites, commercial facilities or areas, industrial facilities, municipal facilities, and residential areas.

(2) Where the Copermittee determines escalated enforcement is not required, a rationale must be recorded in the applicable electronic database or tabular system used to track violations.

(3) Escalated enforcement actions must continue to increase in severity, as necessary, to compel compliance as soon as possible.

e. REPORTING OF NON-COMPLIANT SITES

(1) Each Copermittee must notify the San Diego Water Board in writing within ~~2~~

~~working days~~ 5 calendar days of issuing escalated enforcement (as defined in the Copermittee's Enforcement Response Plan) to a construction site that poses a significant threat to water quality as a result of violations or other non-compliance with its permits and applicable local ordinances, and the requirements of this Order. Written notification may be provided electronically by email.

(2) Each Copermittee must notify the San Diego Water Board of non-filers under the Industrial General Permit and Construction General Permit by email to Nonfilers_R9@waterboards.ca.gov.

7. Public Education and Participation

Each Copermittee must implement, individually or with other Copermittees, a public education and participation program in accordance with the strategies identified in the Water Quality Improvement Plan to promote and encourage the development of programs, management practices, and behaviors that reduce the discharge of pollutants from the MS4 ~~in storm water~~ to the MEP, prevent controllable non-storm water discharges from entering the MS4, and protect water quality standards in receiving waters.

a. Public Education

The public education program component implemented within the Copermittee's jurisdiction must include, at a minimum, the following:

(1) Educational activities, public information activities, and other appropriate outreach activities intended to reduce pollutants ~~associated with the application of pesticides, herbicides and fertilizer and other pollutants of concern in storm water discharges~~ of concern ~~to and~~ from ~~its~~ the MS4 to the MEP. Activities shall be determined and prioritized by Copermittees by jurisdiction and/or watershed (Provision B) to address the highest threats to water quality (such as pesticides, herbicides and fertilizers, used oil, toxic waste, etc.; and to facilitate the proper management and disposal of used oil and toxic waste, etc.) as determined and prioritized by the Copermittee(s) by jurisdiction and/or watershed to address the highest priority water quality conditions identified in the Water Quality Improvement Plan;

~~(2) Educational activities, public information activities, and other appropriate outreach activities to facilitate the proper management and disposal of used oil and toxic materials; and~~

~~(3)~~(2) Appropriate education and training measures for specific target audiences, such as construction site operators, residents, underserved target audiences and school-aged children, as determined and prioritized by the Copermittee(s) by jurisdiction and/or watershed, based on high risk behaviors and pollutants of concern.

b. PUBLIC PARTICIPATION

The public participation program component implemented within the Copermittee's jurisdiction must include, at a minimum, the following:

(1) A process for members of the public to participate in updating the highest priority water quality conditions, numeric goals, and water quality improvement strategies in the Water Quality Improvement Plan.

(2) Opportunities for members of the public to participate in providing the Copermittee recommendations for improving the effectiveness of the water quality improvement strategies implemented within its jurisdiction.

(3) Opportunities for members of the public to participate in programs and/or activities that can result in the prevention or elimination of non-storm water discharges to the MS4, reduction of pollutants in storm water discharges from the MS4, and/or restoration and protection of the quality of receiving waters.

c. STRATEGIES TO ADDRESS THE HIGHEST PRIORITY WATER QUALITY CONDITIONS

Each Copermittee must describe in its jurisdictional runoff management program document the strategies and/or activities that will be implemented within its jurisdiction, as applicable, to educate the public and encourage public participation to address potential sources of pollutants and/or stressors that contribute to the highest priority water quality conditions in the Watershed Management Area as follows:

(1) The target audiences and/or areas within the Copermittee's jurisdiction where the strategies and/or activities will be implemented;

(2) Provide specific details about how the strategies and/or activities will be implemented (e.g. educational topics, materials and/or activities, public outreach and participation programs and/or opportunities);

(3) Each Copermittee should collaborate and cooperate with other Copermittees and/or entities in the Watershed Management Area to identify and implement regional public education and participation activities, programs and opportunities;

(4) Each Copermittee must incorporate a mechanism for evaluating and

assessing educational and other public outreach activities, as needed, to identify progress and incorporate modifications necessary to increase the effectiveness of the public education and participation program.

8. Fiscal Analysis

a. Each Copermittee must secure the resources necessary to meet all the requirements of this Order.

b. Each Copermittee must conduct an annual fiscal analysis of its jurisdictional runoff management program in its entirety. The fiscal analysis must include the following:

(1) Identification of the various categories of expenditures necessary to implement the requirements of this Order, including a description of the specific capital, operation and maintenance, and other expenditure items to be accounted for in each category of expenditures;

(2) The staff resources needed and allocated to meet the requirements of this Order, including any development, implementation, and enforcement activities required;

(3) The estimated expenditures for Provisions E.8.b.(1) and E.8.b.(2) for the current fiscal year; and

(4) The source(s) of funds that are proposed to meet the necessary expenditures described in Provisions E.8.b.(1) and E.8.b.(2), including legal restrictions on the use of such funds, for the current fiscal year and next fiscal year.

c. Each Copermittee must submit a summary of the annual fiscal analysis with each Annual Report required pursuant to Provision F.3.b.

d. Each Copermittee must provide the documentation used to develop the summary of the annual fiscal analysis upon request by the San Diego Water Board.

F. REPORTING

The purpose of this provision is to determine and document compliance with the requirements set forth in this Order. The goal of reporting is to communicate to the San Diego Water Board and the people of the State of California the implementation status of each jurisdictional runoff management program and compliance with the requirements of this Order. This goal is to be accomplished through the submittal of specific deliverables to the San Diego Water Board by the Copermittees.

1. Water Quality Improvement Plans

The Copermittees for each Watershed Management Area must develop and submit the Water Quality Improvement Plan in accordance with the following requirements:

a. WATER QUALITY IMPROVEMENT PLAN DEVELOPMENT

Each Water Quality Improvement Plan must be developed in accordance with the following process:

(1) Priority Water Quality Conditions and Potential Strategies ~~Numeric Goals~~

(a) The Copermittees must implement a public participation process to solicit data and information to be utilized in the development and identification of the priority water quality conditions for the Watershed Management Area.

(b) The Copermittees are encouraged to involve the public and key stakeholders as early and often as possible during the development of the priority water quality conditions and ~~numeric goals~~ potential strategies to be included in the Water Quality Improvement Plan.

(c) Within 6 months after the commencement of coverage under this Order, the Copermittees must develop and submit the Water Quality Improvement Plan requirements of Provision B.2.a-d and a list of potential strategies that will be considered for the draft Water Quality Improvement Plan to the San Diego Water Board. Each Copermittee selecting the option to develop a Water Quality Improvement Plan to serve as an iterative, implementation-based compliance mechanism per Provision B.3.a.(3) must also indicate their intent to pursue the option in the submittal. The San Diego Water Board will issue a public notice and solicit public comments on the Water Quality Improvement Plan for a minimum of 60 days.

(d) The Copermittees must consider ~~revise~~ revisions to the priority water quality conditions ~~and numeric goals~~ based on comments received and must respond to ~~and/or~~ recommendations or direction from the San Diego Water Board Executive Officer.

(2) Numeric Goals and Water Quality Improvement Strategies and Schedules

(a) The Copermittees are encouraged to involve the public and key stakeholders as early and often as possible during the development of the numeric goals and water quality improvement strategies and schedules to be included in the Water Quality Improvement Plan.

(b) Within ~~9~~ 16 months after the commencement of coverage under this Order, the Copermittees must develop and submit the Water Quality Improvement Plan requirements of Provisions B.2.e and B.3 to the San Diego Water Board. Each Copermittee selecting the option to develop a Water Quality Improvement Plan to serve as an iterative, implementation-based compliance mechanism per Provision B.3.a.(3) must also submit a draft Reasonable Assurance Analysis. The San Diego Water Board will issue a public notice and solicit public comments on the Water Quality Improvement Plan for a minimum of 60 days.

(c) The Copermittees must consider revisions to~~revise~~ the numeric goals and water quality improvement strategies and schedules based on public comments received ~~and/or~~ and must respond to recommendations or direction from the San Diego Water Board Executive Officer.

b. WATER QUALITY IMPROVEMENT PLAN SUBMITTAL

(1) Within ~~18~~ 24 months after the commencement of coverage under this Order, the Copermittees for each Watershed Management Area must submit a complete Water Quality Improvement Plan in accordance with the requirements of Provision B to the San Diego Water Board. Each Copermittees selecting the option to develop a Water Quality Improvement Plan to serve as an iterative, implementation-based compliance mechanism per Provision B.3.a.(3) must also submit a final Reasonable Assurance Analysis. The Santa Margarita River Watershed Management Area must submit a complete Water Quality Improvement Plan in accordance with the requirements of Provision B to the San Diego Water Board 18 months after the Riverside Copermittees are covered under this Order. The San Diego Water Board will issue a public notice and solicit public comments on the Water Quality Improvement Plan for a minimum of 30 days.

(2) Based on the comments received, the San Diego Water Board will determine whether to hold a public hearing or to limit public input to submittal of written comments. If no hearing is held the San Diego Water Board will notify the Copermittees within 6 months that the Water Quality Improvement Plan has been accepted as complete following its review and determination that the Water Quality Improvement Plan meets the requirements of this Order.

(3) The Copermittees must consider revisions to ~~revise~~ the Water Quality Improvement Plan based on public comments received ~~and/or~~ and must

respond to recommendations or direction from the San Diego Water Board Executive Officer.

(4) The Water Quality Improvement Plan must be made available on the Regional Clearinghouse required pursuant to Provision F.4 within 30 days of acceptance by the San Diego Water Board.

(5) Copermittees must commence with implementation of the Water Quality Improvement Plan no later than the fiscal year (July 1) following San Diego Water Board approval of the Water Quality Improvement Plan.

2. Updates

a. JURISDICTIONAL RUNOFF MANAGEMENT PROGRAM DOCUMENT UPDATES

Each Copermittee must update its jurisdictional runoff management program document in accordance with the following requirements:

(1) Each Copermittee is encouraged to involve the public and key stakeholders as early and often as possible to solicit recommendations for updates to its jurisdictional runoff management program document.

(2) Each Copermittee must update its jurisdictional runoff management program document to incorporate the requirements of Provision E no later than ~~18~~24 months after the commencement of coverage under this Order.

(3) Each Copermittee must submit updates to its jurisdictional runoff management program, with a rationale for the modifications, either in the Annual Report required pursuant to Provision F.3.b, or as part of the Report of Waste Discharge required pursuant to Provision F.5.b.

(4) The Copermittee must revise the modifications as directed by the San Diego Water Board Executive Officer.

(5) Updated jurisdictional runoff management program documents must be made available on the Regional Clearinghouse required pursuant to Provision F.4 within 30 days of submitting the Annual Report.

b. BMP DESIGN MANUAL UPDATES

Each Copermittee must update its BMP Design Manual in accordance with the following requirements:

(1) Each Copermittee must update its BMP Design Manual to incorporate the requirements of Provisions E.3.a-d no later than ~~18~~24 months after the commencement of coverage under this Order.

(2) Subsequent updates must be consistent with the requirements of Provisions E.3.a-d and must be submitted as part of the Annual Reports required pursuant to Provision F.3.b, or as part of the Report of Waste Discharge required pursuant to Provision F.5.b.

(3) Updated BMP Design Manuals must be made available on the Regional Clearinghouse required pursuant to Provision F.4 within 30 days of completing the update.

c. Water Quality Improvement Plan Updates

The Water Quality Improvement Plans must be updated in accordance with the following process:

(1) The Copermittees must implement a public participation process to solicit data and information to be utilized in updating the Water Quality Improvement Plan.

(2) The Copermittees are encouraged to involve the public and key stakeholders as early and often as possible during the updates to the Water Quality Improvement Plan.

(3) The Copermittees for each Watershed Management Area must submit requested updates to the Water Quality Improvement Plan, with the public input received and the rationale for the requested updates, either in the Annual Reports required pursuant to Provision F.3.b, or as part of the Report of Waste Discharge required pursuant to Provision F.5.b. The requested updates are considered accepted by the San Diego Water Board if no response is provided to the Copermittee after 3 months of submitting the request.

(4) The Copermittees must revise the requested updates as directed by the San Diego Water Board Executive Officer.

(5) Updated Water Quality Improvement Plans must be made available on the Regional Clearinghouse required pursuant to Provision F.4 within 30 days of acceptance of the requested updates by the San Diego Water Board.

3. Progress Reporting

a. Progress Report Presentations

The Copermittees for each Watershed Management Area must appear before the San Diego Water Board, as requested by the San Diego Water Board, to provide progress reports on the implementation of the Water Quality

Improvement Plan and jurisdictional runoff management programs.

b. ANNUAL REPORTS

(1) The Copermittees for each Watershed Management Area must submit an Annual Report for each reporting period no later than January 31 of the following year. The annual reporting period consists of two periods: 1) July 1 to June 30 of the following year for the jurisdictional runoff management programs, 2) October 1 to September 30 of the following year for the monitoring and assessment programs. The first Annual Report must be prepared for the reporting period beginning July 1 after commencement of coverage under this Order, and upon San Diego Water Board determination that the Water Quality Improvement Plan meets the requirements of this Order to June 30 in the following year for the jurisdictional runoff management programs. ~~,~~ The first Annual Report must be prepared for the reporting period beginning 50 days after adoption of this Order and the January 31st following the first September 30th (conclusion of monitoring season) after the San Diego Water Board determines that the Water Quality Improvement Plan meets the requirements of this Order ~~and September 30 in the following year~~ for the monitoring and assessment programs. Annual Reports must be made available on the Regional Clearinghouse required pursuant to Provision F.4. Each Annual Report must include the following:

(a) The receiving water and MS4 outfall discharge monitoring data collected pursuant to Provisions D.1 and D.2, summarized and presented in tabular and graphical form;

(b) Progress of the special studies required pursuant to Provision D.3, and the results or findings when a special study, or each phase of a special study, is completed;

(c) The findings from the assessments required pursuant to Provision D.4;

(d) The progress of implementing the Water Quality Improvement Plan, including, but not limited to, the following:

(i) The progress toward achieving the interim and final numeric goals for the highest water quality priorities for the Watershed Management Area,

(ii) The water quality improvement strategies that were implemented and/or no longer implemented by each of the Copermittees during the reporting period and previous reporting periods, and are planned to be implemented during the next reporting period,

(iii) Proposed modifications to the water quality improvement strategies, with public input received and rationale for the proposed modifications,

(iv) Previously proposed modifications or updates incorporated into the Water Quality Improvement Plan and/or each Copermittee's jurisdictional runoff management program document and implemented by the Copermittees in the Watershed Management Area, and

(v) Proposed modifications or updates to the Water Quality Improvement Plan and/or each Copermittee's jurisdictional runoff management program document;

(d) A completed Jurisdictional Runoff Management Program Annual Report Form (Attachment D or accepted revision) for each Copermittee in the Watershed Management Area, certified by a Principal Executive Officer, Ranking Elected Official, or Duly Authorized Representative.

(2) Each Copermittee must complete and submit a Jurisdictional Runoff Management Program Annual Report Form (Attachment D or accepted revision) no later than October 31 of each year until the first Annual Report is required to be submitted. Each Copermittee must submit the information on the Jurisdictional Runoff Management Program Annual Report Form specific to the area within its jurisdiction in each Watershed Management Area.

(3) Each Copermittee must provide any data or documentation utilized in developing the Annual Report upon request by the San Diego Water Board. ~~Any~~ Copermittee monitoring data utilized in developing the Annual Report must be uploaded to the California Environmental Data Exchange Network (CEDEN).[32] Any Copermittee monitoring and assessment data utilized in developing the Annual Report must be provided on the Regional Clearinghouse required pursuant to Provision F.4.

~~c. REGIONAL MONITORING AND ASSESSMENT REPORT~~

~~(1) The Copermittees must submit a Regional Monitoring and Assessment Report no later than 180 days in advance of the expiration date of this Order. The Regional Monitoring and Assessment Report may be submitted as part of the Report of Waste Discharge required pursuant to Provision F.5.b. The Copermittees must review the receiving water and MS4 outfall discharge monitoring data collected pursuant to Provisions D.1 and D.2, and findings from the assessments required pursuant to Provision D.4, to assess the following:~~

~~(a) The beneficial uses of the receiving waters within the San Diego Region~~

[32] Data must be uploaded to CEDEN Southern California Regional Data Center (http://www.sccwrp.org/Data/DataSubmission/SouthernCaliforniaRegionalDataCenter.aspx) using the templates provided on the CEDEN website.

~~that are protected or must be restored;~~

~~(b) The progress toward restoring impacted beneficial uses in the receiving waters within the San Diego Region; and~~

~~(c) Pollutants or conditions of emerging concern that may impact beneficial uses in the receiving waters within the San Diego Region.~~

~~(2) The Regional Monitoring and Assessment Report must include recommendations for improving the implementation and assessment of the Water Quality Improvement Plans and jurisdictional runoff management programs.~~

~~(3) Each Copermittee must provide any data or documentation utilized in developing the Regional Monitoring and Assessment Report upon request by the San Diego Water Board. Any monitoring and assessment data utilized in developing the Regional Monitoring and Assessment Report must be provided on the Regional Clearinghouse required pursuant to Provision F.4.~~

4. Regional Clearinghouse

The Copermittees must develop, update, and maintain an internet-based Regional Clearinghouse that is made available to the public no later than 18 months after the effective date of this Order.[33]

a. The Copermittees, through the Regional Clearinghouse, must make the following documents and data available, organized by Watershed Management Area, which may be linked to other internet-based data portals and databases where the original documents are stored:

(1) Water Quality Improvement Plan for the Watershed Management Area, and all updated versions with date of update;

(2) Annual Reports for the Watershed Management Area;

(3) Jurisdictional Runoff Management Program document for each Copermittee within the Watershed Management Area, and all updated versions with date of update;

(4) BMP Design Manual for each Copermittee within the Watershed Management Area, and all updated versions with date of update;

[33] The Copermittee may elect to develop and maintain the clearinghouse(s) provided by other Copermittees or agencies.

(5) Reports from special studies (e.g. source identification, BMP effectiveness assessment) conducted in the Watershed Management Area;

(6) Monitoring data collected pursuant to Provision D for each Watershed Management Area must be uploaded to CEDEN,[34] with links to the uploaded data; and

(7) Available GIS data, layers, and/or shapefiles used to develop the maps generated and maintained by the Copermittees for the Water Quality Improvement Plans, Annual Reports, and jurisdictional runoff management program documents.

b. The Copermittees, through the Regional Clearinghouse, must make the following information and documents available:

(1) Contact information (point of contact, phone number, email address, and mailing address) for each Copermittee;

(2) Public hotline number for reporting non-storm water and illicit discharges for each Copermittee;

[34] Data must be uploaded to CEDEN Southern California Regional Data Center (http://www.sccwrp.org/Data/DataSubmission/SouthernCaliforniaRegionalDataCenter.aspx) using the templates provided on the CEDEN website.

(3) Email address for reporting non-storm water and illicit discharges for each Copermittee;

(4) Link to each Copermittee's website, if available, where the public may find additional information about the Copermittee's storm water management program and for requesting records for the implementation of its program;

(5) Information about opportunities for the public to participate in programs and/or activities that can result in the prevention or elimination of non-storm water discharges to the MS4, reduction of pollutants in storm water discharges from the MS4, and/or restoration and protection of the quality of receiving waters; and

(6) Reports from regional monitoring programs in which the Copermittees participate (e.g. Southern California Monitoring Coalition, Southern California Coastal Water Research Project Bight Monitoring);

(7) Regional Monitoring and Assessment Reports; and

(8) Any other information, data, and documents the Copermittees determine as appropriate for making available to the public.

5. Report of Waste Discharge

a. The Orange County Copermittees and the Riverside County Copermittees are required to submit a complete Report of Waste Discharge pursuant to the requirements of their current Orders. The San Diego Water Board will review and consider the Reports of Waste Discharge to determine whether modification to this Order, pursuant to the requirements of Provision H, will be required prior the Orange County Copermittees and/or Riverside County Copermittees becoming covered under this Order. The current Orders for the Orange County Copermittees and Riverside County Copermittees are rescinded upon notification of coverage under this Order except for enforcement purposes.

b. The Copermittees subject to the requirements of this Order must submit to the San Diego Water Board a complete Report of Waste Discharge as an application for the re-issuance of this Order and NPDES permit. The Report of Waste Discharge must be submitted no later than 180 days in advance of the expiration date of this Order. The Report of Waste Discharge must contain the following minimum information:

(1) Names and addresses of the Copermittees;

(2) Names and titles of the primary contacts of the Copermittees;

(3) Proposed changes to the Copermittees' Water Quality Improvement Plans and the supporting justification;

(4) Proposed changes to the Copermittees' jurisdictional runoff management programs and the supporting justification;

(5) Any other information necessary for the re-issuance of this Order;

(6) Any information to be included as part of the Report of Waste Discharge pursuant to the requirements of this Order; and

(7) Any other information required by federal regulations for NPDES permit reissuance.

6. Application for Early Coverage

a. The Orange County Copermittees, collectively, or Riverside County Copermittees, collectively, may apply for early coverage under this Order by submitting a Report of Waste Discharge Form 200, with a written request for early coverage under this Order.

b. The San Diego Water Board will review the application for early coverage. A notification of coverage under this Order will be issued to the Copermittees in the respective county by the San Diego Water Board upon completion of the early coverage application requirements. The effective coverage date will be specified in the notification of coverage. The Copermittees in the respective county are authorized to have MS4 discharges pursuant to the requirements of this Order starting on the effective coverage date specified in the notification of coverage. The existing Order for the respective county is rescinded upon the effective coverage date specified in the notification of coverage except for enforcement purposes.

7. Reporting Provisions

Each Copermittee must comply with all the reporting and recordkeeping provisions of the Standard Permit Provisions and General Provisions contained in Attachment B to this Order.

G. PRINCIPAL WATERSHED COPERMITTEE RESPONSIBILITIES

1. The Copermittees within each Watershed Management Area must designate a Principal Watershed Copermittee and notify the San Diego Water Board of the name of the Principal Watershed Copermittee. ~~An individual Copermittee should not be designated a Principal Watershed Copermittee for more than two Watershed Management Areas.~~ The notification may be submitted with the Water Quality Improvement Plan required pursuant to Provision F.1 of this Order.

2. All Copermittees have some level of commitment, not just the Principal Watershed Copermittee. The Principal Watershed Copermittee is responsible for, at a minimum, the following:

- **a.** Serving as liaison between the Copermittees in the Watershed Management Area and the San Diego Water Board on general permit issues, and when necessary and appropriate, representing the Copermittees in the Watershed Management Area before the San Diego Water Board.

- **b.** Facilitating the development of the Water Quality Improvement Plan in accordance with the requirements of Provision B of this Order

- **c.** Coordinating the submittal of the deliverables required by Provisions F.1, F.2, F.3.a, and F.3.b of this Order.

- **d.** Coordinating and developing, with the other Principal Watershed Copermittees, the requirements of Provisions F.3.c, F.4, and F.5.b of this Order.

H. MODIFICATION OF PROGRAMS

1. Modifications of the Order may be initiated by the San Diego Water Board or by the Copermittees. Requests by Copermittees must be made to the San Diego Water Board.

2. Minor modifications to the Order may be made by the San Diego Water Board where the proposed modification complies with all the effective prohibitions and limitations, and other requirements of this Order.

3. Proposed modifications to the Order outside of the Water Quality Improvement Plan process that are not minor require amendment of this Order in accordance with this Order's rules, policies, and procedures.

4. The San Diego Water Board may re-open and modify this Order at any time prior to its expiration, after opportunity for public comment and a public hearing, if the State Water Board determines that revisions are warranted to those provisions of the Order addressing compliance with water quality standards in the receiving water and/or those provisions of the Order establishing an iterative process for implementation of management practices to assure compliance with water quality standards in the receiving water.

~~4.~~5. The San Diego Water Board may re-open and modify this order at any time prior to its expiration, after opportunity for public comment and a public hearing, if the Basin Plan Amendments for any of the TMDLs in Attachment E are revised by the San Diego Regional Board. Should a TMDL Basin Plan Amendment be revised and adopted by the Regional Board, then the Regional Board will re-open this Order as soon as possible to update the TMDL requirements in Attachment E to reflect the revised Basin Plan Amendment.

I. STANDARD PERMIT PROVISIONS AND GENERAL PROVISIONS

Each Copermittee must comply with all the Standard Permit Provisions and General Provisions contained in Attachment B to this Order.

ATTACHMENT A

DISCHARGE PROHIBITIONS AND SPECIAL PROTECTIONS

1. Basin Plan Waste Discharge Prohibitions

California Water Code Section 13243 provides that a Regional Water Board, in a water quality control plan, may specify certain conditions or areas where the discharge of waste or certain types of waste is not permitted. The following waste discharge prohibitions in the Water Quality Control Plan for the San Diego Basin (Basin Plan) are applicable to any person, as defined by Section 13050(c) of the California Water Code, who is a citizen, domiciliary, or political agency or entity of California whose activities in California could affect the quality of waters of the state within the boundaries of the San Diego Region.

1. The discharge of waste to waters of the state in a manner causing, or threatening to cause a condition of pollution, contamination or nuisance as defined in California Water Code Section 13050, is prohibited.

2. The discharge of waste to land, except as authorized by waste discharge requirements or the terms described in California Water Code Section 13264 is prohibited.

3. The discharge of pollutants or dredged or fill material to waters of the United States except as authorized by a National Pollutant Discharge Elimination System (NPDES) permit or a dredged or fill material permit (subject to the exemption described in California Water Code Section 13376) is prohibited.

4. Discharges of recycled water to lakes or reservoirs used for municipal water supply or to inland surface water tributaries thereto are prohibited, unless this San Diego Water Board issues a NPDES permit authorizing such a discharge; the proposed discharge has been approved by the State Department of Health Services (DHS) and the operating agency of the impacted reservoir; and the discharger has an approved fail-safe long-term disposal alternative.

5. The discharge of waste to inland surface waters, except in cases where the quality of the discharge complies with applicable receiving water quality objectives, is prohibited. Allowances for dilution may be made at the discretion of the San Diego Water Board. Consideration would include streamflow data, the degree of treatment provided and safety measures to ensure reliability of facility performance. As an example, discharge of secondary effluent would probably be permitted if streamflow provided 100:1 dilution capability.

6. The discharge of waste in a manner causing flow, ponding, or surfacing on lands not owned or under the control of the discharger is prohibited, unless the discharge is authorized by the San Diego Water Board.

7. The dumping, deposition, or discharge of waste directly into waters of the state, or adjacent to such waters in any manner which may permit its being transported into the waters, is prohibited unless authorized by the San Diego Water Board.

8. Any discharge to a storm water conveyance system that is not composed entirely of "*storm water*" is effectively prohibited unless authorized by the San Diego Water Board. [The federal regulations, 40 CFR 122.26(b)(13), define storm water as storm water runoff, snow melt runoff, and surface runoff and drainage. 40 CFR 122.26(b)(2) defines an illicit discharge as any discharge to a storm water conveyance system that is not composed entirely of storm water except discharges pursuant to a NPDES permit and discharges resulting from fire fighting activities.] [§122.26 amended at 56 FR 56553, November 5, 1991; 57 FR 11412, April 2, 1992].

9. The unauthorized discharge of treated or untreated sewage to waters of the state or to a storm water conveyance system is prohibited.

10. The discharge of industrial wastes to conventional septic tank/subsurface disposal systems, except as authorized by the terms described in California Water Code Section 13264, is prohibited.

11. The discharge of radioactive wastes amenable to alternative methods of disposal into the waters of the state is prohibited.

12. The discharge of any radiological, chemical, or biological warfare agent into waters of the state is prohibited.

13. The discharge of waste into a natural or excavated site below historic water levels is prohibited unless the discharge is authorized by the San Diego Water Board.

14. The discharge of sand, silt, clay, or other earthen materials from any activity, including land grading and construction, in quantities which cause deleterious bottom deposits, turbidity or discoloration in waters of the state or which unreasonably affect, or threaten to affect, beneficial uses of such waters is prohibited.

15. The discharge of treated or untreated sewage from vessels to Mission Bay, Oceanside Harbor, Dana Point Harbor, or other small boat harbors is prohibited.

16. The discharge of untreated sewage from vessels to San Diego Bay is prohibited.

17. The discharge of treated sewage from vessels to portions of San Diego Bay that are less than 30 feet deep at mean lower low water (MLLW) is prohibited.

18. The discharge of treated sewage from vessels, which do not have a properly functioning US Coast Guard certified Type I or Type II marine sanitation device, to portions of San Diego Bay that are greater than 30 feet deep at mean lower low water (MLLW) is prohibited.

2. Attachment B to State Water Board Resolution 2012-0012

Special Protections for Areas of Special Biological Significance, Governing Point Source Discharges of Storm Water and Nonpoint Source Waste Discharges

I. PROVISIONS FOR POINT SOURCE DISCHARGES OF STORM WATER AND NONPOINT SOURCE WASTE DISCHARGES

The following terms, prohibitions, and special conditions (hereafter collectively referred to as special conditions) are established as limitations on point source storm water and nonpoint source discharges. These special conditions provide Special Protections for marine aquatic life and natural water quality in Areas of Special Biological Significance (ASBS), as required for State Water Quality Protection Areas pursuant to California Public Resources Code Sections 36700(f) and 36710(f). These Special Protections are adopted by the State Water Board as part of the California Ocean Plan (Ocean Plan) General Exception.

The special conditions are organized by category of discharge. The State Water Resources Control Board (State Water Board) and Regional Water Quality Control Boards (Regional Water Boards) will determine categories and the means of regulation for those categories [e.g., Point Source Storm Water National Pollutant Discharge Elimination System (NPDES) or Nonpoint Source].

A. PERMITTED POINT SOURCE DISCHARGES OF STORM WATER

1. General Provisions for Permitted Point Source Discharges of Storm Water

    a. Existing storm water discharges into an ASBS are allowed only under the following conditions:

        (1) The discharges are authorized by an NPDES permit issued by the State Water Board or Regional Water Board;

        (2) The discharges comply with all of the applicable terms, prohibitions, and special conditions contained in these Special Protections; and

        (3) The discharges:

            (i) Are essential for flood control or slope stability, including roof, landscape, road, and parking lot drainage;

            (ii) Are designed to prevent soil erosion;

            (iii) Occur only during wet weather;

(iv) Are composed of only storm water runoff.

b. Discharges composed of storm water runoff shall not alter natural ocean water quality in an ASBS.

c. The discharge of trash is prohibited.

d. Only discharges from existing storm water outfalls are allowed. Any proposed or new storm water runoff discharge shall be routed to existing storm water discharge outfalls and shall not result in any new contribution of waste to an ASBS (i.e., no additional pollutant loading). “Existing storm water outfalls” are those that were constructed or under construction prior to January 1, 2005. “New contribution of waste” is defined as any addition of waste beyond what would have occurred as of January 1, 2005. A change to an existing storm water outfall, in terms of re-location or alteration, in order to comply with these special conditions, is allowed and does not constitute a new discharge.

e. Non-storm water discharges are prohibited except as provided below:

(1) The term “non-storm water discharges” means any waste discharges from a municipal separate storm sewer system (MS4) or other NPDES permitted storm drain system to an ASBS that are not composed entirely of storm water.

(2) (i) The following non-storm water discharges are allowed, provided that the discharges are essential for emergency response purposes, structural stability, slope stability or occur naturally:

(a) Discharges associated with emergency fire fighting operations.

(b) Foundation and footing drains.

(c) Water from crawl space or basement pumps.

(d) Hillside dewatering.

(e) Naturally occurring groundwater seepage via a storm drain.

(f) Non-anthropogenic flows from a naturally occurring stream via a culvert or storm drain, as long as there are no contributions of anthropogenic runoff.

(ii) An NPDES permitting authority may authorize non-storm water discharges to an MS4 with a direct discharge to an ASBS only to the extent the

NPDES permitting authority finds that the discharge does not alter natural ocean water quality in the ASBS.

(3) Authorized non-storm water discharges shall not cause or contribute to a violation of the water quality objectives in Chapter II of the Ocean Plan nor alter natural ocean water quality in an ASBS.

2. Compliance Plans for Inclusion in Storm Water Management Plans (SWMP) and Storm Water Pollution Prevention Plans (SWPPP).

The discharger shall specifically address the prohibition of non-storm water runoff and the requirement to maintain natural water quality for storm water discharges to an ASBS in an ASBS Compliance Plan to be included in its SWMP or a SWPPP, as appropriate to permit type. If a statewide permit includes a SWMP, then the discharger shall prepare a stand-alone compliance plan for ASBS discharges. The ASBS Compliance Plan is subject to approval by the Executive Director of the State Water Board (statewide permits) or Executive Officer of the Regional Water Board (for permits issued by Regional Water Boards).

a. The Compliance Plan shall include a map of surface drainage of storm water runoff, showing areas of sheet runoff, prioritize discharges, and describe any structural Best Management Practices (BMPs) already employed and/or BMPs to be employed in the future. Priority discharges are those that pose the greatest water quality threat and which are identified to require installation of structural BMPs. The map shall also show the storm water conveyances in relation to other features such as service areas, sewage conveyances and treatment facilities, landslides, areas prone to erosion, and waste and hazardous material storage areas, if applicable. The SWMP or SWPPP shall also include a procedure for updating the map and plan when changes are made to the storm water conveyance facilities.

b. The ASBS Compliance Plan shall describe the measures by which all non-authorized non-storm water runoff (e.g., dry weather flows) has been eliminated, how these measures will be maintained over time, and how these measures are monitored and documented.

c. For Municipal Separate Storm Sewer System (MS4s), the ASBS Compliance Plan shall require minimum inspection frequencies as follows:

(1) The minimum inspection frequency for construction sites shall be weekly during rainy season;

(2) The minimum inspection frequency for industrial facilities shall be monthly during the rainy season;

(3) The minimum inspection frequency for commercial facilities (e.g., restaurants) shall be twice during the rainy season; and

(4) Storm water outfall drains equal to or greater than 18 inches (457 mm) in diameter or width shall be inspected once prior to the beginning of the rainy season and once during the rainy season and maintained to remove trash and other anthropogenic debris.

d. The ASBS Compliance Plan shall address storm water discharges (wet weather flows) and, in particular, describe how pollutant reductions in storm water runoff, that are necessary to comply with these special conditions, will be achieved through BMPs. Structural BMPs need not be installed if the discharger can document to the satisfaction of the State Water Board Executive Director (statewide permits) or Regional Water Board Executive Officer (Regional Water Board permits) that such installation would pose a threat to health or safety. BMPs to control storm water runoff discharges (at the end-of-pipe) during a design storm shall be designed to achieve on average the following target levels:

(1) Table B Instantaneous Maximum Water Quality Objectives in Chapter II of the Ocean Plan; or

(2) A 90% reduction in pollutant loading during storm events, for the applicant's total discharges. The baseline for the reduction is the effective date of the Exception. The baseline for these determinations is the effective date of the Exception, and the reductions must be achieved and documented within four (4) years of the effective date.

e. The ASBS Compliance Plan shall address erosion control and the prevention of anthropogenic sedimentation in ASBS. The natural habitat conditions in the ASBS shall not be altered as a result of anthropogenic sedimentation.

f. The ASBS Compliance Plan shall describe the non-structural BMPs currently employed and planned in the future (including those for construction activities), and include an implementation schedule. The ASBS Compliance Plan shall include non-structural BMPs that address public education and outreach. Education and outreach efforts must adequately inform the public that direct discharges of pollutants from private property not entering an MS4 are prohibited. The ASBS Compliance Plan shall also describe the structural BMPs, including any low impact development (LID) measures, currently employed and planned for higher threat discharges and include an implementation schedule. To control storm water runoff discharges (at the end-of-pipe) during a design storm, permittees must first consider using LID practices to infiltrate, use, or evapotranspirate storm water runoff on-site.

g. The BMPs and implementation schedule shall be designed to ensure that natural water quality conditions in the receiving water are achieved and maintained by either reducing flows from impervious surfaces or reducing pollutant loading, or some combination thereof.

h. If the results of the receiving water monitoring described in IV.B. of these special conditions indicate that the storm water runoff is causing or contributing to an alteration of natural ocean water quality in the ASBS, the discharger shall submit a report to the State Water Board and Regional Water Board within 30 days of receiving the results.

(1) The report shall identify the constituents in storm water runoff that alter natural ocean water quality and the sources of these constituents.

(2) The report shall describe BMPs that are currently being implemented, BMPs that are identified in the SWMP or SWPPP for future implementation, and any additional BMPs that may be added to the SWMP or SWPPP to address the alteration of natural water quality. The report shall include a new or modified implementation schedule for the BMPs.

(3) Within 30 days of the approval of the report by the State Water Board Executive Director (statewide permits) or Regional Water Board Executive Officer (Regional Water Board permits), the discharger shall revise its ASBS Compliance Plan to incorporate any new or modified BMPs that have been or will be implemented, the implementation schedule, and any additional monitoring required.

(4) As long as the discharger has complied with the procedures described above and is implementing the revised SWMP or SWPPP, the discharger does not have to repeat the same procedure for continuing or recurring exceedances of natural ocean water quality conditions due to the same constituent.

(5) Compliance with this section does not excuse violations of any term, prohibition, or condition contained in these Special Protections.

3. Compliance Schedule

a. On the effective date of the Exception, all non-authorized non-storm water discharges (e.g., dry weather flow) are effectively prohibited.

b. Within one year from the effective date of the Exception, the discharger shall submit a written ASBS Compliance Plan to the State Water Board Executive Director (statewide permits) or Regional Water Board Executive Officer (Regional Water Board permits) that describes its strategy to comply with these special conditions, including the requirement to maintain natural water quality in the affected ASBS. The ASBS Compliance Plan shall include a time schedule to implement appropriate non-structural and structural controls (implementation schedule) to comply with these special conditions for inclusion in the discharger's SWMP or SWPPP, as appropriate to permit type.

c. Within 18 months of the effective date of the Exception, any non-structural controls that are necessary to comply with these special conditions shall be implemented.

d. Within four (4) years of the effective date of the Exception, any structural controls identified in the ASBS Compliance Plan that are necessary to comply with these special conditions shall be operational.

e. Within four (4) years of the effective date of the Exception, all dischargers must comply with the requirement that their discharges into the affected ASBS maintain natural ocean water quality. If the initial results of post-storm receiving water quality testing indicate levels higher than the 85th percentile threshold of reference water quality data and the pre-storm receiving water levels, then the discharger must re-sample the receiving water, pre- and post-storm. If after re-sampling the post-storm levels are still higher than the 85th percentile threshold of reference water quality data, and the pre-storm receiving water levels, for any constituent, then natural ocean water quality is exceeded. See attached Flowchart.

f. The Executive Director of the State Water Board (statewide permits) or Executive Officer of the Regional Water Board (Regional Water Board permits) may only authorize additional time to comply with the special conditions d. and e., above if good cause exists to do so. Good cause means a physical impossibility or lack of funding.

If a discharger claims physical impossibility, it shall notify the Board in writing within thirty (30) days of the date that the discharger first knew of the event or circumstance that caused or would cause it to fail to meet the deadline in d. or e. The notice shall describe the reason for the noncompliance or anticipated noncompliance and specifically refer to this Section of this Exception. It shall describe the anticipated length of time the delay in compliance may persist, the cause or causes of the delay as well as measures to minimize the impact of the delay on water quality, the measures taken or to be taken by the discharger to prevent or minimize the delay, the schedule by which the measures will be implemented, and the anticipated date of compliance. The discharger shall adopt all reasonable measures to avoid and minimize such delays and their impact on water quality.

The discharger may request an extension of time for compliance based on lack of funding. The request for an extension shall require:

(1) for municipalities, a demonstration of significant hardship to discharger ratepayers, by showing the relationship of storm water fees to annual

household income for residents within the discharger's jurisdictional area, and the discharger has made timely and complete applications for all available bond and grant funding, and either no bond or grant funding is available, or bond and/or grant funding is inadequate; or

(2) for other governmental agencies, a demonstration and documentation of a good faith effort to acquire funding through that agency's budgetary process.

B. NONPOINT SOURCE DISCHARGES

[NOT INCLUDED]
[PROVISIONS FOR NONPOINT SOURCE DISCHARGES NOT APPLICABLE]

II. ADDITIONAL REQUIREMENTS FOR PARKS AND RECREATION FACILITIES

[NOT INCLUDED]
[ADDITIONAL REQUIREMENTS FOR PARKS AND RECREATION FACILITIES NOT APPLICABLE]

III. ADDITIONAL REQUIREMENTS – WATERFRONT AND MARINE OPERATIONS

[NOT INCLUDED]
[ADDITIONAL REQUIREMENTS FOR WATERFRONT AND MARINE OPERATIONS NOT APPLICABLE]

IV. MONITORING REQUIREMENTS

Monitoring is mandatory for all dischargers to assure compliance with the Ocean Plan. Monitoring requirements include both: (A) core discharge monitoring, and (B) ocean receiving water monitoring. The State and Regional Water Boards must approve sampling site locations and any adjustments to the monitoring programs. All ocean receiving water and reference area monitoring must be comparable with the Water Boards' Surface Water Ambient Monitoring Program (SWAMP).

Safety concerns: Sample locations and sampling periods must be determined considering safety issues. Sampling may be postponed upon notification to the State and Regional Water Boards if hazardous conditions prevail.

Analytical Chemistry Methods: All constituents must be analyzed using the lowest minimum detection limits comparable to the Ocean Plan water quality objectives. For metal analysis, all samples, including storm water effluent, reference samples, and ocean receiving water samples, must be analyzed by the approved analytical method with the lowest minimum detection limits (currently Inductively Coupled Plasma/Mass Spectrometry) described in the Ocean Plan.

A. CORE DISCHARGE MONITORING PROGRAM

1. General sampling requirements for timing and storm size:

   Runoff must be collected during a storm event that is greater than 0.1 inch and generates runoff, and at least 72 hours from the previously measurable storm event. Runoff samples shall be collected when post-storm receiving water is sampled, and analyzed for the same constituents as receiving water and reference site samples (see section IV B) as described below.

2. Runoff flow measurements

   a. For municipal/industrial storm water outfalls in existence as of December 31, 2007, 18 inches (457mm) or greater in diameter/width (including multiple outfall pipes in combination having a width of 18 inches, runoff flows must be measured or calculated, using a method acceptable to and approved by the State and Regional Water Boards.
   b. This will be reported annually for each precipitation season to the State and Regional Water Boards.

3. Runoff samples – storm events

   a. For outfalls equal to or greater than 18 inches (0.46m) in diameter or width:

      (1) samples of storm water runoff shall be analyzed during the same storm as receiving water samples for oil and grease, total suspended solids, and, within the range of the southern sea otter indicator bacteria or some other measure of fecal contamination, ; and

      (2) samples of storm water runoff shall be analyzed for critical life stage chronic toxicity (one invertebrate or algal species) at least once during each storm season when receiving water is sampled in the ASBS

      (3) If an applicant has no outfall greater than 36 inches, then storm water runoff from the applicant's largest outfall shall be further analyzed during the same storm as receiving water samples for Ocean Plan Table B metals for protection of marine life, Ocean Plan polynuclear aromatic hydrocarbons (PAHs), current use pesticides (pyrethroids and OP pesticides), and nutrients (ammonia, nitrate and phosphates).

   b. For outfalls equal to or greater than 36 inches (0.91m) in diameter or width:

      (1) samples of storm water runoff shall be analyzed during the same storm as receiving water samples for oil and grease, total suspended solids, and,

within the range of the southern sea otter indicator bacteria or some other measure of fecal contamination; and

(2) samples of storm water runoff shall be further analyzed during the same storm as receiving water samples for Ocean Plan Table B metals for protection of marine life, Ocean Plan polynuclear aromatic hydrocarbons (PAHs), current use pesticides (pyrethroids and OP pesticides), and nutrients (ammonia, nitrate and phosphates) and

(3) samples of storm water runoff shall be analyzed for critical life stage chronic toxicity (one invertebrate or algal species) at least once during each storm season when receiving water is sampled in the ASBS.

c. For an applicant not participating in a regional monitoring program [see below in Section IV (B)] in addition to (a.) and (b.) above, a minimum of the two largest outfalls or 20 percent of the larger outfalls, whichever is greater, shall be sampled (flow weighted composite samples) at least three times annually during wet weather (storm event) and analyzed for all Ocean Plan Table A constituents, Table B constituents for marine aquatic life protection (except for toxicity, only chronic toxicity for three species shall be required), DDT, PCBs, Ocean Plan PAHs, OP pesticides, pyrethroids, nitrates, phosphates, and Ocean Plan indicator bacteria. For parties discharging to ASBS in more than one Regional Water Board region, at a minimum, one (the largest) such discharge shall be sampled annually in each Region.

4. The Executive Director of the State Water Board (statewide permits) or Executive Officer of the Regional Water Board (Regional Water Board permits) may reduce or suspend core monitoring once the storm runoff is fully characterized. This determination may be made at any point after the discharge is fully characterized, but is best made after the monitoring results from the first permit cycle are assessed.

B. OCEAN RECEIVING WATER AND REFERENCE AREA MONITORING PROGRAM

In addition to performing the Core Discharge Monitoring Program in Section II.A above, all applicants having authorized discharges must perform ocean receiving water monitoring. In order to fulfill the requirements for monitoring the physical, chemical, and biological characteristics of the ocean receiving waters within their ASBS, dischargers may choose either (1) an individual monitoring program, or (2) participation in a regional integrated monitoring program.

1. Individual Monitoring Program: The requirements listed below are for those dischargers who elect to perform an individual monitoring program to fulfill the requirements for monitoring the physical, chemical, and biological characteristics of the ocean receiving waters within the affected ASBS. In addition to Core Discharge Monitoring, the following additional monitoring requirements shall be met:

a. Three times annually, during wet weather (storm events), the receiving water at the point of discharge from the outfalls described in section (IV)(A)(3)(c) above shall be sampled and analyzed for Ocean Plan Table A constituents, Table B constituents for marine aquatic life, DDT, PCBs, Ocean Plan PAHs, OP pesticides, pyrethroids, nitrates, phosphates, salinity, chronic toxicity (three species), and Ocean Plan indicator bacteria.

   The sample location for the ocean receiving water shall be in the surf zone at the point of discharges; this must be at the same location where storm water runoff is sampled. Receiving water shall be sampled at approximately the same time prior to (pre-storm) and during (or immediately after) the same storm (post storm). Reference water quality shall also be sampled and analyzed for the same constituents pre-storm and post-storm, during the same storms when receiving water is sampled. Reference stations will be determined by the State Water Board's Division of Water Quality and the applicable Regional Water Board(s).

b. Sediment sampling shall occur at least three times during every five (5) year period. The subtidal sediment (sand or finer, if present) at the discharge shall be sampled and analyzed for Ocean Plan Table B constituents for marine aquatic life, DDT, PCBs, PAHs, pyrethroids, and OP pesticides. For sediment toxicity testing, only an acute toxicity test using the amphipod Eohaustorius estuarius must be performed.

c. A quantitative survey of intertidal benthic marine life shall be performed at the discharge and at a reference site. The survey shall be performed at least once every five (5) year period. The survey design is subject to approval by the Regional Water Board and the State Water Board's Division of Water Quality. The results of the survey shall be completed and submitted to the State Water Board and Regional Water Board at least six months prior to the end of the permit cycle.

d. Once during each five (5) year period, a bioaccumulation study shall be conducted to determine the concentrations of metals and synthetic organic pollutants at representative discharge sites and at representative reference sites. The study design is subject to approval by the Regional Water Board and the State Water Board's Division of Water Quality. The bioaccumulation study may include California mussels (Mytilus californianus) and/or sand crabs (Emerita analoga or Blepharipoda occidentalis). Based on the study results, the Regional Water Board and the State Water Board's Division of Water Quality, may adjust the study design in subsequent permits, or add or modify additional test organisms (such as shore crabs or fish), or modify the study design appropriate for the area and best available sensitive measures of contaminant exposure.

e. Marine Debris: Representative quantitative observations for trash by type and source shall be performed along the coast of the ASBS within the influence of the discharger's outfalls. The design, including locations and frequency, of the marine debris observations is subject to approval by the Regional Water Board and State Water Board's Division of Water Quality.

f. The monitoring requirements of the Individual Monitoring Program in this section are minimum requirements. After a minimum of one (1) year of continuous water quality monitoring of the discharges and ocean receiving waters, the Executive Director of the State Water Board (statewide permits) or Executive officer of the Regional Water Board (Regional Water Board permits) may require additional monitoring, or adjust, reduce or suspend receiving water and reference station monitoring. This determination may be made at any point after the discharge and receiving water is fully characterized, but is best made after the monitoring results from the first permit cycle are assessed.

2. Regional Integrated Monitoring Program: Dischargers may elect to participate in a regional integrated monitoring program, in lieu of an individual monitoring program, to fulfill the requirements for monitoring the physical, chemical, and biological characteristics of the ocean receiving waters within their ASBS. This regional approach shall characterize natural water quality, pre- and post-storm, in ocean reference areas near the mouths of identified open space watersheds and the effects of the discharges on natural water quality (physical, chemical, and toxicity) in the ASBS receiving waters, and should include benthic marine aquatic life and bioaccumulation components. The design of the ASBS stratum of a regional integrated monitoring program may deviate from the otherwise prescribed individual monitoring approach (in Section IV.B.1) if approved by the State Water Board's Division of Water Quality and the Regional Water Boards.

a. Ocean reference areas shall be located at the drainages of flowing watersheds with minimal development (in no instance more than 10% development), and shall not be located in CWA Section 303(d) listed waterbodies or have tributaries that are 303(d) listed. Reference areas shall be free of wastewater discharges and anthropogenic non-storm water runoff. A minimum of low threat storm runoff discharges (e.g. stream highway overpasses and campgrounds) may be allowed on a case-by-case basis. Reference areas shall be located in the same region as the ASBS receiving water monitoring occurs. The reference areas for each Region are subject to approval by the participants in the regional monitoring program and the State Water Board's Division of Water Quality and the applicable Regional Water Board(s). A minimum of three ocean reference water samples must be collected from each station, each from a separate storm. A minimum of one reference location shall be sampled for each ASBS receiving water site sampled per responsible party. For parties discharging to ASBS in more than one Regional Water Board region, at a minimum, one reference station and one receiving water station shall be sampled in each region.

b. ASBS ocean receiving water must be sampled in the surf zone at the location where the runoff makes contact with ocean water (i.e. at "point zero"). Ocean receiving water stations must be representative of worst-case discharge conditions (i.e. co-located at a large drain greater than 36 inches, or if drains greater than 36 inches are not present in the ASBS then the largest drain greater than18 inches.) Ocean receiving water stations are subject to approval by the participants in the regional monitoring program and the State Water Board's Division of Water Quality and the applicable Regional Water Board(s). A minimum of three ocean receiving water samples must be collected during each storm season from each station, each from a separate storm. A minimum of one receiving water location shall be sampled in each ASBS per responsible party in that ASBS. For parties discharging to ASBS in more than one Regional Water Board region, at a minimum, one reference station and one receiving water station shall be sampled in each region.

c. Reference and receiving water sampling shall commence during the first full storm season following the adoption of these special conditions, and post-storm samples shall be collected when annual storm water runoff is sampled. Sampling shall occur in a minimum of two storm seasons. For those ASBS dischargers that have already participated in the Southern California Bight 2008 ASBS regional monitoring effort, sampling may be limited to only one storm season.

d. Receiving water and reference samples shall be analyzed for the same constituents as storm water runoff samples. At a minimum, constituents to be sampled and analyzed in reference and discharge receiving waters must include oil and grease, total suspended solids, Ocean Plan Table B metals for protection of marine life, Ocean Plan PAHs, pyrethroids, OP pesticides, ammonia, nitrate, phosphates, and critical life stage chronic toxicity for three species. In addition, within the range of the southern sea otter, indicator bacteria or some other measure of fecal contamination shall be analyzed.

3. Waterfront and Marine Operations: In addition to the above requirements for ocean receiving water monitoring, additional monitoring must be performed for marinas and boat launch and pier facilities:

a. For all marina or mooring field operators, in mooring fields with 10 or more occupied moorings, the ocean receiving water must be sampled for Ocean Plan indicator bacteria, residual chlorine, copper, zinc, grease and oil, methylene blue active substances (MBAS), and ammonia nitrogen.

(1) For mooring field operators opting for an individual monitoring program (Section IV.B.1 above), this sampling must occur weekly (on the weekend) from May through October.

(2) For mooring field operators opting to participate in a regional integrated monitoring program (Section IV.B.2 above), this sampling must occur monthly from May through October on a high use weekend in each month. The Water

Boards may allow a reduction in the frequency of sampling, through the regional monitoring program, after the first year of monitoring.

b. For all mooring field operators, the subtidal sediment (sand or finer, if present) within mooring fields and below piers shall be sampled and analyzed for Ocean Plan Table B metals (for marine aquatic life beneficial use), acute toxicity, PAHs, and tributyltin. For sediment toxicity testing, only an acute toxicity test using the amphipod Eohaustorius estuarius must be performed. This sampling shall occur at least three times during a five (5) year period. For mooring field operators opting to participate in a regional integrated monitoring program, the Water Boards may allow a reduction in the frequency of sampling after the first sampling effort's results are assessed.

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ATTACHMENT B

STANDARD PERMIT PROVISIONS AND GENERAL PROVISIONS

1. Standard Permit Provisions

Code of Federal Regulations Title 40 Section 122.41 (40 CFR 122.41) includes conditions, or provisions, that apply to all National Pollutant Discharge Elimination System (NPDES) permits. Additional provisions applicable to NPDES permits are in 40 CFR 122.42. All applicable provisions in 40 CFR 122.41 and 40 CFR 122.42 must be incorporated into this Order and NPDES permit. The applicable 40 CFR 122.41 and 40 CFR 122.42 provisions are as follows:

a. DUTY TO COMPLY [40 CFR 122.41(a)]

The Copermittee must comply with all of the provisions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act (CWA) and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

(1) The Copermittee must comply with effluent standards or prohibitions established under Section 307(a) of the CWA for toxic pollutants and with standards for sewage sludge use or disposal established under Section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions or standards for sewage sludge use or disposal, even if the permit has not yet been modified to incorporate the requirement. [40 CFR 122.41(a)(1)]

(2) The CWA provides that any person who violates Section 301, 302, 306, 307, 308, 318 or 405 of the CWA, or any permit condition or limitation implementing any such sections in a permit issued under Section 402, or any requirement imposed in a pretreatment program approved under Section 402(a)(3) or 402(b)(8) of the CWA, is subject to a civil penalty not to exceed $25,000 per day for each violation. The CWA provides that any person who *negligently* violates Section 301, 302, 306, 307, 308, 318, or 405 of the CWA, or any condition or limitation implementing any of such sections in a permit issued under Section 402 of the CWA, or any requirement imposed in a pretreatment program approved under Section 402(a)(3) or 402(b)(8) of the CWA, is subject to criminal penalties of $2,500 to $25,000 per day of violation, or imprisonment of not more than 1 year, or both. In the case of a second or subsequent conviction for a negligent violation, a person shall be subject to criminal penalties of not more than $50,000 per day of violation, or by imprisonment of not more than 2 years, or both. Any person who *knowingly* violates such sections, or such conditions or limitations is subject to criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment for not more than 3 years, or both. In the case of a second or subsequent conviction for a knowing violation, a person shall be subject to criminal penalties of not more than $100,000 per day of violation, or imprisonment of not more than 6 years, or both. Any person who knowingly violates Section 301, 302, 303, 306, 307, 308, 318 or 405 of the CWA, or any permit condition or limitation implementing any of such sections in a permit issued under Section 402 of the CWA, and who knows at that time that he thereby places another person in imminent danger of death or serious bodily injury, shall, upon conviction, be subject to a fine of

not more than $250,000 or imprisonment of not more than 15 years, or both. In the case of a second or subsequent conviction for a knowing endangerment violation, a person shall be subject to a fine of not more than $500,000 or by imprisonment of not more than 30 years, or both. An organization, as defined in Section 309(c)(3)(B)(iii) of the CWA, shall, upon conviction of violating the imminent danger provision, be subject to a fine of not more than $1,000,000 and can be fined up to $2,000,000 for second or subsequent convictions.
[40 CFR 122.41(a)(2)]

(3) Any person may be assessed an administrative penalty by the San Diego Regional Water Quality Control Board (San Diego Water Board), State Water Resources Control Board (State Water Board), or United States Environmental Protection Agency (USEPA) for violating Section 301, 302, 306, 307, 308, 318 or 405 of the CWA, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of this Act. Administrative penalties for Class I violations are not to exceed $10,000 per violation, with the maximum amount of any Class I penalty assessed not to exceed $25,000. Penalties for Class II violations are not to exceed $10,000 per day for each day during which the violation continues, with the maximum amount of any Class II penalty not to exceed $125,000.
[40 CFR 122.41(a)(3)]

b. DUTY TO REAPPLY [40 CFR 122.41(b)]

If a Copermittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the Copermittee must apply for and obtain a new permit.

c. NEED TO HALT OR REDUCE ACTIVITY NOT A DEFENSE [40 CFR 122.41(c)]

It shall not be a defense for a Copermittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

d. DUTY TO MITIGATE [40 CFR 122.41(d)]

The Copermittee must take all reasonable steps to minimize or prevent any discharge or prevent any discharge or sludge use or disposal in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

e. PROPER OPERATION AND MAINTENANCE [40 CFR 122.41(e)]

The Copermittee must at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Copermittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems that are installed by a Copermittee only when the operation is necessary to achieve compliance with the conditions of this permit.

f. PERMIT ACTIONS [40 CFR 122.41(f)]

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Copermittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

g. PROPERTY RIGHTS [40 CFR 122.41(g)]

This permit does not convey any property rights of any sort, or any exclusive privilege.

h. DUTY TO PROVIDE INFORMATION [40 CFR 122.41(h)]

The Copermittee must furnish to the San Diego Water Board, State Water Board, or USEPA within a reasonable time, any information which the San Diego Water Board, State Water Board, or USPEA may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The Copermittee must also furnish to the San Diego Water Board, State Water Board, or USPEA upon request, copies of records required to be kept by this permit.

i. INSPECTION AND ENTRY [40 CFR 122.41(i)]

The Copermittee must allow the San Diego Water Board, State Water Board, USEPA, and/or their authorized representative (including an authorized contractor acting as their representative), upon presentation of credentials and other documents as may be required by law, to:

(1) Enter upon the Copermittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit; [40 CFR 122.41(i)(1)]

(2) Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit; [40 CFR 122.41(i)(2)]

(3) Inspect and photograph at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; [40 CFR 122.41(i)(3)] and

(4) Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the CWA, any substances or parameters at any location. [40 CFR 122.41(i)(4)]

j. MONITORING AND RECORDS [40 CFR 122.41(j)]

(1) Samples and measurements taken for the purpose of monitoring must be representative of the monitored activity. [40 CFR 122.41(j)(1)]

(2) Except for records of monitoring information required by this permit related to the Copermittee's sewage sludge use and disposal activities, which shall be retained for a period of at least five (5) years (or longer as required by 40 CFR Part 503), the

Copermittee must retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three (3) years from the date of the sample, measurement, report or application. This period may be extended by request of the San Diego Water Board at any time. [40 CFR 122.41(j)(2)]

(3) Records for monitoring information must include: [40 CFR 122.41(j)(3)]

(a) The date, exact place, and time of sampling or measurements; [40 CFR 122.41(j)(3)(i)]
(b) The individual(s) who performed the sampling or measurements; [40 CFR 122.41(j)(3)(ii)]
(c) The date(s) analyses were performed; [40 CFR 122.41(j)(3)(iii)]
(d) The individual(s) who performed the analyses; [40 CFR 122.41(j)(3)(iv)]
(e) The analytical techniques or methods used; [40 CFR 122.41(j)(3)(v)] and
(f) The results of such analyses. [40 CFR 122.41(j)(3)(vi)]

(4) Monitoring must be conducted according to test procedures under 40 CFR Part 136 unless another method is required under 40 CFR Subchapters N or O. [40 CFR 122.41(j)(4)]

In the case of pollutants for which there are no approved methods under 40 CFR Part 136 or otherwise required under 40 CFR Subchapters N and O, monitoring must be conducted according to a test procedure specified in the permit for such pollutants. [40 CFR 122.44(i)(1)(iv)]

(5) The CWA provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or both. [40 CFR 122.41(j)(5)]

k. SIGNATORY REQUIREMENT [40 CFR 122.41(k)]

(1) All applications, reports, or information submitted to the San Diego Water Board, State Water Board, or USEPA must be signed and certified. (See 40 CFR 122.22) [40 CFR 122.41(k)(1)]

(a) *For a municipality, State, Federal, or other public agency.* [All applications must be signed] [b]y either a principal executive officer or ranking elected official. [40 CFR 122.22(a)(3)]

(b) All reports required by permits, and other information requested by the San Diego Water Board, State Water Board, or USEPA must be signed by a person described in paragraph (a) of this section, or by a duly authorized representative of that person. A person is a duly authorized representative only if: [40 CFR 122.22(b)]

(i) The authorization is made in writing by a person described in paragraph (a) of this section; [40 CFR 122.22(b)(1)]

(ii) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company, (A duly authorized representative may thus be either a named individual or any individual occupying a named position.) [40 CFR 122.22(b)(2)] and,

(iii) The written authorization is submitted to the San Diego Water Board and State Water Board. [40 CFR 122.22(b)(3)]

(c) *Changes to authorization.* If an authorization under paragraph (b) of this section is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph (b) of this section must be submitted to the San Diego Water Board prior to or together with any reports, information, or applications to be signed by an authorized representative. [40 CFR 122.22(c)]

(d) *Certification.* Any person signing a document under paragraph (a) or (b) of this section shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations." [40 CFR 122.22(d)]

(2) The CWA provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or non-compliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both. [40 CFR 122.41(k)(2)]

I. REPORTING REQUIREMENTS [40 CFR 122.41(l)]

(1) *Planned changes.* The Copermittee must give notice to the San Diego Water Board as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when: [40 CFR 122.41(l)(1)]

(a) The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR 122.29(b); [40 CFR 122.41(l)(1)(i)] or

(b) The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which

are subject neither to effluent limitations in the permit, nor to notification requirements under 40 CFR 122.42(a)(1).
[40 CFR 122.41(l)(1)(ii)]

(c) The alteration or addition results in a significant change in the Copermittee's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan. [40 CFR 122.41(l)(1)(iii)]

(2) *Anticipated noncompliance*. The Copermittee must give advance notice to the San Diego Water Board or State Water Board of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.
[40 CFR 122.41(l)(2)]

(3) *Transfers*. This permit is not transferable to any person except after notice to the San Diego Water Board. The San Diego Water Board may require modification or revocation and reissuance of the permit to change the name of the Copermittee and incorporate such other requirements as may be necessary under the CWA.
[40 CFR 122.41(l)(3)]

(4) *Monitoring reports.* Monitoring results must be reported at the intervals specified elsewhere in this permit. [40 CFR 122.41(l)(4)]

(a) Monitoring results must be reported on a Discharge Monitoring Report (DMR) form or forms provided or specified by the San Diego Water Board or State Water Board for reporting results of monitoring of sludge use or disposal practices. [40 CFR 122.41(l)(4)(i)]

(b) If the Copermittee monitors any pollutant more frequently than required by the permit using test procedures approved under 40 CFR Part 136 or another method required for an industry-specific waste stream under 40 CFR Subchapters N or O, the results of this monitoring must be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the San Diego Water Board or State Water Board.
[40 CFR 122.41(l)(4)(ii)]

(c) Calculations for all limitations which require averaging of measurements must utilize an arithmetic mean unless otherwise specified in the permit.
[40 CFR 122.41(l)(4)(iii)]

(5) *Compliance schedules*. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit must be submitted no later than 14 days following each schedule date. [40 CFR 122.41(l)(5)]

(6) *Twenty-four hour reporting.*

(a) The Copermittee must report any noncompliance that may endanger health or the environment. Any information must be provided orally within 24 hours from the time the Copermittee becomes aware of the circumstances. A written submission must also be provided within five (5) days of the time the Copermittee becomes aware of the circumstances. The written submission must contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. [40 CFR 122.41(l)(6)(i)]

(b) The following must be included as information which must be reported within 24 hours under this paragraph: [40 CFR 122.41(l)(6)(ii)]

(i) Any unanticipated bypass that exceeds any effluent limitation in the permit (See 40 CFR 122.41(g)). [40 CFR 122.41(l)(6)(ii)(A)]
(ii) Any upset which exceeds any effluent limitation in the permit. [40 CFR 122.41(l)(6)(ii)(B)] and,
(iii) Violation of a maximum daily discharge limitation for any of the pollutants listed by the San Diego Water Board in the permit to be reported within 24 hours. (See 40 CFR 122.44(g)) [40 CFR 122.41(l)(6)(ii)(C)]

(c) The San Diego Water Board may waive the above-required written report on a case-by-case basis if the oral report has been received within 24 hours. [40 CFR 122.41(l)(6)(iii)]

(7) *Other noncompliance.* The Copermittee must report all instances of noncompliance not reported in accordance with the standard provisions required under 40 CFR 122.41(l)(4), (5), and (6), at the time monitoring reports are submitted. The reports must contain the information listed in the standard provisions required under 40 CFR 122.41(l)(6). [40 CFR 122.41(l)(7))]

(8) *Other information.* When the Copermittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the San Diego Water Board, State Water Board, or USEPA, the Copermittee must promptly submit such facts or information. [40 CFR 122.41(l)(8)]

~~**m. BYPASS** [40 CFR 122.41(m)]~~

~~(1) *Definitions.*~~

~~(a) "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility. [40 CFR 122.41(m)(1)(i)] or~~

~~(b) "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be~~

~~expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.~~
~~[40 CFR 122.41(m)(1)(ii)]~~

~~(2) *Bypass not exceeding limitations*. The Copermittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the standard provisions required under 40 CFR 122.41(m)(3) and (4).~~
~~[40 CFR 122.41(m)(2)]~~

~~(3) *Notice.*~~

~~(a) *Anticipated bypass*. If the Copermittee knows in advance of the need for a bypass, it must submit a notice, if possible at least ten days before the date of the bypass. [40 CFR 122.41(m)(3)(i)] or~~

~~(b) *Unanticipated bypass*. The Copermittee must submit notice of an unanticipated bypass in accordance with the standard provisions required under 40 CFR 122.41(l)(6) (24-hour notice).~~
~~[40 CFR 122.41(m)(3)(ii)]~~

~~(4) *Prohibition of Bypass.*~~

~~(a) Bypass is prohibited, and the San Diego Water Board may take enforcement action against a Copermittee for bypass, unless:~~
~~[40 CFR 122.41(m)(4)(i)]~~

~~(i) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage; [40 CFR 122.41(m)(4)(i)(A)]~~
~~(ii) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance;~~
~~[40 CFR 122.41(m)(4)(i)(B)] and,~~
~~(iii) The Copermittee submitted notice in accordance with the standard provisions required under 40 CFR 122.41(m)(3).~~
~~[40 CFR 122.41(m)(4)(i)(C)]~~

~~(b) The San Diego Water Board may approve an anticipated bypass, after considering its adverse effects, if the San Diego Water Board determines that it will meet the three conditions listed above.~~
~~[40 CFR 122.41(m)(4)(ii)]~~

~~n.~~m. **UPSET** [40 CFR 122.41(n)]

(1) *Definition.* “Upset” means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the Copermittee. An upset does not

include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation. [40 CFR 122.41(n)(1)]

(2) *Effect of an upset*. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the standard provisions required under 40 CFR 122.41(n)(3) are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review. [40 CFR 122.41(n)(2)]

(3) *Conditions necessary for a demonstration of upset*. A Copermittee who wishes to establish the affirmative defense of upset must demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that: [40 CFR 122.41(n)(3)]

(a) An upset occurred and that the Copermittee can identify the cause(s) of the upset; [40 CFR 122.41(n)(3)(i)]
(b) The permitted facility was at the time being properly operated; [40 CFR 122.41(n)(3)(ii)] and
(c) The Copermittee submitted notice of the upset in accordance with the standard provisions required under 40 CFR 122.41(l)(6)(ii)(B) (24-hour notice). [40 CFR 122.41(n)(3)(iii)]
(d) The Copermittee complied with any remedial measures pursuant to the standard provisions required under 40 CFR 122.41(d). [40 CFR 122.41(n)(3)(iii)]

(4) *Burden of proof*. In any enforcement proceeding, the Copermittee seeking to establish the occurrence of an upset has the burden of proof. [40 CFR 122.41(n)(4)]

~~o.~~n. STANDARD PERMIT PROVISIONS FOR MUNICIPAL SEPARATE STORM SEWER SYSTEMS

[40 CFR 122.42(c)]

The operator of a large or medium municipal separate storm sewer system or a municipal separate storm sewer that has been designated by the San Diego Water Board or State Water Board under 40 CFR 122.26(a)(1)(v) must submit an annual report by the anniversary of the date of the issuance of the permit for such system. The report must include:

(1) The status of implementing the components of the storm water management program that are established as permit conditions; [40 CFR 122.42(c)(1)]

(2) Proposed changes to the storm water management programs that are established as permit conditions. Such proposed changes must be consistent with 40 CFR 122.26(d)(2)(iii); [40 CFR 122.42(c)(2)] and

(3) Revisions, if necessary, to the assessment of controls and the fiscal analysis reported in the permit application under 40 CFR 122.26(d)(2)(iv) and (v); [40 CFR 122.42(c)(3)]

(4) A summary of data, including monitoring data, that is accumulated throughout the reporting year; [40 CFR 122.42(c)(4)]

(5) Annual expenditures and budget for year following each annual report; [40 CFR 122.42(c)(5)]

(6) A summary describing the number and nature of enforcement actions, inspections, and public education programs; [40 CFR 122.42(c)(6)]

(7) Identification of water quality improvements or degradation. [40 CFR 122.42(c)(7)]

~~p.~~o. **STANDARD PERMIT PROVISIONS FOR STORM WATER DISCHARGES** [40 CFR 122.42(d)]

The initial permits for discharges composed entirely of storm water issued pursuant to 40 CFR 122.26(e)(7) must require compliance with the conditions of the permit as expeditiously as practicable, but in no event later than three years after the date of issuance of the permit.

2. General Provisions

In addition to the standard provisions required to be incorporated into the Order and NPDES permit pursuant to 40 CFR 122.41 and 40 CFR 122.42, several other general provisions apply to this Order. The general provisions applicable to this Order and NPDES permit are as follows:

a. DISCHARGE OF WASTE IS A PRIVILEGE

No discharge of waste into the waters of the State, whether or not such discharge is made pursuant to waste discharge requirements, shall create a vested right to continue such discharge. All discharges of waste into waters of the State are privileges, not rights. [CWC Section 13263(g)]

b. DURATION OF ORDER AND NPDES PERMIT

(1) *Effective date*. This Order and NPDES permit becomes effective on the 50th day after its adoption provided the USEPA has no objection. If the USEPA objects to its issuance, this Order shall not become effective until such objection is withdrawn. This Order supersedes Order No. R9-2007-0001 upon the effective date of this Order, and supersedes Order Nos. R9-2009-0002 and R9-2010-0016 upon their expiration or earlier notice of coverage.

(2) *Expiration*. This Order and NPDES permit expires five years after its effective date. [40 CFR 122.46(a)]

(3) *Continuation of expired order*. After this Order and NPDES permit expires, the terms and conditions of this Order and NPDES permit are automatically continued pending issuance of a new permit if all requirements of the federal NPDES regulations on the continuation of expired permits (40 CFR 122.6) are complied with.

c. AVAILABILITY

A copy of this Order must be kept at a readily accessible location and must be available to on-site personnel at all times.

d. CONFIDENTIALITY OF INFORMATION

Except as provided for in 40 CFR 122.7, no information or documents submitted in accordance with or in application for this Order will be considered confidential, and all such information and documents shall be available for review by the public at the San Diego Water Board office.

Claims of confidentiality for the following information will be denied:
[40 CFR 122.7(b)]

(1) The name and address of any permit applicant or Copermittee; [40 CFR 122.7(b)(1)] and

(2) Permit applications and attachments, permits, and effluent data. [40 CFR 122.7(b)(2)]

e. EFFLUENT LIMITATIONS

(1) *Interim effluent limitations*. The Copermittee must comply with any interim effluent limitations as established by addendum, enforcement action, or revised waste discharge requirements which have been, or may be, adopted by the San Diego Water Board.

(2) *Other effluent limitations and standards*. If any applicable toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is promulgated under Section 307(a) of the CWA for a toxic pollutant and that standard or prohibition is more stringent than any limitation on the pollutant in the permit, the San Diego Water Board shall institute proceedings under these regulations to modify or revoke and reissue the permit to conform to the toxic effluent standard or prohibition. [40 CFR 122.44(b)(1)].

f. DUTY TO MINIMIZE OR CORRECT ADVERSE IMPACTS

The Copermittee must take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with this Order, including such accelerated or additional monitoring as may be necessary to determine the nature and impact of the noncompliance.

g. PERMIT ACTIONS

The filing of a request by the Copermittee for modification, revocation and reissuance, or termination of this Order, or a notification of planned change in or anticipated noncompliance with this Order does not stay any condition of this Order. (See 40 CFR

122.41(f)) In addition, the following provisions apply to this Order:

(1) Upon application by any affected person, or on its own motion, the San Diego Water Board may review and revise the requirements in this Order. All requirements must be reviewed periodically. [CWC Section 13263(e)]

(2) This Order may be terminated or modified for cause, including, but not limited to, all of the following: [CWC Section 13381]

(a) Violation of any condition contained in the requirements of this Order. [CWC Section 13381(a)]

(b) Obtaining the requirements in this Order by misrepresentation, or failure to disclose fully all relevant facts. [CWC Section 13381(b)]

(c) A change in any condition that requires either a temporary or permanent reduction or elimination of the permitted discharge. [CWC Section 13381(c)]

(3) When this Order is transferred to a new owner or operator, such requirements as may be necessary under the CWC may be incorporated into this Order.

h. NPDES PERMITTED NON-STORM WATER DISCHARGES

The San Diego Water Board has, in prior years, issued a limited number of individual NPDES permits for non-storm water discharges to MS4s. The San Diego Water Board or State Water Board may in the future, upon prior notice to the Copermittee(s), issue an NPDES permit for any non-storm water discharge (or class of non-storm water discharges) to an MS4. A Copermittee will not be held responsible for pollutants in its MS4 discharge originating from an NPDES-permitted non-storm water discharge.

i. MONITORING

In addition to the standard provisions required under 40 CFR 122.41(j) and (l)(4), the following general monitoring provisions apply to this Order:

(1) Where procedures are not otherwise specified in Order, sampling, analysis and quality assurance/quality control must be conducted in accordance with the Quality Assurance Management Plan (QAMP) for the State of California's Surface Water Ambient Monitoring Program (SWAMP), adopted by the State Water Resources Control Board (State Water Board).

~~(2) Pursuant to 40 CFR 122.41(j)(2) and CWC Section 13383(a), each Copermittee must retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least five (5) years from the date of the sample, measurement, report or application. This period may be extended by request of the San Diego Water Board at any time.~~

~~(3)~~(2) All chemical, bacteriological, and toxicity analyses must be conducted at a laboratory certified for such analyses by the California Department of Public Health or a laboratory approved by the San Diego Water Board.

~~(4)~~(3) For priority toxic pollutants that are identified in the California Toxics Rule (CTR) (65 Fed. Reg. 31682), the Copermittees must instruct their laboratories to establish calibration standards that are equivalent to or lower than the Minimum Levels (MLs) published in Appendix 4 of the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SIP). If a Copermittee can demonstrate that a particular ML is not attainable, in accordance with procedures set forth in 40 CFR Part 136, the lowest quantifiable concentration of the lowest calibration standard analyzed by a specific analytical procedure (assuming that all the method specified sample weights, volumes, and processing steps have been followed) may be used instead of the ML listed in Appendix 4 of the SIP. The Copermittee must submit documentation from the laboratory to the San Diego Water Board for approval prior to raising the ML for any priority toxic pollutant.

j. ENFORCEMENT

(1) The San Diego Water Board is authorized to enforce the terms of this Order under several provisions of the CWC, including, but not limited to, CWC Sections 13385, 13386, and 13387.

(2) Nothing in this Order shall be construed to protect the Copermittee from its liabilities under federal, state, or local laws.

(3) The CWC provides for civil and criminal penalties comparable to, and in some cases greater than, those provided for under the CWA.

(4) Except as provided in the standard conditions required under 40 CFR 122.41(m) and (n), nothing in this Order shall be construed to relieve the Copermittee from civil or criminal penalties for noncompliance.

(5) Nothing in this Order shall be construed to preclude the institution of any legal action or relieve the Copermittee from any responsibilities, liabilities, or penalties to which the Copermittee is or may be subject to under Section 311 of the CWA.

(6) Nothing in this Order shall be construed to preclude institution of any legal action or relieve the Copermittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authoring preserved by Section 510 of the CWA.

k. SEVERABILITY

The provisions of this Order are severable, and if any provision of this Order, or the application of any provisions of this Order to any circumstance, is held invalid, the application of such provision to other circumstances and the remainder of this Order shall not be affected thereby.

l. APPLICATIONS

Any application submitted by a Copermittee for reissuance or modification of this Order must satisfy all applicable requirements specified in federal regulations as well as any additional requirements for submittal of a Report of Waste Discharge specified in the CWC and the California Code of Regulations.

m. IMPLEMENTATION

All plans, reports and subsequent amendments submitted in compliance with this Order must be implemented immediately (or as otherwise specified). All submittals by Copermittees must be adequate to implement the requirements of this Order.

n. REPORT SUBMITTALS

(1) All report submittals must include an executive summary, introduction, conclusion, recommendations, and signed certified statement.

(2) Each Copermittee must submit a signed certified statement covering its responsibilities for each applicable submittal.

(3) The Principal Watershed Copermittee(s) must submit a signed certified statement covering its responsibilities for each applicable submittal and the sections of the submittals for which it is responsible.

(4) Unless otherwise directed, the Copermittees must submit one hard copy and one electronic copy of each report required under this Order to the San Diego Water Board, and one electronic copy to the USEPA.

(5) The Copermittees must submit reports and provide notifications as required by this Order to the following:

EXECUTIVE OFFICER
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION
9174 SKY PARK COURT, SUITE 100
SAN DIEGO CA 92123-4340
Telephone: (858) 467-2952 Fax: (858) 571-6972

EUGENE BROMLEY
US ENVIRONMENTAL PROTECTION AGENCY
REGION IX
PERMITS ISSUANCE SECTION (W-5-1)
75 HAWTHORNE STREET
SAN FRANCISCO CA 94105

ATTACHMENT C

ACRONYMS AND ABBREVIATIONS

AMAL	Average Monthly Action Level
ASBS	Area(s) of Special Biological Significance
BMP	Best Management Practice
Basin Plan	Water Quality Control Plan for the San Diego Basin
CEQA	California Environmental Quality Act
CCR	California Code of Regulations
CFR	Code of Federal Regulations
CWA	Clean Water Act
CWC	California Water Code
CZARA	Coastal Zone Act Reauthorization Amendments of 1990
ESAs	Environmentally Sensitive Areas
GIS	Geographic Information System
IBI	Index of Biological Integrity
LID	Low Impact Development
MDAL	Maximum Daily Action Level
MEP	Maximum Extent Practicable
MS4	Municipal Separate Storm Sewer System
NAL	Non-Storm Water Action Level
NAICS	North American Industry Classification System
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
ROWD	Report of Waste Discharge (application for NPDES reissuance)
SAL	Storm Water Action Level
San Diego Water Board	California Regional Water Quality Control Board, San Diego Region
SIC	Standard Industrial Classification Code
State Water Board	State Water Resources Control Board
TMDL	Total Maximum Daily Load
USEPA	United States Environmental Protection Agency
WDID	Waste Discharge Identification Number
WLA	Waste Load Allocation
WQBEL	Water Quality Based Effluent Limitation

DEFINITIONS

Active/Passive Sediment Treatment - Using mechanical, electrical or chemical means to flocculate or coagulate suspended sediment for removal from runoff from construction sites prior to discharge.

Anthropogenic Litter – Trash generated from human activities, not including sediment.

Automotive Repair Shop – a facility that is categorized in any one of the following Standard Industrial Classification (SIC) codes: 5013, 5014, 5541, 7532-7534, or 7536-7539 or equivalent NAICS code.

Average Monthly Action Level – The highest allowable average of daily discharges over a calendar month.

Beneficial Uses - The uses of water necessary for the survival or wellbeing of man, plants, and wildlife. These uses of water serve to promote tangible and intangible economic, social, and environmental goals. "Beneficial Uses" of the waters of the State that may be protected include, but are not limited to, domestic, municipal, agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves. Existing beneficial uses are uses that were attained in the surface or ground water on or after November 28, 1975; and potential beneficial uses are uses that would probably develop in future years through the implementation of various control measures. "Beneficial Uses" are equivalent to "Designated Uses" under federal law. [California Water Code Section 13050(f)].

Best Management Practices (BMPs) - Defined in 40 CFR 122.2 as schedules of activities, effective prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs also include treatment requirements, operating procedures and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. In the case of municipal discharge permits, BMPs may be used in the place of numeric effluent limits.

Bioassessment - The use of biological community information to evaluate the biological integrity of a water body and its watershed. With respect to aquatic ecosystems, bioassessment is the collection and analysis of samples of the benthic macroinvertebrate community together with physical/habitat quality measurements associated with the sampling site and the watershed to evaluate the biological condition (i.e. biotic integrity) of a water body.

Biofiltration - Practices that use vegetation and amended soils to detain and treat runoff from impervious areas. Treatment is through filtration, infiltration, adsorption, ion exchange, and biological uptake of pollutants.

Biological Integrity - Defined in Karr J.R. and D.R. Dudley. 1981. Ecological perspective on water quality goals. *Environmental Management* 5:55-68 as: "A balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of natural habitat of the region." Also referred to as ecosystem health.

BMP Design Manual – A plan developed to eliminate, reduce, or mitigate the impacts of runoff from development projects, including Priority Development Projects.

Channel Rehabilitation and Improvement – Remedial measures or activities for the purpose of improving or restoring the environmental health of streams, channels or river systems. Techniques may vary from in-stream restoration techniques to off-line stormwater management practices installed in the system corridor or upland areas. Rehabilitation techniques may include, but are not limited to the following: riparian zone restoration, constructed wetlands, bank stabilization, channel modifications, and day lighting of drainage systems. Effectiveness may be measured in various manners, included: assessment of habitat, reduced stream bank erosion, and restoration of water and sediment transport balance.

Clean Water Act Section 303(d) Water Body - An impaired water body in which water quality does not meet applicable water quality standards and/or is not expected to meet water quality standards, even after the application of technology based pollution controls required by the CWA. The discharge of runoff to these water bodies by the Copermittees is significant because these discharges can cause or contribute to violations of applicable water quality standards.

Construction Site – Any project, including projects requiring coverage under the Construction General Permit, that involves soil disturbing activities greater than 10,000 square feet including, but not limited to, clearing, grading, disturbances to ground such as stockpiling, and excavation. This does not include interior construction activities such as interior remodeling, plumbing, electrical, or mechanical work.

Contamination - As defined in the Porter-Cologne Water Quality Control Act, contamination is "an impairment of the quality of waters of the State by waste to a degree which creates a hazard to the public health through poisoning or through the spread of disease. 'Contamination' includes any equivalent effect resulting from the disposal of waste whether or not waters of the State are affected."

Copermittee – An incorporated city within the County of Orange, County of Riverside, or County of San Diego in the San Diego Region (Region 9), the County of Orange, the County of Riverside, the County of San Diego, the Orange County Flood Control District, the Riverside County Water Conservation and Flood Control District, the San Diego Regional Airport Authority, or the San Diego Unified Port District.

Copermittees – All of the individual Copermittees, collectively.

Critical Channel Flow (Qc) – The channel flow that produces the critical shear stress that initiates bed movement or that erodes the toe of channel banks. When measuring Qc, it should be based on the weakest boundary material – either bed or bank.

Daily Discharge – Defined as either: (1) the total mass of the constituent discharged over the calendar day or any 24 hour period that reasonably represents a calendar day for purposes of sampling (as specified in the permit), for a constituent with limitations expressed in units of mass or; (2) the unweighted arithmetic mean measurement of the constituent over the day for a constituent with limitations expressed in other units of measurement (e.g. concentration.)

The Daily Discharge may be determined by the analytical results of a composite sample taken over the course of one day (a calendar day, or other 24 hour period other than a day), or by the arithmetic mean of analytical results from one or more grab samples taken over the course of a day.

Development Projects - Construction, rehabilitation, redevelopment, or reconstruction of any public or private ~~residential~~ projects involving land disturbance activities~~, industrial, commercial, or any other projects~~.

Direct Discharge to an Environmentally Sensitive Area – Flow that is conveyed overland a distance of 200 ft or less from the development to the ESA, or conveyed in a pipe any amount of distance as an isolated flow from the development to the ESA (i.e. not commingled with flows from adjacent lands).

Dry Season –May 1 to September 30.

Dry Weather – Weather is considered dry if the preceding 72 hours has been without measurable precipitation (>0.1 inch).

Enclosed Bays – Enclosed bays are indentations along the coast that enclose an area of oceanic water within distinct headlands or harbor works. Enclosed bays include all bays where the narrowest distance between the headlands or outermost bay works is less than 75 percent of the greatest dimension of the enclosed portion of the bay. Enclosed bays do not include inland surface waters or ocean waters.

Erosion – When land is diminished or worn away due to wind, water, or glacial ice. Often the eroded debris (silt or sediment) becomes a pollutant via storm water runoff. Erosion occurs naturally but can be intensified by land clearing activities such as farming, development, road building, and timber harvesting.

Environmentally Sensitive Areas (ESAs) - Areas that include but are not limited to all Clean Water Act Section 303(d) impaired water bodies; areas designated as Areas of Special Biological Significance by the State Water Board and San Diego Water Board; State Water Quality Protected Areas; water bodies designated with the RARE beneficial use by the State Water Board and San Diego Water Board; areas designated as preserves or their equivalent under the Natural Communities Conservation Program within the Cities and County of Orange; and any other equivalent environmentally sensitive areas which have been identified by the Copermittees.

Estuaries – Waters, including coastal lagoons, located at the mouth of streams that serve as areas of mixing fresh and ocean waters. Coastal lagoons and mouths of streams that are temporarily separated from the ocean by sandbars shall be considered estuaries. Estuarine waters shall be considered to extend from a bay or the open ocean to a point upstream where there is no significant mixing of fresh water and ocean water. Estuaries do not include inland surface waters or ocean waters.

Existing Development – Any area that has been developed and exists for municipal, commercial, industrial, or residential purposes, uses, or activities. May include areas that are not actively used for its originally developed purpose, but may be re-purposed or redeveloped for another use or activity.

Flow Duration – The long-term period of time that flows occur above a threshold that causes significant sediment transport and may cause excessive erosion damage to creeks and streams (not a single storm event duration). The simplest way to visualize this is to consider a histogram of pre- and post-project flows using long-term records of hourly data. To maintain pre-development flow duration means that the total number of hours (counts) within each range of flows in a flow-duration histogram cannot increase between the pre- and post-development condition. Flow duration within the range of geomorphologically significant flows is important for managing erosion.

Grading - The cutting and/or filling of the land surface to a desired slope or elevation.

Hazardous Material – Any substance that poses a threat to human health or the environment due to its toxicity, corrosiveness, ignitability, explosive nature or chemical reactivity. These also include materials named by the USEPA in 40 CFR 116 to be reported if a designated quantity of the material is spilled into the waters of the U.S. or emitted into the environment.

Hazardous Waste - Hazardous waste is defined as "any waste which, under Section 600 of Title 22 of this code, is required to be managed according to Chapter 30 of Division 4.5 of Title 22 of this code" [CCR Title 22, Division 4.5, Chapter 11, Article 1].

Household Hazardous Waste – Paints, cleaning products, and other hazardous wastes generated during home improvement or maintenance activities.

Hydromodification – The change in the natural watershed hydrologic processes and runoff characteristics (i.e., interception, infiltration, overland flow, and groundwater flow) caused by urbanization or other land use changes that result in increased stream flows and sediment transport. In addition, alteration of stream and river channels, such as stream channelization, concrete lining, installation of dams and water impoundments, and excessive streambank and shoreline erosion are also considered hydromodification, due to their disruption of natural watershed hydrologic processes.

Illicit Connection – Any connection to the MS4 that conveys an illicit discharge.

Illicit Discharge - Any discharge to the MS4 that is not composed entirely of storm water except discharges pursuant to a NPDES permit and discharges resulting from fire fighting activities [40 CFR 122.26(b)(2)].

Inactive Areas – Areas of construction activity that are not active and those that have been active and are not scheduled to be re-disturbed for at least 14 days.

Infiltration – Water other than wastewater that enters a sewer system (including sewer service connections and foundation drains) from the ground through such means as defective pipes, pipe joints, connections, or manholes. Infiltration does not include, and is distinguished from, inflow [40 CFR 35.2005(20)].

Inland Surface Waters – Includes all surface waters of the U.S. ~~State~~ that do not include the ocean, enclosed bays, or estuaries.

Jurisdictional Runoff Management Program Document – A written description of the specific jurisdictional runoff management measures and programs that each Copermittee will implement to comply with this Order and ensure that storm water pollutant discharges in runoff are reduced to the MEP and do not cause or contribute to a violation of water quality standards.

Low Impact Development (LID) – A storm water management and land development strategy that emphasizes conservation and the use of on-site natural features integrated with engineered, small-scale hydrologic controls to more closely reflect pre-development hydrologic functions.

Low Impact Development Best Management Practices (LID BMPs) – LID BMPs include schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States through storm water management and land development strategies that emphasize conservation ~~s~~and the use of on-site natural features integrated with engineered, small-scale hydrologic controls to more closely reflect pre-development hydrologic functions. LID BMPs include retention practices that do not allow runoff, such as infiltration, rain water harvesting and reuse, and evapotranspiration. LID BMPs also include flow-through practices such as biofiltration that may have some discharge of storm water following pollutant reduction.

Major Outfall – As defined in the Code of Federal Regulations, a major outfall is a MS4 outfall that discharges from a single pipe with an inside diameter of 36 inches or more or its equivalent (i.e. discharge from a single conveyance other than a circular pipe which is associated with a drainage area of more than 50 acres); or, for MS4s that receive storm water from lands zoned for industrial activity (based on comprehensive zoning plans or equivalent), a MS4 outfall that discharges from a single pipe with an inside diameter of 12 inches or more or from its equivalent (i.e. discharge from other than a circular pipe associated with a drainage area of 2 acres or more).

Maximum Daily Action Level (MDAL) –The highest allowable daily discharge of a pollutant, over a calendar day (or 24 hour period). For pollutants with action levels expressed in units of mass, the daily discharge is calculated as the total mass of the pollutant discharged over the day. For pollutants with action levels expressed in other units of measurement, the daily discharge is calculated as the arithmetic mean measurement of the pollutant over the day.

Maximum Extent Practicable (MEP) – The technology-based standard established by Congress in CWA section 402(p)(3)(B)(iii) for ~~storm water~~ discharges of pollutants that operators of MS4s must meet. Technology-based standards establish the level of pollutant reductions that dischargers must achieve, typically by treatment or by a combination of source control and treatment control BMPs. MEP generally emphasizes pollution prevention and source control BMPs primarily (as the first line of defense) in combination with treatment methods serving as a backup (additional line of defense). MEP considers economics and is generally, but not necessarily, less stringent than BAT. A definition for MEP is not provided either in the statute or in the regulations. Instead the definition of MEP is dynamic and will be defined by the following process over time: municipalities propose their definition of MEP by way of their runoff management programs. Their total collective and individual activities conducted pursuant to the runoff management programs becomes their proposal for MEP as it applies both to their overall effort, as well as to specific activities (e.g., MEP for street sweeping, or MEP for MS4 maintenance). In the absence of a proposal acceptable to the San Diego Water Board, the San Diego Water Board defines MEP.

In a memo dated February 11, 1993, entitled "Definition of Maximum Extent Practicable," Elizabeth Jennings, Senior Staff Counsel, SWRCB addressed the achievement of the MEP standard as follows:

"*To achieve the MEP standard, municipalities must employ whatever Best Management*

Practices (BMPs) are technically feasible (i.e., are likely to be effective) and are not cost prohibitive. The major emphasis is on technical feasibility. Reducing pollutants to the MEP means choosing effective BMPs, and rejecting applicable BMPs only where other effective BMPs will serve the same purpose, or the BMPs would not be technically feasible, or the cost would be prohibitive. In selecting BMPs to achieve the MEP standard, the following factors may be useful to consider:

a. Effectiveness: Will the BMPs address a pollutant (or pollutant source) of concern?
b. Regulatory Compliance: Is the BMP in compliance with storm water regulations as well as other environmental regulations?
c. Public Acceptance: Does the BMP have public support?
d. Cost: Will the cost of implementing the BMP have a reasonable relationship to the pollution control benefits to be achieved?
e. Technical Feasibility: Is the BMP technically feasible considering soils, geography, water resources, etc.?

The final determination regarding whether a municipality has reduced pollutants to the maximum extent practicable can only be made by the Regional or State Water Boards, and not by the municipal discharger. If a municipality reviews a lengthy menu of BMPs and chooses to select only a few of the least expensive, it is likely that MEP has not been met. On the other hand, if a municipal discharger employs all applicable BMPs except those where it can show that they are not technically feasible in the locality, or whose cost would exceed any benefit derived, it would have met the standard. Where a choice may be made between two BMPs that should provide generally comparable effectiveness, the discharger may choose the least expensive alternative and exclude the more expensive BMP. However, it would not be acceptable either to reject all BMPs that would address a pollutant source, or to pick a BMP based solely on cost, which would be clearly less effective. In selecting BMPs the municipality must make a serious attempt to comply and practical solutions may not be lightly rejected. In any case, the burden would be on the municipal discharger to show compliance with its permit. After selecting a menu of BMPs, it is the responsibility of the discharger to ensure that all BMPs are implemented."

Monitoring Year – October 1 to September 30

Municipal Separate Storm Sewer System (MS4) – A conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains): (i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or designated and approved management agency under section 208 of the CWA that discharges to waters of the United States; (ii) Designated or used for collecting or conveying storm water; (iii) Which is not a combined sewer; (iv) Which is not part of the Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.22~~26~~. Copermittees need only comply with permit conditions relating to discharges from the municipal separate storm sewers for which they are operators." 40 CFR §122.21(a)(vi).

National Pollutant Discharge Elimination System (NPDES) - The national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under Sections 307, 318, 402, and 405 of the CWA.

Non-Storm Water - All discharges to and from a MS4 that do not originate from precipitation events (i.e., all discharges from a MS4 other than storm water). Non-storm water includes illicit discharges and NPDES permitted discharges and the discharges described in Provision E(2)(a)(3)-(5).

Nuisance - As defined in the Porter-Cologne Water Quality Control Act, a nuisance is "anything which meets all of the following requirements: 1) Is injurious to health, or is indecent, or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property. 2) Affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal. 3) Occurs during, or as a result of, the treatment or disposal of wastes."

Ocean Waters – the territorial marine waters of the State as defined by California law to the extent these waters are outside of enclosed bays, estuaries, and coastal lagoons. Discharges to ocean waters are regulated in accordance with the State Board's California Ocean Plan.

Order – Unless otherwise specified, refers to this Order, Order No. R9-2013-0001 (NPDES No. CAS0109266)

Outfall - *Outfall* means a *point source* as defined by 40 CFR 122.2 at the point where a municipal separate storm sewer discharges to waters of the United States and does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels or other conveyances which connect segments of the same stream or other waters of the United States and are used to convey waters of the United States. 40 C.F.R. 122.26(b)(9).

Parking Lot – a land area or facility for the tempraory parking or storage of motor vehicles used personally, for business, or for commerce.

Persistent Flow - Persistent flow is defined as the presence of flowing, pooled, or ponded water more than 72 hours after a measureable rainfall event of 0.1 inch or greater during three consecutive monitoring and/or inspection events. All other flowing, pooled, or ponded water is considered transient.

Person - A person is defined as an individual, association, partnership, corporation, municipality, State or Federal agency, or an agent or employee thereof [40 CFR 122.2].

Point Source - Any discernible, confined, and discrete conveyance, including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operations, landfill leachate collection systems, vessel, or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.

Pollutant - Any agent that may cause or contribute to the degradation of water quality such that a condition of pollution or contamination is created or aggravated.

Pollution - As defined in the Porter-Cologne Water Quality Control Act, pollution is "the alteration of the quality of the waters of the State by waste, to a degree that unreasonably affects the either of the following: 1) The waters for beneficial uses; or 2) Facilities that serve these beneficial uses." Pollution may include contamination.

Pollution Prevention - Pollution prevention is defined as practices and processes that reduce or eliminate the generation of pollutants, in contrast to source control BMPs, treatment control BMPs, or disposal.

~~Pre-Development~~ Pre-Project Runoff Conditions – Runoff conditions that exist~~ed~~ onsite immediately before ~~the existing development was constructed, or exists onsite before~~ planned development activities occur. Pre-project is not intended to be interpreted as that period before any human-induced land disturbance has occurred. 64 FR 68761.

Priority Development Projects - New development and redevelopment projects defined under Provision E.3.b of Order No. R9-2012-0011.

Properly Designed – Designed in accordance with the Copermittee's BMP Design Manual and/or any appropriate design requirements set forth by the Copermittee and based on widely accepted design criteria.

Public Education, Outreach and Participation – Programs to educate residents, businesses and visitors about the importance of water quality and water quality programs so that they will support local efforts and understand their role in protecting receiving waters. The Education and Outreach Program will increase knowledge and awareness, improve attitudes toward storm pollution prevention, and provide a foundation for changing behaviors that contribute to storm water pollution.

Rainy Season (aka Wet Season) –October 1 to April 30

Receiving Waters – Waters of the United States.

Receiving Water Limitations - Waste discharge requirements issued by the San Diego Water Board typically include both: (1) "Effluent Limitations" (or "Discharge Limitations") that specify the technology-based or water-quality-based effluent limitations; and (2) "Receiving Water Limitations" that specify the water quality objectives in the Basin Plan as well as any other limitations necessary to attain those objectives. In summary, the "Receiving Water Limitations" provision is the provision used to implement the requirements of CWA section 402(p)(3)(B).

Redevelopment - The creation, addition, and or replacement of impervious surface on an already developed site through construction or alteration of the existing footprint. Examples include the expansion of a building footprint, road widening, the addition to or replacement of a structure, and creation or addition of impervious surfaces. Replacement of impervious surfaces includes any activity that is not part of a routine maintenance activity where impervious material(s) are removed, exposing underlying soil during construction. Redevelopment does not include trenching and resurfacing associated with utility work; resurfacing existing roadways; resurfacing, cutting and reconfiguring of surface parking lots; new sidewalk construction, pedestrian ramps, or bike lane on existing roads; and routine replacement of damaged pavement, such as pothole repair.

Reporting Period – The period of information that is reported in the Annual Report. The reporting period consists of two components: 1) July 1 to June 30, consistent with the fiscal year, for the implementation of the jurisdictional runoff management programs, and 2) October 1 to September 30, consistent with the monitoring year for the monitoring and assessment programs. Together, these two time periods constitute the reporting year for the Annual Report due January 31 following the end of the monitoring year.

Restaurant – A facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC code 5812).

Retail gasoline outlet (RGO) – A business that sells automotive or truck fuel to the general public.

Retain –Keep or hold in a particular place, condition, or position without discharge to surface waters.

Retrofitting – – Storm water management practice put into place after development has occurred in watersheds where the practices previously did not exist or are ineffective. Retrofitting of developed areas is intended to improve water quality, protect downstream channels, reduce flooding, or meet other specific objectives. Retrofitting developed areas may include, but is not limited to replacing roofs with green roofs, disconnecting downspouts or impervious surfaces to drain to pervious surfaces, replacing impervious surfaces with pervious surfaces, installing rain barrels, installing rain gardens, and trash area enclosures.

Runoff - All flows in a storm water conveyance system that consists of the following components: (1) storm water (wet weather flows) and (2) non-storm water including dry weather flows.

San Diego Water Board – As used in this document the term "San Diego Water Board" is synonymous with the term "Regional Board" as defined in Water Code section 13050(b) and is intended to refer to the California Regional Water Quality Control Board for the San Diego Region as specified in Water Code Section 13200.

Sediment - Soil, sand, and minerals washed from land into water. Sediment resulting from anthropogenic sources (i.e. human induced land disturbance activities) is considered a pollutant. This Order regulates only the discharges of sediment from anthropogenic sources and does not regulate naturally occurring sources of sediment. Sediment can destroy fish-nesting areas, clog animal habitats, and cloud waters so that sunlight does not reach aquatic plants.

Source Control BMP – ~~–~~Land use or site planning practices, or structural or nonstructural measures that aim to prevent runoff pollution by reducing the potential for contamination at the source of pollution. Source control BMPs minimize the contact between pollutants and runoff.

Street, Road, Highway, Freeway and Driveway – Any paved impervious surface that is used for the transportation of automobiles, trucks, motorcycles, and other vehicles.

Storm Water – – Per 40 CFR 122.26(b)(13), means storm water runoff, snowmelt runoff and surface runoff and drainage. Surface runoff and drainage pertains to runoff and drainage resulting from precipitation events.

Stream, Channel, or Habitat Rehabilitation – – Measures or activities for the purpose of improving or restoring the environmental health (i.e. physical, chemical and biological integrity) of streams, channels, or river systems. Rehabilitation techniques may include, but are not limited to, riparian zone restoration, constructed wetlands, bank stabilization, channel reconfiguration, and daylighting drainage systems.

Structural BMPs - A subset of BMPs which detains, retains, filters, removes, or prevents the release of pollutants to surface waters from development projects in perpetuity, after construction of a project is completed.

Total Maximum Daily Load (TMDL) - The maximum amount of a pollutant that can be discharged into a water body from all sources (point and non-point) and still maintain water quality standards. Under CWA section 303(d), TMDLs must be developed for all water bodies that do not meet water quality standards after application of technology-based controls.

Toxicity - Adverse responses of organisms to chemicals or physical agents ranging from mortality to physiological responses such as impaired reproduction or growth anomalies). The water quality objectives for toxicity provided in the Basin Plan, state in part…"All waters shall be free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life….The survival of aquatic life in surface waters subjected to a waste discharge or other controllable water quality factors, shall not be less than that for the same water body in areas unaffected by the waste discharge".

Treatment Control BMP – Any engineered system designed to remove pollutants by simple gravity settling of particulate pollutants, filtration, biological uptake, media absorption or any other physical, biological, or chemical process.

Unpaved Road – Any long, narrow stretch without pavement used for traveling by motor passenger vehicles between two or more points. Unpaved roads are generally constructed of dirt, gravel, aggregate or macadam and may be improved or unimproved.

Waste - As defined in CWC Section 13050(d), "waste includes sewage and any and all other waste substances, liquid, solid, gaseous, or radioactive, associated with human habitation, or of human or animal origin, or from any producing, manufacturing, or processing operation, including waste placed within containers of whatever nature prior to, and for purposes of, disposal."

Article 2 of CCR Title 23, Chapter 15 (Chapter 15) contains a waste classification system that applies to solid and semi-solid waste, which cannot be discharged directly or indirectly to water of the state and which therefore must be discharged to land for treatment, storage, or disposal in accordance with Chapter 15. There are four classifications of waste (listed in order of highest to lowest threat to water quality): hazardous waste, designated waste, non-hazardous solid waste, and inert waste.

Water Quality Objective - Numerical or narrative limits on constituents or characteristics of water designated to protect designated beneficial uses of the water. [California Water Code Section 13050 (h)]. California's water quality objectives are established by the State and Regional Water Boards in the Water Quality Control Plans. Numeric or narrative limits for pollutants or characteristics of water designed to protect the beneficial uses of the water. In other words, a water quality objective is the maximum concentration of a pollutant that can exist in a receiving water and still generally ensure that the beneficial uses of the receiving water remain protected (i.e., not impaired). Since water quality objectives are designed specifically to protect the beneficial uses, when the objectives are violated the beneficial uses are, by definition, no longer protected and become impaired. This is a fundamental concept under the Porter Cologne Act. Equally fundamental is Porter Cologne's definition of pollution. A condition of pollution exists when the water quality needed to support designated beneficial uses has become unreasonably affected or impaired; in other words, when the water quality objectives have been violated. These underlying definitions (regarding beneficial use protection) are the reason why all waste discharge requirements implementing the federal NPDES regulations require compliance with water quality objectives. (Water quality objectives are also called water quality criteria in the CWA.)

Water Quality Standards - Water quality standards, as defined in Clean Water Act section 303(c) consist of the beneficial uses (e.g., swimming, fishing, municipal drinking water supply, etc.,) of a water body and criteria (referred to as water quality objectives in the California Water Code) necessary to protect those uses. Under the Water Code, the water boards establish beneficial uses and water quality objectives in water quality control or basin plans. Together with an anti-degradation policy, these beneficial uses and water quality objectives serve as water quality standards under the Clean Water Act. In Clean Water Act parlance, state beneficial uses are called "designated uses" and state water quality objectives are called "criteria." Throughout this Order, the relevant term is used depending on the statutory scheme.

Waters of the State - Any water, surface or underground, including saline waters within the boundaries of the State [CWC section 13050 (e)]. The definition of the Waters of the State is broader than that for the Waters of the United States in that all water in the State is considered to be a Waters of the State ~~regardless of circumstances or condition~~.

Waters of the United States - As defined in the 40 CFR 122.2, the Waters of the U.S. are defined as: "(a) All waters, which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; (b) All interstate waters, including interstate "wetlands;" (c) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, "wetlands," sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation or destruction of which would affect or could affect interstate or foreign commerce including any such waters: (1) Which are or could be used by interstate or foreign travelers for recreational or other purposes; (2) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or (3) Which are used or could be used for industrial purposes by industries in interstate commerce; (d) All impoundments of waters otherwise defined as waters of the United States under this definition: (e) Tributaries of waters identified in paragraphs (a) through (d) of this definition; (f) The territorial seas; and (g) "Wetlands" adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) through (f) of this definition. Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with the EPA."

Watershed - That geographical area which drains to a specified point on a water course, usually a confluence of streams or rivers (also known as drainage area, catchment, or river basin).

Wet Season (aka Rainy Season) –October 1 to April 30

Wet Weather – Weather is considered wet if there is a storm event of 0.1 inches and greater and the following 72 hours, unless otherwise defined by another regulatory mechanism.

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ATTACHMENT D

JURISDICTIONAL RUNOFF MANAGEMENT PROGRAM ANNUAL REPORT FORM

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JURISDICTIONAL RUNOFF MANAGEMENT PROGRAM
ANNUAL REPORT FORM
FY ________________

I. COPERMITTEE INFORMATION		
Copermittee Name:		
Copermittee Primary Contact Name:		
Copermittee Primary Contact Information: Address: City: County: State: Zip: Telephone: Fax: Email:		
II. LEGAL AUTHORITY		
Has the Copermittee established adequate legal authority within its jurisdiction to control pollutant discharges into and from its MS4 that complies with Order No. R9-2013-0001?	YES NO	☐ ☐
A Principal Executive Officer, Ranking Elected Official, or Duly Authorized Representative has certified that the Copermittee obtained and maintains adequate legal authority?	YES NO	☐ ☐
III. JURISDICTIONAL RUNOFF MANAGEMENT PROGRAM DOCUMENT UPDATE		
Was an update of the jurisdictional runoff management program document required or recommended by the San Diego Water Board?	YES NO	☐ ☐
If YES to the question above, did the Copermittee update its jurisdictional runoff management program document and make it available on the Regional Clearinghouse?	YES NO	☐ ☐
IV. ILLICIT DISCHARGE DETECTION AND ELIMINATION PROGRAM		
Has the Copermittee implemented a program to actively detect and eliminate illicit discharges and connections to its MS4 that complies with Order No. R9-2013-0001?	YES NO	☐ ☐
Number of non-storm water discharges reported by the public		
Number of non-storm water discharges detected by Copermittee staff or contractors		
Number of non-storm water discharges investigated by the Copermittee		
Number of sources of non-storm water discharges identified		
Number of non-storm water discharges eliminated		
Number of sources of illicit discharges or connections identified		
Number of illicit discharges or connections eliminated		
Number of enforcement actions issued		
Number of escalated enforcement actions issued		
V. DEVELOPMENT PLANNING PROGRAM		
Has the Copermittee implemented a development planning program that complies with Order No. R9-2013-0001?	YES NO	☐ ☐
Was an update to the BMP Design Manual required or recommended by the San Diego Water Board?	YES NO	☐ ☐
If YES to the question above, did the Copermittee update its BMP Design Manual and make it available on the Regional Clearinghouse?	YES NO	☐ ☐
Number of proposed development projects in review		
Number of Priority Development Projects in review		
Number of Priority Development Projects approved		
Number of approved Priority Development Projects exempt from any BMP requirements		
Number of approved Priority Development Projects allowed alternative compliance		
Number of Priority Development Projects granted occupancy		
Number of completed Priority Development Projects in inventory		
Number of high priority Priority Development Project structural BMP inspections		
Number of Priority Development Project structural BMP violations		
Number of enforcement actions issued		
Number of escalated enforcement actions issued		

JURISDICTIONAL RUNOFF MANAGEMENT PROGRAM
ANNUAL REPORT FORM
FY _______________

VI. CONSTRUCTION MANAGEMENT PROGRAM	
Has the Copermittee implemented a construction management program that complies with Order No. R9-2013-0001?	YES ☐ NO ☐
Number of construction sites in inventory	
Number of active construction sites in inventory	
Number of inactive construction sites in inventory	
Number of construction sites closed/completed during reporting period	
Number of construction site inspections	
Number of construction site violations	
Number of enforcement actions issued	
Number of escalated enforcement actions issued	

VII. EXISTING DEVELOPMENT MANAGEMENT PROGRAM				
Has the Copermittee implemented an existing development management program that complies with Order No. R9-2013-0001?				YES ☐ NO ☐
	Municipal	Commercial	Industrial	Residential
Number of facilities or areas in inventory				
Number of existing development inspections				
Number of follow-up inspections				
Number of violations				
Number of enforcement actions issued				
Number of escalated enforcement actions issued				

VIII. PUBLIC EDUCATION AND PARTICIPATION	
Has the Copermittee implemented a public education program component that complies with Order No. R9-2013-0001?	YES ☐ NO ☐
Has the Copermittee implemented a public participation program component that complies with Order No. R9-2013-0001?	YES ☐ NO ☐

IX. FISCAL ANALYSIS	
Has the Copermittee attached to this form a summary of its fiscal analysis that complies with Order No. R9-2013-0001?	YES ☐ NO ☐

X. CERTIFICATION

I [☐ Principal Executive Officer ☐ Ranking Elected Official ☐ Duly Authorized Representative] certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

______________________ Signature	______________________ Date
______________________ Print Name	______________________ Title
______________________ Telephone Number	______________________ Email

ATTACHMENT E

SPECIFIC PROVISIONS FOR TOTAL MAXIMUM DAILY LOADS APPLICABLE TO ORDER NO. R9-2013-0001

These provisions implement Total Maximum Daily Loads (TMDLs), adopted by the San Diego Water Board and approved by USEPA under Clean Water Act section 303(c), which are applicable to discharges regulated under this Order. The provisions and schedules for implementation of the TMDLs described below must be incorporated into the Water Quality Improvement Plans, required pursuant to Provision B of this Order, for the specified Watershed Management Areas.

1. Total Maximum Daily Load for Diazinon in Chollas Creek Watershed
2. Total Maximum Daily Loads for Dissolved Copper in Shelter Island Yacht Basin
3. Total Maximum Daily Loads for Total Nitrogen and Total Phosphorus in Rainbow Creek Watershed
4. Total Maximum Daily Loads for Dissolved Copper, Lead, and Zinc in Chollas Creek
5. Total Maximum Daily Loads for Indicator Bacteria, Baby Beach in Dana Point Harbor and Shelter Island Shoreline Park in San Diego Bay
6. Revised Total Maximum Daily Loads for Indicator Bacteria, Project I – Twenty Beaches and Creeks in the San Diego Region (Including Tecolote Creek)

1. Total Maximum Daily Load for Diazinon in Chollas Creek Watershed

a. APPLICABILITY

(1) TMDL Basin Plan Amendment: Resolution No. R9-2002-0123

(2) TMDL Adoption and Approval Dates:

San Diego Water Board Adoption Date:	August 14, 2002
State Water Board Approval Date:	July 16, 2003
Office of Administrative Law Approval Date:	September 11, 2003
US EPA Approval Date:	November 3, 2003

(3) TMDL Effective Date: September 11, 2003

(4) Watershed Management Area: San Diego Bay

(5) Water Body: Chollas Creek

(6) Responsible Copermittees: City of La Mesa, City of Lemon Grove, City of San Diego, County of San Diego, San Diego Unified Port District

b. FINAL TMDL COMPLIANCE REQUIREMENTS~~WATER QUALITY BASED EFFLUENT LIMITATIONS~~

Final TMDL compliance requirements ~~The WQBELs~~ for Chollas Creek consist of the following:

(1) Receiving Water Limitations

Discharges from the MS4s must not cause or contribute to the ~~violation~~ exceedance of the following receiving water limitations by the end of the compliance schedule under Specific Provision 1.a~~aa~~:

Table 1.1
Receiving Water Limitations as Concentrations in Chollas Creek

Constituent	Exposure Duration	Receiving Water Limitation	Averaging Period
Diazinon	Acute	0.16~~08~~ µg/L	1 hour
	Chronic	0.10~~05~~ µg/L	4 days

(2) Final Water Quality Based Effluent Limitations

~~Discharges from the MS4s must not contain concentrations that exceed the following effluent limitations by the end of the compliance schedule under Specific Provision 1.c:~~
In the case that receiving water limitations are exceeded after the end of the compliance schedules under Specific Provision 1.b.(4), effluent limitations will be used to determine whether MS4 discharges are causing or contributing to exceedances of receiving water quality limitations. To demonstrate MS4 discharges are not causing or contributing to an exceedance of receiving

water quality limitations, MS4 discharges must meet the concentration-based effluent limitations in Table 1.2.

Table 1.2
Effluent Limitations as Concentrations in MS4 Discharges to Chollas Creek

Constituent	Exposure Duration	Effluent Limitation	Averaging Period
Diazinon	Acute	0.~~072~~ 144 µg/L	1 hour
	Chronic	0.~~045~~ 09 µg/L	4 days

1. Concentrations shall be determined on a flow-weighted basis across all outfalls within a jurisdiction, not outfall-by-outfall.

(3) Best Management Practices

The following BMPs for Chollas Creek must be incorporated into the Water Quality Improvement Plan for the San Diego Bay Watershed Management Area and implemented by the Responsible Copermittees:

(a) The Responsible Copermittees must implement BMPs to support the achievement of the WQBELs under Specific Provision 1.b for Chollas Creek.

(b) The Responsible Copermittees must implement the Diazinon Toxicity Control Plan and Diazinon Public Outreach/Education Program as described in the report titled, *Technical Report for Total Maximum Daily Load for Diazinon in Chollas Creek Watershed, San Diego County*, dated August 14, 2002, including subsequent modifications, in order to achieve the WQBELs under Specific Provision 1.b.

(c) The Responsible Copermittees should coordinate any BMPs implemented to address this TMDL with Caltrans as possible.

(d) For Copermittees utilizing the Water Quality Improvement Plan compliance option, the strategies and activities contained in the Water Quality Improvement Plan accepted by the San Diego Water Board and adaptively managed as outlined in Provision B.6, F.1, and F.2, will serve as BMP-based WQBELs under the following conditions, as outlined in Provision B.3.a:

(1) A Responsible Copermittee requests that the Water Quality Improvement Plan be approved as the basis for compliance with the discharge prohibitions (A.1), receiving water limitations (A.2), and/or effluent limitations (A.3) in the letter of submittal to the San Diego Water Board;

(2) Reasonable assurance is demonstrated that the strategies and activities in the Water Quality Improvement Plan are expected to attain the final receiving water limitations or final WQBELs under Specific Provision 1.b;

(3) The submitted schedule as outlined in Provision B.3 provides sufficient detail regarding the strategies and activities to be implemented to allow

the Regional Board to use the schedule for compliance determination in a clear, specific, measurable, and enforceable manner; AND

(4) The Water Quality Improvement Plan is approved by the Regional Board Executive Officer and is implemented per the approved schedule and adapted pursuant to Provisions B.6, F.1, and F.2.

~~c. COMPLIANCE SCHEDULE~~

(4) Final Compliance Dates

The Responsible Copermittees are required to achieve their respective WLAs by December 31, 2010. The Responsible Copermittees must be in compliance with the final receiving water limitations or final WQBELs under Specific Provision 1.b.

(5) Final Compliance Determination

Compliance with final compliance requirements of Specific Provision 1.b may be demonstrated by a Responsible Copermittee via one of the following methods:

(a) There is no direct or indirect discharge from the Responsible Copermittees' MS4s to the receiving water; OR

(b) There are no exceedances of the applicable receiving water limitations under Specific Provision 1.b.(1) in the receiving water at, or downstream of the Responsible Copermittee's MS4 outfalls; OR

(c) There are no exceedances of the applicable effluent limitations under Specific Provision 1.b.(2) at the Responsible Copermittee's MS4 outfalls; OR

(d) The Responsible Copermittee can demonstrate that exceedances of the applicable final receiving water limitations under Specific Provision 1.b.(1) in the receiving water are due to loads from non-MS4 sources; OR

(e) The Responsible Copermittee has submitted and is fully implementing a Water Quality Improvement Plan that is developed and adaptively managed as outlined in Provisions B, F.1 and F.2, is accepted by the San Diego Water Board, and meets the conditions of Specific Provision 1.b.(3).d.

~~d.~~c. SPECIFIC MONITORING AND ASSESSMENT REQUIREMENTS

(1) The Responsible Copermittees must implement the monitoring and assessment requirements issued under Investigation Order No. R9-2004-0277, *California Department of Transportation and San Diego Municipal*

Separate Storm Sewer System Copermittees Responsible for the Discharge of Diazinon into the Chollas Creek Watershed. The monitoring reports required under Investigation Order No. R9-2004-0277 must be submitted as part of the Annual Reports required under Provision F.3.b of this Order.

(2) The Responsible Copermittees must monitor the effluent of the MS4 outfalls for diazinon within the Chollas Creek watershed, and calculate or estimate the annual diazinon loads, in accordance with the requirements of Provisions D.2, D.4.b.(1), and D.4.b.(2) of this Order. The monitoring and assessment results must be submitted as part of the Annual Reports required under Provision F.3.b of this Order.

~~e. COMPLIANCE DETERMINATION~~

~~Compliance with WQBELs of Specific Provision 1.b may be demonstrated via one of the following methods:~~

~~(1) There is no direct or indirect discharge from the Responsible Copermittees' MS4s to the receiving water;~~

~~(2) There are no exceedances of the applicable receiving water limitations under Specific Provision 1.b.(1) in the receiving water at, or downstream of the Responsible Copermittees' MS4 outfalls; OR~~

~~(3) There are no violations of the applicable effluent limitations under Specific Provision 1.b.(2) at the Responsible Copermittees' MS4 outfalls.~~

2. Total Maximum Daily Loads for Dissolved Copper in Shelter Island Yacht Basin

a. APPLICABILITY

(1) TMDL Basin Plan Amendment: Resolution No. R9-2005-0019

(2) TMDL Adoption and Approval Dates:

San Diego Water Board Adoption Date: February 9, 2005
State Water Board Approval Date: September 22, 2005
Office of Administrative Law Approval Date: December 2, 2005
US EPA Approval Date: February 8, 2006

(3) TMDL Effective Date: December 2, 2005

(4) Watershed Management Area: San Diego Bay

(5) Water Body: Shelter Island Yacht Basin

(6) Responsible Copermittee: City of San Diego~~t~~

b. FINAL TMDL COMPLIANCE REQUIREMENTS ~~WATER QUALITY BASED EFFLUENT LIMITATIONS~~

~~The WQBELs~~ Final TMDL compliance requirements for Shelter Island Yacht Basin consist of the following:

(1) Final Receiving Water Limitations

Discharges from the MS4s must not cause or contribute to the exceedance ~~violation~~ of the following receiving water limitations by the end of the compliance schedule under Specific Provision 2.~~c~~b(4):

Table 2.1
Receiving Water Limitations as Concentrations in Shelter Island Yacht Basin

Constituent	Exposure Duration	Receiving Water Limitation	Averaging Period
Dissolved Copper	Acute	4.8 x WER µg/L	1 hour
	Chronic	3.1 x WER µg/L	4 days

Notes:
* The Water Effect Ratio (WER) is assumed to be 1.0 unless there is a site-specific and chemical-specific WER.

(2) Final Water Quality Based Effluent Limitations

In the case that receiving water limitations are exceeded after the end of the compliance schedule under Specific Provision 2.b.(4), ~~Discharges from the MS4s must not contain pollutant loads that exceed the following~~ effluent limitations will be used to determine whether MS4 discharges are causing or contributing to exceedances of receiving water quality limitations~~by the end of the compliance schedule under Specific Provision 2.c:~~. To demonstrate MS4 discharges are not causing or contributing to exceedances of receiving water quality limitations, MS4 discharges must meet the load-based effluent limitations in Table 2.2.

Table 2.2
Effluent Limitations as Annual Loads in MS4 Discharges to Shelter Island Yacht Basin

Constituent	Effluent Limitation
Dissolved Copper	30 x WER kg/yr

Notes:
* The Water Effect Ratio (WER) is assumed to be 1.0 unless there is a site-specific and chemical-specific WER.

(3) Final Best Management Practices

~~The Responsible Copermittee must implement BMPs to support the achievement of the WQBELs under Specific Provision 2.b for Shelter Island Yacht Basin~~

(a) The Responsible Copermittee must implement BMPs to support the achievement of the final receiving water limitations or final WQBELs under Specific Provision 2.b.

(b) The Responsible Copermittees should coordinate any BMPs implemented to address this TMDL with other responsible parties as possible.

(c) For Copermittees utilizing the Water Quality Improvement Plan compliance option, the strategies and activities contained in the Water Quality Improvement Plan accepted by the San Diego Water Board and adaptively managed as outlined in Provision B.6, F.1, and F.2, will serve as BMP-based WQBELs under the following conditions, as outlined in Provision B.3.a:

(1) A Responsible Copermittee requests that the Water Quality Improvement Plan be approved as the basis for compliance in the letter of submittal to the San Diego Water Board;

(2) Reasonable assurance is demonstrated that the strategies and activities in the Water Quality Improvement Plan are expected to attain the final receiving water limitations or final WQBELs under Specific Provision 2.b;

(3) The submitted schedule as outlined in Provision B.3 provides sufficient

detail regarding the strategies and activities to be implemented to allow the Regional Board to use the schedule for compliance determination in a clear, specific, measurable, and enforceable manner; AND

(4) The Water Quality Improvement Plan is approved by the Regional Board Executive Officer and is implemented per the approved schedule and adapted pursuant to Provisions B.6, F.1, and F.2.

(4) Final Compliance Schedule

The Responsible Copermittee is required to achieve the MS4 WLA by December 2, 2005. The Responsible Copermittee must be in compliance with the final receiving water limitations or final WQBELs under Specific Provision 2.b.

(5) Final Compliance Determination

Compliance with final compliance requirements of Specific Provision 2.b.(1) may be demonstrated by a Responsible Copermittee via one of the following methods:

(a) There is no direct or indirect discharge from the Responsible Copermittee's MS4s to the receiving water; OR

(b) There are no exceedances of the applicable receiving water limitations under Specific Provision 1.b.(1) in the receiving water at, or downstream of the Responsible Copermittee's MS4 outfalls; OR

(c) There are no exceedances of the applicable effluent limitations under Specific Provision 2.b.(2) at the Responsible Copermittee's MS4 outfalls; OR

(d) The Responsible Copermittee can demonstrate that exceedances of the applicable final receiving water limitations under Specific Provision 2.b.(1) in the receiving water are due to loads from non-MS4 sources; OR

(e) The Responsible Copermittee has submitted and is fully implementing a Water Quality Improvement Plan that is developed and adaptively managed as outlined in Provisions B, F.1 and F.2, is accepted by the San Diego Water Board, and meets the conditions of Specific Provision 2.b.(3).c.

c. Specific Monitoring and Assessment Requirements

The Responsible Copermittee must monitor the effluent of its MS4 outfalls for dissolved copper, and calculate or estimate the monthly and annual dissolved copper loads, in accordance with the requirements of Provisions D.2, D.4.b.(1), and D.4.(b)(2)of this Order. The monitoring and assessment results must be submitted as part of the Annual Reports required under Provision F.3.b of this Order.

~~d. COMPLIANCE DETERMINATION~~

~~Compliance with WQBELs of Specific Provision 2.b may be demonstrated via one of the following methods:~~

~~(1) There is no direct or indirect discharge from the Responsible Copermittee's MS4s to the receiving water;~~

~~(2) There are no exceedances of the applicable receiving water limitations under Specific Provision 2.b.(1) in the receiving water at, or downstream of the Responsible Copermittee's MS4 outfalls; OR~~

~~(3) There are no violations of the applicable effluent limitations under Specific Provision 2.b.(2) at the Responsible Copermittee's MS4 outfalls.~~

3. Total Maximum Daily Loads for Total Nitrogen and Total Phosphorus in Rainbow Creek Watershed

a. APPLICABILITY

(1) TMDL Basin Plan Amendment: Resolution No. R9-2005-0036

(2) TMDL Adoption and Approval Dates:

San Diego Water Board Adoption Date:	February 9, 2005
State Water Board Approval Date:	November 16, 2005
Office of Administrative Law Approval Date:	February 1, 2006
US EPA Approval Date:	March 22, 2006

(3) TMDL Effective Date: February 1, 2006

(4) Watershed Management Area: Santa Margarita River

(5) Water Body: Rainbow Creek

(6) Responsible Copermittee: County of San Diego

b. FINAL TMDL COMPLIANCE REQUIREMENTS~~WATER QUALITY BASED EFFLUENT LIMITATIONS~~

~~The WQBELs~~ Final TMDL compliance requirements for Rainbow Creek consist of the following:

(1) Final Receiving Water Limitations

Discharges from the MS4s must not cause or contribute to the ~~violation~~ exceedance of the following receiving water limitations by the end of the compliance schedule under Specific Provision 3.b(4)~~c.(1)~~:

Table 3.1
Receiving Water Limitations as Concentrations in Rainbow Creek

Constituent	Receiving Water Limitation
Nitrate (as N)	10 mg/L
Total Nitrogen	1 mg/L
Total Phosphorus	0.1 mg/L

(2) Final Water Quality Based Effluent Limitations

(a) In the case that receiving water limitations are exceeded after the end of the compliance schedules under Specific Provision 3.b.(4), ~~Discharges from the MS4s must not contain concentrations that exceed the following~~ effluent limitations will be used to determine whether MS4 discharges are causing or contributing to exceedances of receiving water quality limitations. ~~by the end of the compliance schedule under Specific Provision 3.c.(1):~~ To demonstrate MS4 discharges are not causing or contributing to exceedances of receiving water quality limitations, MS4 discharges must meet either the concentration-based effluent limitations in Table 3.2 or the load-based effluent limitations in Table 3.3.

Table 3.2
Effluent Limitations as Concentrations in MS4 Discharges to Rainbow Creek

Constituent	Effluent Limitation
Nitrate (as N)	10 mg/L
Total Nitrogen	1 mg/L
Total Phosphorus	0.1 mg/L

1. Concentrations shall be determined on a flow-weighted basis across all outfalls within a jurisdiction, not outfall-by-outfall.

~~(b) Pollutant loads from given land uses discharging to and from the MS4s must not exceed the following effluent limitations by the end of the compliance schedule under Specific Provision 3.c.(1):~~

Table 3.3
Effluent Limitations as Annual Loads in MS4 Discharges to Rainbow Creek

Land Use	Total N	Total P
Commercial nurseries	116 kg/yr	3 kg/yr
Park	3 kg/yr	0.1 kg/yr
Residential areas	149 kg/yr	12 kg/yr
Urban areas	27 kg/yr	6 kg/yr

~~Interim effluent limitations expressed as pollutant loads are given in the compliance schedule under Specific Provision 3.0.~~

(3) Final Best Management Practices

(a) The Responsible Copermittee must implement BMPs to support the achievement of the final receiving water limitations or final WQBELs under Specific Provision 3.b for Rainbow Creek.

(b) The Responsible Copermittee should coordinate any BMPs implemented to address this TMDL with Caltrans and other sources as possible.

(c) For Copermittees utilizing the Water Quality Improvement Plan compliance option, the strategies and activities contained in the Water Quality Improvement Plan accepted by the San Diego Water Board and adaptively managed as outlined in Provision B.6, F.1, and F.2, will serve as BMP-based WQBELs under the following conditions, as outlined in Provision B.3.a:

(1) A Responsible Copermittee requests that the Water Quality Improvement Plan be approved as the basis for compliance in the letter of submittal to the San Diego Water Board;

(2) Reasonable assurance is demonstrated that the strategies and activities in the Water Quality Improvement Plan are expected to attain the final receiving water limitations or final WQBELs under Specific Provision 3.b;

(3) The submitted schedule as outlined in Provision B.3 provides sufficient detail regarding the strategies and activities to be implemented to allow the Regional Board to use the schedule for compliance determination in a clear, specific, measurable, and enforceable manner; AND

(4) The Water Quality Improvement Plan is approved by the Regional Board Executive Officer and is implemented per the approved schedule and adapted pursuant to Provisions B.6, F.1, and F.2.

~~c. COMPLIANCE SCHEDULE~~

(5) Final Compliance Date

The Responsible Copermittee must be in compliance with the final receiving water limitations or final WQBELs under Specific Provision 3.b, by December 31, 2021.

(6) Final Compliance Determination

Compliance with final compliance requirements of Specific Provision 3.b.(1) may be demonstrated by a Responsible Copermittee via one of the following methods:

(a) There is no direct or indirect discharge from the Responsible Copermittee's MS4s to the receiving water; OR

(b) There are no exceedances of the applicable receiving water limitations under Specific Provision 3.b.(1) in the receiving water at, or downstream of the Responsible Copermittee's MS4 outfalls; OR

(c) There are no exceedances of either the applicable numeric or load based effluent limitations under Specific Provision 3.b.(2) at the Responsible Copermittee's MS4 outfalls; OR

(d) The Responsible Copermittee can demonstrate that exceedances of the applicable final receiving water limitations under Specific Provision 3.b.(1).a in the receiving water are due to loads from natural sources or non-MS4 sources; OR

(e) The Responsible Copermittee is using its legal authority to reduce nutrient discharges from the land uses identified under Specific Provision 3.b.(2).b to the maximum extent practicable; OR

(f) The Responsible Copermittee has submitted and is fully implementing a Water Quality Improvement Plan that is developed and adaptively managed as outlined in Provisions B, F.1 and F.2, is accepted by the San Diego Water Board, and meets the conditions of Specific Provision 3.b.(3).d.

c. INTERIM COMPLIANCE REQUIREMENTS

~~(6) Interim Compliance Requirements~~

Interim TMDL compliance requirements consist of the following:

(1) Interim Water Quality Based Effluent Limitations

Discharges from the MS4s must not exceed the interim WQBELs presented in

Table 3.4 by the end of the interim compliance schedule as presented in Table 3.4.

Table 3.4
Interim Effluent Limitations as Annual Loads in
MS4 Discharges from Specific Land Uses to Rainbow Creek

Land Use	Total N Interim Effluent Limitations (kg/yr)			Total P Interim Effluent Limitations (kg/yr)		
	Interim Compliance Date			Interim Compliance Date		
	2009	2013	2017	2009	2013	2017
Commercial nurseries	390	299	196	20	16	10
Park	5	3	3	0.15	0.10	0.10
Residential areas	507	390	260	99	74	47
Urban areas	40	27	27	9	6	6

(2) Interim Best Management Practices

(a) The Responsible Copermittee must implement BMPs to support the achievement interim effluent limitations under Specific Provision 3.c.(1).

(b) The Responsible Copermittees should coordinate any BMPs implemented to address this TMDL with other responsible parties as possible.

(c) For Copermittees utilizing the Water Quality Improvement Plan compliance option, the strategies and activities contained in the Water Quality Improvement Plan accepted by the San Diego Water Board and adaptively managed as outlined in Provision B.6, F.1, and F.2, will serve as BMP-based WQBELs under the following conditions, as outlined in Provision B.3.a:

(1) A Responsible Copermittee requests that the Water Quality Improvement Plan be approved as the basis for compliance with the discharge prohibitions (A.1), receiving water limitations (A.2), and/or effluent limitations (A.3) in the letter of submittal to the San Diego Water Board;

(2) Reasonable assurance is demonstrated that the strategies and activities in the Water Quality Improvement Plan are expected to attain the interim load requirements under Specific Provision 3.c.(1);

(3) The submitted schedule as outlined in Provision B.3 provides sufficient detail regarding the strategies and activities to be implemented to allow the Regional Board to use the schedule for compliance determination in a clear, specific, measurable, and enforceable manner; AND

(4) The Water Quality Improvement Plan is approved by the Regional Board Executive Officer and is implemented per the approved schedule and adapted pursuant to Provisions B.6, F.1, and F.2.

(3) Interim Compliance Determination

Compliance with interim compliance requirements of Specific Provision 3.c may be demonstrated via one of the following methods:

(a) There is no direct or indirect discharge from the Responsible Copermittee's MS4s to the receiving water; OR

(b) There are no exceedances of the applicable final receiving limitations under Specific Provision 3.b.(1) in the receiving water at, or downstream of the Responsible Copermittee's MS4 outfalls; OR

(c) The Responsible Copermittee demonstrates applicable interim WQBELs under Specific Provision 3.c.(1) have been achieved; OR

(d) The Responsible Copermittee can demonstrate that exceedances of the applicable final receiving water limitations under Specific Provision 3.b.(1) are due to loads from natural sources or non-MS4 sources; OR

(e) The Responsible Copermittee is using its legal authority to reduce nutrient discharges from the land uses identified under Specific Provision 3.b.(2).(b) to the maximum extent practicable; OR

(f) The Responsible Copermittee has submitted and is fully implementing a Water Quality Improvement Plan, that is developed and adaptively managed as outlined in Provisions B, F.1 and F.2, is accepted by the San Diego Water Board, and meets the conditions of Specific Provision 3.c.(2).c.

d. SPECIFIC MONITORING AND ASSESSMENT REQUIREMENTS

The Responsible Copermittee must implement the Sampling and Analysis Plan for Rainbow Creek Nutrient Reduction TMDL Implementation Water Quality Monitoring, dated January 2010. The results of any monitoring conducted during the reporting period, and assessment of whether the interim and final WQBELs have been achieved must be submitted as part of the Annual Reports required under Provision F.3.b of this Order.

~~e. COMPLIANCE DETERMINATION~~

~~(1) Compliance with interim compliance requirements of Specific Provision 3.c.(2) may be demonstrated via one of the following methods:~~

~~(a) There is no direct or indirect discharge from the Responsible Copermittee's MS4s to the receiving water;~~

~~(b) There are no exceedances of the applicable receiving water limitations under Specific Provision 3.b.(1) in the receiving water at, or downstream of the Responsible Copermittee's MS4 outfalls;~~

~~(c) There are no violations of the applicable effluent limitations under Specific Provision 3.b.(2)(a) at the Responsible Copermittee's MS4 outfalls;~~

~~(d) The pollutant loads from given land uses discharging to and from the MS4s do not exceed the applicable effluent limitations under Specific Provision 3.b.(2)(b); OR~~

~~(e) The Responsible Copermittee has submitted and is fully implementing a Water Quality Improvement Plan, accepted by the San Diego Water Board, which provides reasonable assurance that the interim compliance requirements will be achieved by the interim compliance dates.~~

~~(2) Compliance with WQBELs of Specific Provision 3.b may be demonstrated via one of the following methods:~~

~~(a) There is no direct or indirect discharge from the Responsible Copermittee's MS4s to the receiving water;~~

~~(b) There are no exceedances of the applicable receiving water limitations under Specific Provision 3.b.(1) in the receiving water at, or downstream of the Responsible Copermittee's MS4 outfalls;~~

~~(c) There are no violations of the applicable effluent limitations under Specific Provision 3.b.(2)(a) at the Responsible Copermittee's MS4 outfalls; OR~~

~~(d) The pollutant loads from given land uses discharging to and from the MS4s do not exceed the applicable effluent limitations under Specific Provision 3.b.(2)(b).~~

4. Total Maximum Daily Loads for Dissolved Copper, Lead, and Zinc in Chollas Creek

a. APPLICABILITY

(1) TMDL Basin Plan Amendment: Resolution No. R9-2007-0043

(2) TMDL Adoption and Approval Dates:

San Diego Water Board Adoption Date: June 13, 2007
State Water Board Approval Date: July 15, 2008
Office of Administrative Law Approval Date: October 22, 2008
US EPA Approval Date: December 18, 2008

(3) TMDL Effective Date: October 22, 2008

(4) Watershed Management Area: San Diego Bay

(5) Water Body: Chollas Creek

(6) Responsible Copermittees: City of La Mesa, City of Lemon Grove, City of San Diego, County of San Diego, San Diego Unified Port District

b. FINAL TMDL COMPLIANCE REQUIREMENTS~~WATER QUALITY BASED EFFLUENT LIMITATIONS~~

~~The WQBELs~~ Final TMDL compliance requirements for Chollas Creek consist of the following:

(1) Final Receiving Water Limitations

Discharges from the MS4s must not cause or contribute to the ~~violation~~ exceedance of the following receiving water limitations by the end of the compliance schedule under Specific Provision 4.b.(4)~~c.(1)~~:

Table 4.1
Receiving Water Limitations as Concentrations in Chollas Creek

Constituent	Exposure Duration	Receiving Water Limitation (µg/L)	Averaging Period
Dissolved Copper	Acute	$(0.96) \times e^{[0.9422 \times \ln(\text{hardness}) - 1.700]} \times \text{WER}^*$	1 hour
	Chronic	$(0.96) \times e^{[0.8545 \times \ln(\text{hardness}) - 1.702]} \times \text{WER}^*$	4 days
Dissolved Lead	Acute	$[1.46203 - 0.145712 \times \ln(\text{hardness})] \times e^{[1.273 \times \ln(\text{hardness}) - 1.460]} \times \text{WER}^*$	1 hour
	Chronic	$[1.46203 - 0.145712 \times \ln(\text{hardness})] \times e^{[1.273 \times \ln(\text{hardness}) - 4.705]} \times \text{WER}^*$	4 days
Dissolved Zinc	Acute	$(0.978) \times e^{[0.8473 \times \ln(\text{hardness}) + 0.884]} \times \text{WER}^*$	1 hour
	Chronic	$(0.986) \times e^{[0.8473 \times \ln (\text{hardness}) + 0.884]} \times \text{WER}^*$	4 days

Notes:

* The Water Effect Ratio (WER) is assumed to be 1.0 unless there is a site-specific and chemical-specific WER.

(2) Final Water Quality Based Effluent Limitations

In the case that receiving water limitations are exceeded after the end of the compliance schedules under Specific Provision 4.b.(4), ~~Discharges from the MS4s must not contain pollutant loads that exceed the following~~ effluent limitations will be used to determine whether MS4 discharges are causing or contributing to exceedances of receiving water quality limitations. ~~by the end of the compliance schedule under Specific Provision 4.c.(1):~~ To demonstrate MS4 discharges are not causing or contributing to exceedances of receiving water quality limitations, MS4 discharges must meet the concentration-based effluent limitations in Table 4.2.

Table 4.2
Effluent Limitations as Concentrations in MS4 Discharges to Chollas Creek

Constituent	Exposure Duration	Effluent Limitation (µg/L)	Averaging Period
Dissolved Copper	Acute	$90\% \times (0.96) \times e^{[0.9422 \times \ln(\text{hardness}) - 1.700]} \times \text{WER*}$	1 hour
	Chronic	$90\% \times (0.96) \times e^{[0.8545 \times \ln(\text{hardness}) - 1.702]} \times \text{WER*}$	4 days
Dissolved Lead	Acute	$90\% \times [1.46203 - 0.145712 \times \ln(\text{hardness})] \times e^{[1.273 \times \ln(\text{hardness}) - 1.460]} \times \text{WER*}$	1 hour
	Chronic	$90\% \times [1.46203 - 0.145712 \times \ln(\text{hardness})] \times e^{[1.273 \times \ln(\text{hardness}) - 4.705]} \times \text{WER*}$	4 days
Dissolved Zinc	Acute	$90\% \times (0.978) \times e^{[0.8473 \times \ln(\text{hardness}) + 0.884]} \times \text{WER*}$	1 hour
	Chronic	$90\% \times (0.986) \times e^{[0.8473 \times \ln(\text{hardness}) + 0.884]} \times \text{WER*}$	4 days

Notes:
* The Water Effect Ratio (WER) is assumed to be 1.0 unless there is a site-specific and chemical-specific WER.

(3) Final Best Management Practices

(a) The Responsible Copermittees must implement BMPs to support the achievement of the final receiving water limitations or final WQBELs under Specific Provision 4.b.(1) for Chollas Creek.

(b) The Responsible Copermittees should coordinate any BMPs implemented to address this TMDL with Caltrans and the U.S. Navy as possible.

(c) For Copermittees utilizing the Water Quality Improvement Plan compliance option, the strategies and activities contained in the Water Quality Improvement Plan accepted by the San Diego Water Board and adaptively managed as outlined in Provision B.6, F.1, and F.2, will serve as BMP-based WQBELs under the following conditions, as outlined in Provision B.3.a:

(1) A Responsible Copermittee requests that the Water Quality Improvement Plan be approved as the basis for compliance with the

discharge prohibitions (A.1), receiving water limitations (A.2), and/or effluent limitations (A.3) in the letter of submittal to the San Diego Water Board;

(2) Reasonable assurance is demonstrated that the strategies and activities in the Water Quality Improvement Plan are expected to attain the final receiving water limitations or final WQBELs under Specific Provision 4.b;

(3) The submitted schedule as outlined in Provision B.3 provides sufficient detail regarding the strategies and activities to be implemented to allow the Regional Board to use the schedule for compliance determination in a clear, specific, measurable, and enforceable manner; AND

(4) The Water Quality Improvement Plan is approved by the Regional Board Executive Officer and is implemented per the approved schedule and adapted pursuant to Provisions B.6, F.1, and F.2.

~~c. COMPLIANCE SCHEDULE~~

(4) Final WLA Compliance Date

The Responsible Copermittees ~~are required to achieve the WLA, thus~~ must be in compliance with the final receiving water limitation or final WQBELs under Specific Provision 4.b, by October 22, 2028.

(5) Final Compliance Determination

Compliance with final compliance requirements of Specific Provision 4.b.(1) may be demonstrated by a Responsible Copermittee via one of the following methods:

(a) There is no direct or indirect discharge from the Responsible Copermittee's MS4s to the receiving water; OR

(b) There are no exceedances of the applicable receiving water limitations under Specific Provision 4.b.(1) in the receiving water at, or downstream of the Responsible Copermittee's MS4 outfalls; OR

(c) There are no exceedances of the applicable effluent limitations under Specific Provision 4.b.(2) at the Responsible Copermittee's MS4 outfalls; OR

(d) The Responsible Copermittee can demonstrate that exceedances of the applicable final receiving water limitations under Specific Provision 4.b.(1) in the receiving water are due to loads from natural sources or non-MS4 sources; OR

(e) The Responsible Copermittee has submitted and is fully implementing an Enhanced Water Quality Improvement Plan that is developed and adaptively managed as outlined in Provisions B, F.1 and F.2, is accepted by the San Diego Water Board, and meets the conditions of Specific Provision 4.b.(3).c.

~~d.~~c. INTERIM COMPLIANCE REQUIREMENTS

Interim TMDL compliance requirements consist of the following:

(1) Interim Water Quality Based Effluent Limitations

Discharges from the MS4s must not exceed the interim WQBELs by the interim compliance schedule under Specific Provision 4.c.(3). ~~The Responsible Copermittee must comply with the following interim WQBELs by the interim compliance date:~~

Table 4.3
Interim Effluent Limitations as Concentrations in MS4 Discharges to Chollas Creek

Interim Compliance Date	Constituent	Exposure Duration	Effluent Limitation (µg/L)	Averaging Period
October 22, 2018	Dissolved Copper	Acute	1.2 x 90% x (0.96) x $e^{[0.9422 \times \ln(\text{hardness}) - 1.700]}$ x WER*	1 hour
		Chronic	1.2 x 90% x (0.96) x $e^{[0.8545 \times \ln(\text{hardness}) - 1.702]}$ x WER*	4 days
	Dissolved Lead	Acute	1.2 x 90% x [1.46203 – 0.145712 x ln(hardness)] x $e^{[1.273 \times \ln(\text{hardness}) - 1.460]}$ x WER*	1 hour
		Chronic	1.2 x 90% x [1.46203 – 0.145712 x ln(hardness)] x $e^{[1.273 \times \ln(\text{hardness}) - 4.705]}$ x WER*	4 days
	Dissolved Zinc	Acute	1.2 x 90% x (0.978) x $e^{[0.8473 \times \ln(\text{hardness}) + 0.884]}$ x WER*	1 hour
		Chronic	1.2 x 90% x (0.986) x $e^{[0.8473 \times \ln(\text{hardness}) + 0.884]}$ x WER*	4 days

Notes:
* The Water Effect Ratio (WER) is assumed to be 1.0 unless there is a site-specific and chemical-specific WER.

(2) Interim Best Management Practices

(a) The Responsible Copermittee must implement BMPs to support the achievement interim effluent limitations under Specific Provision 4.c.(1).

(b) The Responsible Copermittees should coordinate any BMPs implemented to address this TMDL with other responsible parties as possible.

(c) For Copermittees utilizing the Water Quality Improvement Plan compliance option, the strategies and activities contained in the Water Quality Improvement Plan accepted by the San Diego Water Board and adaptively managed as outlined in Provision B.6, F.1, and F.2, will serve as BMP-based WQBELs under the following conditions, as outlined in Provision B.3.a:

(1) A Responsible Copermittee requests that the Water Quality Improvement Plan be approved as the basis for compliance with the discharge prohibitions (A.1), receiving water limitations (A.2), and/or effluent limitations (A.3) in the letter of submittal to the San Diego Water Board;

(2) Reasonable assurance is demonstrated that the strategies and activities in the Water Quality Improvement Plan are expected to attain the interim WQBELs under Specific Provision 4.c.(1);

(3) The submitted schedule as outlined in Provision B.3 provides sufficient detail regarding the strategies and activities to be implemented to allow the Regional Board to use the schedule for compliance determination in a clear, specific, measurable, and enforceable manner; AND

(4) The Water Quality Improvement Plan is approved by the Regional Board Executive Officer and is implemented per the approved schedule and adapted pursuant to Provisions B.6, F.1, and F.2.

(3) Interim Compliance Date

The Responsible Copermittees must be in compliance with the interim WQBELs under Specific Provision 4.c, by October 22, 2018.

(4) Interim Compliance Determination

Compliance with interim compliance requirements of Specific Provision 4.c may be demonstrated via by a Responsible Copermittee one of the following methods:

(a) There is no direct or indirect discharge from the Responsible Copermittee's MS4s to the receiving water; OR

(b) There are no exceedances of the applicable final receiving limitations under Specific Provision 4.b.(1) in the receiving water at, or downstream of the Responsible Copermittee's MS4 outfalls; OR

(c) The Responsible Copermittee demonstrates applicable interim WQBELs under Specific Provision 4.c.(1) have been achieved; OR

(d) The Responsible Copermittee can demonstrate that exceedances of the applicable final receiving water limitations under Specific Provision 4.b.(1) are due to loads from natural sources or non-MS4 sources; OR

(e) The Responsible Copermittee has submitted and is fully implementing a Water Quality Improvement Plan, that is developed and adaptively managed as outlined in Provisions B, F.1 and F.2, is accepted by the San Diego Water Board, and meets the conditions of Specific Provision 4.c.(2).c.

~~c.~~d. SPECIFIC MONITORING AND ASSESSMENT REQUIREMENTS

(1) The Responsible Copermittees must implement the monitoring and assessment requirements issued under Investigation Order No. R9-2004-0277, *California Department of Transportation and San Diego Municipal Separate Storm Sewer System Copermittees Responsible for the Discharge of Diazinon into the Chollas Creek Watershed*, when it is amended to include monitoring requirements for the Total Maximum Daily Loads for Dissolved Copper, Lead, and Zinc in Chollas Creek. The monitoring reports required under Investigation Order No. R9-2004-0277 must be submitted as part of the Annual Reports required under Provision F.3.b of this Order.

(2) The Responsible Copermittees must monitor the effluent of the MS4 outfalls discharging to Chollas Creek for dissolved copper, lead, and zinc, and calculate or estimate the monthly and annual dissolved copper, lead, and zinc loads, in accordance with the requirements of Provisions D.2, D.4.b.(1), and D.4.b.(2)of this Order. The monitoring and assessment results must be submitted as part of the Annual Reports required under Provision F.3.b of this Order.

~~f. COMPLIANCE DETERMINATION~~

~~(1) Compliance with interim compliance requirements of Specific Provision 4.c.(2) may be demonstrated via one of the following methods:~~

~~(a) There is no direct or indirect discharge from the Responsible Copermittees' MS4s to the receiving water;~~

~~(b) There are no exceedances of the applicable receiving water limitations under Specific Provision 4.b.(1) in the receiving water at, or downstream of the Responsible Copermittees' MS4 outfalls;~~

~~(c) There are no violations of the applicable effluent limitations under Specific Provision 4.b.(2) at the Responsible Copermittees' MS4 outfalls; OR~~

~~(d) The Responsible Copermittees have submitted and is fully implementing a Water Quality Improvement Plan, accepted by the San Diego Water Board, which provides reasonable assurance that the interim compliance requirements will be achieved by the interim compliance dates.~~

~~(2) Compliance with WQBELs of Specific Provision 4.b may be demonstrated via one of the following methods:~~

~~(a) There is no direct or indirect discharge from the Responsible Copermittees' MS4s to the receiving water;~~

~~(b) There are no exceedances of the applicable receiving water limitations under Specific Provision 4.b.(1) in the receiving water at, or downstream of the Responsible Copermittees' MS4 outfalls; OR~~

~~(c) There are no violations of the applicable effluent limitations under Specific Provision 4.b.(2) at the Responsible Copermittees' MS4 outfalls.~~

5. Total Maximum Daily Loads for Indicator Bacteria, Baby Beach in Dana Point Harbor and Shelter Island Shoreline Park in San Diego Bay

a. APPLICABILITY

(1) TMDL Basin Plan Amendment: Resolution No. R9-2008-0027

(2) TMDL Adoption and Approval Dates:

San Diego Water Board Adoption Date:	June 11, 2008
State Water Board Approval Date:	June 16, 2009
Office of Administrative Law Approval Date:	September 15, 2009
US EPA Approval Date:	October 26, 2009

(3) TMDL Effective Date: September 15, 2009

(4) Watershed Management Areas: See Table 5.0

(5) Water Bodies: See Table 5.0

(6) Responsible Copermittees: See Table 5.0

Table 5.0
Applicability of Total Maximum Daily Loads for Indicator Bacteria
Baby Beach in Dana Point Harbor and Shelter Island Shoreline Park in San Diego Bay

Watershed Management Area	Water Body	Segment or Area	Responsible Copermittees
South Orange County	Dana Point Harbor	Baby Beach	-City of Dana Point -County of Orange
San Diego Bay	San Diego Bay	Shelter Island Shoreline Park	- San Diego Unified Port District

b. FINAL TMDL COMPLIANCE REQUIREMENTS ~~WATER QUALITY BASED EFFLUENT LIMITATIONS~~

~~The WQBELs~~ Final TMDL compliance requirements for segments or areas of the water bodies listed in Table 5.0 consist of the following:

(1) Final Receiving Water Limitations

(a) Discharges from the MS4s must not cause or contribute to the ~~violation~~ exceedance of the following receiving water limitations by the end of the compliance schedules under Specific Provisions 5.c.(1)(a)~~(u)~~ and 5.c.(b):

Table 5.1
Receiving Water Limitations as Bacteria Densities in the Water Body

Constituent	Receiving Water Limitations: Single Sample Maximum[1,2]	Receiving Water Limitations: 30-Day Geometric Mean[2]
Total Coliform	10,000 MPN/100mL	1,000 MPN/100mL
Fecal Coliform	400 MPN/100mL	200 MPN/100mL
Enterococcus	104 MPN/100mL	35 MPN/100mL

Notes:
1. During wet weather days, only the single sample maximum receiving water limitations are required to be achieved.
2. During dry weather days, the single sample maximum and 30-day geometric mean receiving water limitations are required to be achieved.

~~(b) If the above receiving water limitations are not met in the receiving water, the Responsible Copermittees must demonstrate that the discharges from the MS4s are not causing or contributing to the exceedance of receiving water limitations.~~

(2) Final Water Quality Based Effluent Limitations

In the case that receiving water limitations are exceeded after the end of the compliance schedules under Specific Provision 5.b.4, ~~Discharges from the MS4s must not contain densities that exceed the following~~ effluent limitations will be used to determine whether MS4 discharges are causing or contributing to exceedances of receiving water quality limitations. ~~by the end of the compliance schedules under Specific Provisions 5.c.(1)(a) and 5.c.(2) to demonstrate the discharge is not causing or contributing to a violation of receiving water quality standards:~~ To demonstrate MS4 discharges are not causing or contributing to exceedances of receiving water quality limitations, MS4 discharges must meet either the concentration-based effluent limitations in Table 5.2a or the load-based effluent limitations in Table 5.2b.

Table 5.2
Effluent Limitations as Bacteria Densities in MS4 Discharges to the Water Body

Constituent	Concentration-Based Effluent Limitations: Single Sample Maximum[1,2]	Concentration-Based Effluent Limitations: 30-Day Geometric Mean[2]
Total Coliform	10,000 MPN/100mL	1,000 MPN/100mL
Fecal Coliform	400 MPN/100mL	200 MPN/100mL
Enterococcus	104 MPN/100mL	35 MPN/100mL

Notes:
1. During wet weather days, only the single sample maximum effluent limitations are required to be achieved.
2. During dry weather days, the single sample maximum and 30-day geometric mean effluent limitations are required to be achieved.
3. Concentrations shall be determined on a flow-weighted basis across all outfalls within a jurisdiction, not outfall-by-outfall

~~Interim effluent limitations expressed as pollutant loads are given in the compliance schedule under Specific Provision 5.c.~~

Table 5.2b
Effluent Limitations as Allowable Loading Rates for MS4 Discharges to the Water Body

		Load-based Effluent Limitations Expressed as Required % Load Reduction by MS4s					
		Dry Weather			Wet Weather		
Waterbody	Shoreline Segment/Area	Total Coliform	Fecal Coliform	*Entero-coccus*	Total Coliform	Fecal Coliform	*Entero-coccus*
Dana Point Harbor	Baby Beach	90.4% reduction	82.7% reduction	96.2% reduction	0% reduction	0% reduction	62.2% reduction
San Diego Bay	Shelter Island Shoreline Park	0% reduction	0% reduction	0% reduction	0% reduction	0% reduction	0% reduction

(3) Final Best Management Practices

(a) The Water Quality Improvement Plans for the applicable Watershed Management Areas in Table 5.0 must incorporate the Bacteria Load Reduction Plan (BLRP) required to be developed pursuant to Resolution No. R9-2008-0027.

(b) The Responsible Copermittee must implement BMPs to support the achievement of the final receiving water limitations or final WQBELs under Specific Provision 5.0 for the segments or areas of the water bodies listed in Table 5.0

(c) For Copermittees utilizing the Water Quality Improvement Plan compliance option, the strategies and activities contained in the Water Quality Improvement Plan accepted by the San Diego Water Board and adaptively managed as outlined in Provision B.6, F.1, and F.2, will serve as BMP-based WQBELs under the following conditions, as outlined in Provision B.3.a:

(1) A Responsible Copermittee requests that the Water Quality Improvement Plan be approved as the basis for compliance with the discharge prohibitions (A.1), receiving water limitations (A.2), and/or effluent limitations (A.3) in the letter of submittal to the San Diego Water Board;

(2) Reasonable assurance is demonstrated that the strategies and activities in the Water Quality Improvement Plan are expected to attain the final receiving water limitations or final WQBELs under Specific Provision 5.b;

(3) The submitted schedule as outlined in Provision B.3 provides sufficient detail regarding the strategies and activities to be implemented to allow the Regional Board to use the schedule for compliance determination in a clear, specific, measurable, and enforceable manner; AND

(4) The Water Quality Improvement Plan is approved by the Regional Board Executive Officer and is implemented per the approved schedule and adapted pursuant to Provisions B.6, F.1, and F.2.

~~c. COMPLIANCE SCHEDULE~~

(4) Final Compliance Dates

(a) Baby Beach in Dana Point Harbor

~~(b) WLA Compliance Dates~~

The Responsible Copermittees for MS4 discharges to Baby Beach ~~are~~

~~required to achieve the WLA, thus~~ must be in compliance with the final receiving water limitations or final WQBELs under Specific Provision 5.b~~0,~~ according to the following compliance schedule:

Table 5.3
Compliance Schedule Dates to Achieve Baby Beach WLAs

Constituent	Dry Weather WLA Compliance Date	Wet Weather WLA Compliance Date
Total Coliform	September 15, 2014	September 15, 2009
Fecal Coliform		September 15, 2009
Enterococcus		September 15, 2019

~~(c) Interim Compliance Requirements~~

~~The Responsible Copermittees for MS4 discharges to Baby Beach must comply with the following interim WQBELs by the interim compliance date:~~

~~**Table 5.4**~~
~~*Interim Effluent Limitations as Loads in MS4 Discharges to Baby Beach*~~

~~Constituent~~	~~Interim Compliance Date~~	~~Dry Weather Interim Effluent Limitation~~	~~Wet Weather Interim Effluent Limitation~~
~~Total Coliform~~	~~September 15, 2012~~	~~4.93×10^{9} MPN/day~~	~~NA*~~
~~Fecal Coliform~~	~~September 15, 2012~~	~~0.59×10^{9} MPN/day~~	~~NA*~~
~~*Enterococcus*~~	~~September 15, 2012~~	~~0.42×10^{9} MPN/day~~	~~NA**~~
	~~September 15, 2016~~	~~NA*~~	~~207×10^{9} MPN/30days~~

~~Notes:~~
~~* The WQBELs under Specific Provision 5.b must already be achieved by the given interim compliance date.~~
~~** There is no corresponding interim WQBEL for the given interim compliance date.~~

~~(d)~~(b) Shelter Island Shoreline Park in San Diego Bay

The Responsible Copermittee for MS4 discharges to Shelter Island Shoreline Park ~~is required to achieve the WLA, thus~~ must be in compliance with the final receiving water limitations or final WQBELs under Specific Provision 5.b~~0~~, by December 31, 2012.

(5) Final Compliance Determination

Compliance with final compliance requirements of Specific Provision 5.b may be demonstrated a Responsible Copermittee via one of the following methods:

(a) There is no direct or indirect discharge from the Responsible Copermittee's MS4s to the receiving water; OR

(b) There are no exceedances of the applicable receiving water limitations under Specific Provision 5.b.(1) in the receiving water at, or downstream of the Responsible Copermittee's MS4 outfalls; OR

(c) There are no exceedances of the applicable effluent limitations under Specific Provision 5.b.(2) at the Responsible Copermittee's MS4 outfalls; OR

(d) The Responsible Copermittee can demonstrate that exceedances of the applicable final receiving water limitations under Specific Provision 5.b.(1)(a) in the receiving water are due to loads from natural sources or non-MS4 sources; OR

(e) The Responsible Copermittee has submitted and is fully implementing an Enhanced Water Quality Improvement Plan that is developed and adaptively managed as outlined in Provisions B, F.1 and F.2, is accepted by the San Diego Water Board, and meets the conditions of Specific Provision 5.b.(3).c.

c. INTERIM COMPLIANCE REQUIREMENTS

Interim TMDL compliance requirements consist of the following:

(1) Interim Water Quality Based Effluent Limitations and Schedule

The Responsible Copermittees for MS4 discharges to Baby Beach must comply with the following interim WQBELs by the interim compliance date:

Table 5.4
Interim Effluent Limitations as Loads in MS4 Discharges to Baby Beach

Constituent	Interim Compliance Date	Dry Weather Interim Effluent Limitation	Wet Weather Interim Effluent Limitation
Total Coliform	September 15, 2012	4.93×10^9 MPN/day	NA*
Fecal Coliform	September 15, 2012	0.59×10^9 MPN/day	NA*
Enterococcus	September 15, 2012	0.42×10^9 MPN/day	NA**
	September 15, 2016	NA*	207×10^9 MPN/30days

Notes:
* The WQBELs under Specific Provision 5.b must already be achieved by the given interim compliance date.
** There is no corresponding interim WQBEL for the given interim compliance date.

(2) Interim Best Management Practices

(a) The Water Quality Improvement Plans for the applicable Watershed Management Areas must incorporate the Bacteria Load Reduction Plan (BLRP) required to be developed pursuant to Resolution No. R9-2008-0027.

(b) The Responsible Copermittees should coordinate any BMPs implemented to address this TMDL with Caltrans and owners/operators of small MS4s as possible.

(c) For Copermittees utilizing the Water Quality Improvement Plan compliance option, the strategies and activities contained in the Water Quality Improvement Plan accepted by the San Diego Water Board and adaptively managed as outlined in Provision B.6, F.1, and F.2, will serve as BMP-based WQBELs under the following conditions, as outlined in Provision B.3.a:

(1) A Responsible Copermittee requests that the Water Quality Improvement Plan be approved as the basis for compliance with the discharge prohibitions (A.1), receiving water limitations (A.2), and/or effluent limitations (A.3) in the letter of submittal to the San Diego Water Board;

(2) Reasonable assurance is demonstrated that the strategies and activities in the Water Quality Improvement Plan are expected to attain the interim effluent limitations under Specific Provision 5.c.(1);

(3) The submitted schedule as outlined in Provision B.3 provides sufficient detail regarding the strategies and activities to be implemented to allow the Regional Board to use the schedule for compliance determination in a clear, specific, measurable, and enforceable manner; AND

(4) The Water Quality Improvement Plan is approved by the Regional Board Executive Officer and is implemented per the approved schedule and adapted pursuant to Provisions B.6, F.1, and F.2.

(3) Interim Compliance Determination

Compliance with interim compliance requirements of Specific Provision 5.c may be demonstrated by a Responsible Copermittee via one of the following methods:

(a) There is no direct or indirect discharge from the Responsible Copermittee's MS4s to the receiving water; OR

(b) There are no exceedances of the applicable final receiving limitations under Specific Provision 5.b.(1) in the receiving water at, or downstream of the Responsible Copermittee's MS4 outfalls; OR

(c) The Responsible Copermittee demonstrates applicable interim WQBELs under Specific Provision 5.c.(1) have been achieved; OR

(d) The Responsible Copermittee can demonstrate that exceedances of the applicable final receiving water limitations under Specific Provision 5.b.(1) are due to loads from natural sources or non-MS4 sources; OR

(e) The Responsible Copermittee has submitted and is fully implementing a Water Quality Improvement Plan, that is developed and adaptively managed as outlined in Provisions B, F.1 and F.2, is accepted by the San Diego Water Board, and meets the conditions of Specific Provision 5.c.(2).c.

d. SPECIFIC MONITORING AND ASSESSMENT REQUIREMENTS

(1) Monitoring Stations

Monitoring locations should consist of, at a minimum, the same locations used to collect data required pursuant to Order Nos. R9-2007-0001 and R9-2009-0002, and beach monitoring for Health and Safety Code section 115880.[35] If exceedances of the applicable interim or final receiving water limitations are observed in the monitoring data, additional monitoring locations and/or other source identification methods must be implemented to identify the sources causing the exceedances. The additional monitoring locations must also be used to demonstrate that the bacteria loads from the identified anthropogenic sources have been addressed and are no longer causing exceedances in the receiving waters.

(2) Monitoring Procedures

(a) The Responsible Copermittees must collect dry weather monitoring samples from the receiving water monitoring stations at least monthly. Dry weather samples collected from additional monitoring stations established to identify sources must be collected at an appropriate frequency to demonstrate bacteria loads from the identified anthropogenic sources have been addressed and are no longer causing exceedances in the receiving waters.

(b) The Responsible Copermittees must collect wet weather monitoring samples within the first 24 hours of the first storm event[36] of the rainy season (i.e. October 1 through April 30). Wet weather samples collected from receiving water stations and any additional monitoring stations established to identify sources must be collected at an appropriate frequency to demonstrate bacteria loads from the identified sources have been addressed and are no longer causing exceedances in the receiving waters.

(c) Samples must be analyzed for total coliform, fecal coliform, and *Enterococcus* indicator bacteria.

(3) Assessment and Reporting Requirements

(a) The Responsible Copermittees must analyze the dry weather and wet weather monitoring data to assess whether the interim and final WQBELs have been achieved.

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[35] Commonly referred to as AB 411 monitoring
[36] Wet weather days are defined by the TMDL as storm events of 0.2 inches or greater and the following 72 hours. The Responsible Copermittees may choose to limit their wet weather sampling requirements to storm events of 0.2 inches or greater, or also include storm events of 0.1 inches or greater as defined by the federal regulations [40CFR122.26(d)(2)(iii)(A)(2)].

(b) The monitoring and assessment results must be submitted as part of the Annual Reports required under Provision F.3.b of this Order.

~~e. COMPLIANCE DETERMINATION~~

~~(1) Compliance with interim compliance requirements of Specific Provision 5.c.(1)(b) may be demonstrated via one of the following methods:~~

~~(a) There is no direct or indirect discharge from the Responsible Copermittees' MS4s to the receiving water;~~

~~(b) There are no exceedances of the applicable receiving water limitations under Specific Provision 5.b.(1)(a) in the receiving water at, or downstream of the Responsible Copermittees' MS4 outfalls;~~

~~(c) There are no violations of the applicable effluent limitations under Specific Provision 5.b.(2) at the Responsible Copermittees' MS4 outfalls;~~

~~(d) The pollutant loads discharging from the Responsible Copermittees' MS4 outfalls do not exceed the applicable effluent limitations under Specific Provision 5.c.(1)(b);~~

~~(e) The Responsible Copermittees can demonstrate that exceedances of the applicable receiving water limitations under Specific Provision 5.b.(1)(a) in the receiving water are due to loads from natural sources, AND pollutant loads from the Copermittees' MS4 are not causing or contributing to the exceedances; OR~~

~~(f) The Responsible Copermittees have submitted and are fully implementing a Water Quality Improvement Plan, accepted by the San Diego Water Board, which provides reasonable assurance that the interim compliance requirements will be achieved by the interim compliance dates.~~

~~(2) Compliance with WQBELs of Specific Provision 5.b may be demonstrated via one of the following methods:~~

~~(a) There is no direct or indirect discharge from the Responsible Copermittees' MS4s to the receiving water;~~

~~(b) There are no exceedances of the applicable receiving water limitations under Specific Provision 5.b.(1)(a) in the receiving water at, or downstream of the Responsible Copermittees' MS4 outfalls;~~

~~(c) There are no violations of the applicable effluent limitations under Specific Provision 5.b.(2) at the Responsible Copermittees' MS4 outfalls;~~

~~(d) The pollutant loads discharging from the Responsible Copermittees' MS4 outfalls do not exceed the applicable effluent limitations under Specific Provision 5.c.(1)(b); OR~~

~~(e) The Responsible Copermittees can demonstrate that exceedances of the applicable receiving water limitations under Specific Provision 5.b.(1)(a) in the receiving water are due to loads from natural sources, AND pollutant loads from the Copermittees' MS4 are not causing or contributing to the exceedances.~~

6. Revised Total Maximum Daily Loads for Indicator Bacteria, Project I – Twenty Beaches and Creeks in the San Diego Region (Including Tecolote Creek)

a. APPLICABILITY

(1) TMDL Basin Plan Amendment: Resolution No. R9-2010-0001

(2) TMDL Adoption and Approval Dates:

San Diego Water Board Adoption Date:	February 10, 2010
State Water Board Approval Date:	December 14, 2010
Office of Administrative Law Approval Date:	April 4, 2011
US EPA Approval Date:	June 22, 2011

(3) TMDL Effective Date: April 4, 2011

(4) Watershed Management Areas: See Table 6.0

(5) Water Bodies: See Table 6.0; Consistent with Basin Plan Amendment (Resolution No. R9-2010-0001, p. A-2); specific beach segments from some of the Pacific Ocean shorelines listed in Table 6.0 have been delisted from the 2008 (sic 2010) 303(d) list that was approved by the San Diego Board on December 16, 2009, and therefore are not subject to the requirements of Attachment E as long as monitoring data continues to support compliance with water quality standards.

(6) Responsible Copermittees: See Table 6.0

Table 6.0
Applicability of Total Maximum Daily Loads for Indicator Bacteria
Project I - Twenty Beaches and Creeks in the San Diego Region (including Tecolote Creek)

Watershed Management Area	Water Body	Segment or Area	Responsible Copermittees
South Orange County	Pacific Ocean Shoreline	Cameo Cove at Irvine Cove Drive – Riviera Way	-City of Laguna Beach -County of Orange -Orange County Flood Control District
		at Heisler Park - North	
	Pacific Ocean Shoreline	at Main Laguna Beach	-City of Aliso Viejo -City of Laguna Beach -City of Laguna Woods -County of Orange -Orange County Flood Control District
		Laguna Beach at Ocean Avenue	
		Laguna Beach at Cleo Street	
		Arch Cove at Bluebird Canyon Road	
		Laguna Beach at Dumond Drive	
	Pacific Ocean Shoreline	Laguna Beach at Lagunita Place / Blue Lagoon Place at Aliso Beach	-City of Aliso Viejo -City of Laguna Beach -City of Laguna Hills -City of Laguna Niguel -City of Laguna Woods -City of Lake Forest
	Aliso Creek	Entire reach (7.2 miles) and associated tributaries:	

		- Aliso Hills Channel - English Canyon Creek - Dairy Fork Creek - Sulfur Creek - Wood Canyon Creek	-City of Mission Viejo -County of Orange -Orange County Flood Control District
	Aliso Creek Mouth	at mouth	

Table 6.0 (Cont'd)
Applicability of Total Maximum Daily Loads for Indicator Bacteria
Project I - Twenty Beaches and Creeks in the San Diego Region (including Tecolote Creek)

Watershed Management Area	Water Body	Segment or Area	Responsible Copermittees
South Orange County (cont'd)	Pacific Ocean Shoreline	Aliso Beach at West Street	-City of Dana Point -City of Laguna Beach -City of Laguna Niguel -County of Orange -Orange County Flood Control District
		Aliso Beach at Table Rock Drive	
		100 Steps Beach at Pacific Coast Hwy at hospital (9th Avenue)	
		at Salt Creek (large outlet)	
		Salt Creek Beach at Salt Creek service road	
		Salt Creek Beach at Strand Road	
	Pacific Ocean Shoreline	at San Juan Creek	-City of Dana Point -City of Laguna Hills -City of Laguna Niguel -City of Mission Viejo -City of Rancho Santa Margarita -City of San Juan Capistrano -County of Orange -Orange County Flood Control District
	San Juan Creek	lower 1 mile	
	San Juan Creek Mouth	at mouth	
	Pacific Ocean Shoreline	at Poche Beach	-City of Dana Point -City of San Clemente -County of Orange -Orange County Flood Control District
		Ole Hanson Beach Club Beach at Pico Drain	
		San Clemente City Beach at El Portal Street Stairs	
		San Clemente City Beach at Mariposa Street	
		San Clemente City Beach at Linda Lane	
		San Clemente City Beach at South Linda Lane	
		San Clemente City Beach at Lifeguard Headquarters	
		under San Clemente Municipal Pier	
		San Clemente City Beach at Trafalgar Canyon (Trafalgar Lane)	

		San Clemente State Beach at Riviera Beach	
		Can Clemente State Beach at Cypress Shores	
San Luis Rey River	Pacific Ocean Shoreline	at San Luis Rey River mouth	-City of Oceanside -City of Vista -County of San Diego

Table 6.0 (Cont'd)
Applicability of Total Maximum Daily Loads for Indicator Bacteria
Project I - Twenty Beaches and Creeks in the San Diego Region (including Tecolote Creek)

Watershed Management Area	Water Body	Segment or Area	Responsible Copermittees
Carlsbad	Pacific Ocean Shoreline	at Moonlight State Beach	-City of Carlsbad -City of Encinitas -City of Escondido -City of San Marcos -County of San Diego
San Dieguito River	Pacific Ocean Shoreline	at San Dieguito Lagoon mouth	-City of Del Mar -City of Escondido -City of Poway -City of San Diego -City of Solana Beach -County of San Diego
Penasquitos	Pacific Ocean Shoreline	Torrey Pines State Beach at Del Mar (Anderson Canyon)	-City of Del Mar -City of Poway -City of San Diego -County of San Diego
Mission Bay	Pacific Ocean Shoreline	La Jolla Shores Beach at El Paseo Grande	-City of San Diego
		La Jolla Shores Beach at Caminito del Oro	
		La Jolla Shores Beach at Vallecitos	
		La Jolla Shores Beach at Avenida de la Playa	
		at Casa Beach, Children's Pool	
		South Casa Beach at Coast Boulevard	
		Whispering Sands Beach at Ravina Street	
		Windansea Beach at Vista de la Playa	
		Windansea Beach at Bonair Street	
		Windansea Beach at Playa del Norte	
		Windansea Beach at Palomar Avenue	
		at Tourmaline Surf Park	
		Pacific Beach at Grand Avenue	
	Tecolote Creek	Entire reach and tributaries	

Table 6.0 (Cont'd)
Applicability of Total Maximum Daily Loads for Indicator Bacteria
Project I- Twenty Beaches and Creeks in the San Diego Region (including Tecolote Creek)

Watershed Management Area	Water Body	Segment or Area	Responsible Copermittees
San Diego River	Forrester Creek	lower 1 mile	-City of El Cajon -City of Santee -County of San Diego
	San Diego River	lower 6 miles	-City of El Cajon -City of La Mesa -City of San Diego -City of Santee -County of San Diego
	Pacific Ocean Shoreline	at San Diego River mouth at Dog Beach	
San Diego Bay	Chollas Creek	lower 1.2 miles	-City of La Mesa -City of Lemon Grove -City of San Diego -County of San Diego - San Diego Unified Port District

b. FINAL TMDL COMPLIANCE REQUIREMENTS ~~WATER QUALITY BASED EFFLUENT LIMITATIONS~~

~~The WQBELs~~ Final TMDL compliance requirements for segments or areas of the water bodies listed in Table 6.0 consist of the following:

(1) Receiving Water Limitations

(a) Discharges from the MS4s must not cause or contribute to the exceedance ~~violation~~ of the following receiving water limitations by the end of the compliance schedules under Specific Provision 6.c.(5)~~(1)~~:

Table 6.1
Receiving Water Limitations as Bacteria Densities and Allowable Exceedance Frequencies in the Water Body

Constituent	Receiving Water Limitations			
	Single Sample Maximum[1,2] (MPN/100mL)	Single Sample Maximum Allowable Exceedance Frequency[3]	30-Day Geometric Mean[2] (MPN/100mL)	30-Day Geometric Mean Allowable Exceedance Frequency
Total Coliform	10,000	22% / 0%	1,000	0%
Fecal Coliform	400	22% / 0%	200	0%
Enterococcus	104[4] / 61[5]	22% / 0%	35[4] / 33[5]	0%

Notes:
1. During wet weather days, only the single sample maximum receiving water limitations are required to be achieved.
2. During dry weather days, the single sample maximum and 30-day geometric mean receiving water limitations are required to be achieved.
3. The 22% single sample maximum allowable exceedance frequency only applies to wet weather days. The 0% single sample maximum allowable exceedance frequency applies to dry weather days.
4. This *Enterococcus* receiving water limitation applies to segments of areas of Pacific Ocean Shoreline listed in Table 6.0.
5. This *Enterococcus* receiving water limitations applies to segments or areas of creeks or creek mouths listed in Table 6.0.

~~Interim receiving water limitations expressed as allowable exceedance frequencies are given in the compliance schedule under Specific Provision 6.c.~~

(b) If the above receiving water limitations are not met in the receiving water, the Responsible Copermittees must demonstrate that the discharges from the MS4s are not causing or contributing to the exceedance ~~violation~~ of receiving water limitations. The Copermittee must provide data that demonstrate the discharges from the MS4s are meeting the effluent limitations under Specific Provision 6.b.(2).

(2) Final Water Quality Based Effluent Limitations

In the case that receiving water limitations are exceeded after the end of the compliance schedules under Specific Provision 6.b.5, ~~Discharges from the MS4s must not contain densities that exceed the following~~ effluent limitations will be used to determine whether MS4 discharges are causing or contributing to exceedances of receiving water quality limitations. ~~by the end of the compliance schedules under Specific Provision 6.c.(1) to demonstrate the discharge is not causing or contributing to a violation of receiving water quality standards:~~ To demonstrate MS4 the discharges are not causing or contributing to a exceedance of receiving water quality limitations, MS4 discharges must meet either the concentration-based effluent limitations in Table 6.2a or the load-based effluent limitations in Table 6.2b.

~~Table 6.2~~
Table 6.2a
Effluent Limitations as Bacteria Densities and Allowable Exceedance Frequencies in MS4 Discharges to the Water Body

	Concentration-based Effluent Limitations[6]			
Constituent	**Single Sample Maximum[1,2] (MPN/100mL)**	**Single Sample Maximum Allowable Exceedance Frequency[3]**	**30-Day Geometric Mean[2] (MPN/100mL)**	**30-Day Geometric Mean Allowable Exceedance Frequency**
Total Coliform	10,000	22% / 0%	1,000	0%
Fecal Coliform	400	22% / 0%	200	0%
Enterococcus	104[4] / 61[5]	22% / 0%	35[4] / 33[5]	0%

Notes:
1. During wet weather days, only the single sample maximum effluent limitations are required to be achieved.
2. During dry weather days, the single sample maximum and 30-day geometric mean effluent limitations are required to be achieved.
3. The 22% single sample maximum allowable exceedance frequency only applies to wet weather days. The 0% single sample maximum allowable exceedance frequency applies to dry weather days
4. This *Enterococcus* effluent limitation and all total coliform limitations ~~applies~~ apply only to MS4 discharges to segments of areas of Pacific Ocean Shoreline listed in Table 6.0.
5. This *Enterococcus* effluent limitation applies only to MS4 discharges to segments or areas of creeks or creek mouths listed in Table 6.0.
6. Concentrations shall be determined on a flow-weighted basis across all outfalls within a jurisdiction, not outfall-by-outfall.

~~Interim effluent limitations expressed as allowable exceedance frequencies are given in the compliance schedule under Specific Provision 6.c.~~

Table 6.2b
Effluent Limitations as Allowable Loading Rates for MS4 Discharges to the Water Body

Watershed	Load-based Effluent Limitations Expressed as Required % Load Reduction by MS4s					
	Dry Weather			Wet Weather		
	Total Coliform	Fecal Coliform	*Entero-coccus*	Total Coliform	Fecal Coliform	*Entero-coccus*
San Joaquin Hills/ Laguna Hills HSAs (901.11 and 901.12)	91.78%	91.72%	98.28%	46.85%	52.07%	51.26
Aliso HSA (901.13)	95.47%	95.58%	99.13%	25.29%	26.62%	27.52%
Dana Point HSA (901.14)	95.04%	95.03%	98.98%	13.15%	14.86%	15.16%
Lower San Juan HSA (901.27)	72.96%	74.21%	94.94%	19.21%	12.82%	27.12%
San Clemente HA (901.30)	94.28%	94.23%	98.83%	23.85%	24.58%	25.26%
San Luis Rey HU (903.00)	38.13%	39.09%	87.38%	5.62%	3.12%	11.69%
San Marcos HA (904.50)	82.82%	82.55%	96.03%	18.47%	18.98%	20.19%
San Dieguito HU (905.00)	14.39%	20.72%	83.48%	4.29%	1.46%	7.72%
Miramar Reservoir HA (906.10)	96.50%	96.59%	99.42%	1.61%	1.99%	1.93%
Scripps HA (906.30)	96.44%	96.42%	99.25%	16.32%	21.14%	18.82%
Tecolote HA (906.5)	94.51%	94.59%	98.94%	16.51%	20.47%	18.15%
Mission San Diego/ Santee HSAs (907.11 and 907.12)	74.03%	69.44%	93.96%	38.14%	53.22%	42.74%
Chollas HSA (908.22)	92.06%	92.15%	98.46%	17.82%	24.84%	21.26%

(3) Best Management Practices

(a) The Water Quality Improvement Plans for the applicable Watershed Management Areas in Table 6.0 must incorporate the Comprehensive Load Reduction Plans (CLRPs) required to be developed pursuant to Resolution No. R9-2010-0001. For segments or areas in Table 6.0 that have been delisted from the Clean Water Act Section 303(d) List of Water Quality Limited Segments, a CLRP is not required.

(b) The Responsible Copermittee must implement BMPs to support the achievement of the final receiving water limitations or final WQBELs under Specific Provision 6.b for the segments or areas of the water bodies listed in Table 6.0.

(c) The Responsible Copermittees should coordinate any BMPs implemented to address this TMDL with Caltrans and owners/operators of small MS4s as possible.

(d) For Copermittees utilizing the Water Quality Improvement Plan compliance option, the strategies and activities contained in the Water Quality Improvement Plan accepted by the San Diego Water Board and adaptively managed as outlined in Provision B.6, F.1, and F.2, will serve as BMP-based WQBELs under the following conditions, as outlined in Provision B.3.a:

(1) A Responsible Copermittee requests that the Water Quality Improvement Plan be approved as the basis for compliance with the discharge prohibitions (A.1), receiving water limitations (A.2), and/or effluent limitations (A.3) in the letter of submittal to the San Diego Water Board;

(2) Reasonable assurance is demonstrated that the strategies and activities in the Water Quality Improvement Plan are expected to attain the final receiving water limitations or final WQBELs under Specific Provision 6.b;

(3) The submitted schedule as outlined in Provision B.3 provides sufficient detail regarding the strategies and activities to be implemented to allow the Regional Board to use the schedule for compliance determination in a clear, specific, measurable, and enforceable manner; AND

(4) The Water Quality Improvement Plan is approved by the Regional Board Executive Officer and is implemented per the approved schedule and adapted pursuant to Provisions B.6, F.1, and F.2.

~~c. Compliance Schedule~~

(1) ~~WLA~~ Compliance Dates

The Responsible Copermittees for MS4 discharges to a segment or area of the water bodies listed in Table 6.0 are required to achieve the WLA, thus must be in compliance with the WQBELs under Specific Provision 6.b, according to the following compliance schedule:

Table 6.3

Compliance Schedule Dates to Achieve Indicator Bacteria WLAs

Constituent	Dry Weather WLA Compliance Date	Wet Weather WLA Compliance Date
Total Coliform*	April 4, 2021	April 4, 2031
Fecal Coliform		
Enterococcus		

* Total coliform receiving water limitations only apply to segments or areas of Pacific Ocean Shoreline listed in Table 6.0.

(5) Final Compliance Determination

Compliance with final compliance requirements of Specific Provision 6.b may be demonstrated by a Responsible Copermittee via one of the following methods:

(a) There is no direct or indirect discharge from the Responsible Copermittee's MS4s to the receiving water;

(b) There are no exceedances of the applicable receiving water limitations under Specific Provision 6.b.(1) in the receiving water at, or downstream of the Responsible Copermittee's MS4 outfalls;

(c) There are no exceedances of the applicable effluent limitations under Specific Provision 6.b.(2) at the Responsible Copermittee's MS4 outfalls; OR

(d) The Responsible Copermittee can demonstrate that exceedances of the applicable final receiving water limitations under Specific Provision 6.b.(1)(a) in the receiving water are due to loads from natural sources or non-MS4 sources; OR

(e) The Responsible Copermittee has submitted and is fully implementing a Water Quality Improvement Plan that is developed and adaptively managed as outlined in Provisions B, F.1 and F.2, is accepted by the San Diego Water Board, and meets the conditions of Specific Provision 6.b.(3).d.

~~d.~~c. INTERIM COMPLIANCE REQUIREMENTS

Interim TMDL compliance requirements for segments or areas of the water bodies listed in Table 6.0 consist of the following:
~~The Responsible Copermittees must comply with the following interim WQBELs by the interim compliance dates:~~

(1) Interim Dry Weather Receiving Water Limitations

The Responsible Copermittee must calculate the “existing” exceedance frequencies of the 30-day geometric mean water quality objectives for each of the indicator bacteria by analyzing the available monitoring data collected between January 1, 1996 and December 31, 2002. "Existing" exceedance frequencies may be calculated by segment or area of a water body, or by water body, and/or by Watershed Management Area listed in Table 6.0. Separate "existing" exceedance frequencies must be calculated for beaches and creeks/creek mouths.

The Responsible Copermittees must achieve a 50 percent reduction in the "existing" exceedance frequency of the 30-day geometric mean WQBELs for the segments or areas of the water bodies listed in Table 6.0 by the interim compliance dates for achieving the interim dry weather WQBELs given in Table 6.5. A 50 percent reduction in the "existing" exceedance frequency is equivalent to half of the "existing" exceedance frequency of the 30-day geometric mean WQBELs.

The "existing" exceedance frequencies and the interim dry weather allowable exceedance frequencies (i.e. interim dry weather WQBELs) calculated by the Responsible Copermittees must be included in the Water Quality Improvement Plans for the applicable Watershed Management Areas.

(2) Interim Wet Weather Receiving Water Limitations

The Responsible Copermittees must achieve the interim wet weather receiving water limitations in Table 6.4, expressed as interim allowable exceedance frequencies, by the interim compliance dates for achieving the interim wet weather WQBELs given in Table 6.5.

Table 6.4
Interim Wet Weather Receiving Water Limitations Expressed as Interim Wet Weather Allowable Exceedance Frequencies

<table>
<tr><th rowspan="2">Watershed Management Area</th><th rowspan="2">Water Body</th><th rowspan="2">Segment or Area</th><th colspan="3">Interim Wet Weather Allowable Exceedance Frequencies</th></tr>
<tr><th>Total Coliform</th><th>Fecal Coliform</th><th>Entero-coccus</th></tr>
<tr><td rowspan="19">South Orange County</td><td rowspan="2">Pacific Ocean Shoreline</td><td>Cameo Cove at Irvine Cove Drive – Riviera Way</td><td rowspan="8">38%</td><td rowspan="8">37%</td><td rowspan="8">39%</td></tr>
<tr><td>at Heisler Park - North</td></tr>
<tr><td rowspan="6">Pacific Ocean Shoreline</td><td>at Main Laguna Beach</td></tr>
<tr><td>Laguna Beach at Ocean Avenue</td></tr>
<tr><td>Laguna Beach at Cleo Street</td></tr>
<tr><td>Arch Cove at Bluebird Canyon Road</td></tr>
<tr><td>Laguna Beach at Dumond Drive</td></tr>
<tr><td>Laguna Beach at Lagunita Place / Blue Lagoon Place at Aliso Beach</td></tr>
<tr><td>Aliso Creek</td><td>Entire reach (7.2 miles) and associated tributaries:
- Aliso Hills Channel
- English Canyon Creek
- Dairy Fork Creek
- Sulfur Creek
- Wood Canyon Creek</td><td>41%</td><td>41%</td><td>42%</td></tr>
<tr><td>Aliso Creek Mouth</td><td>at mouth</td><td>41%</td><td>41%</td><td>42%</td></tr>
<tr><td rowspan="6">Pacific Ocean Shoreline</td><td>Aliso Beach at West Street</td><td rowspan="6">36%</td><td rowspan="6">36%</td><td rowspan="6">36%</td></tr>
<tr><td>Aliso Beach at Table Rock Drive</td></tr>
<tr><td>100 Steps Beach at Pacific Coast Hwy at hospital (9th Avenue)</td></tr>
<tr><td>at Salt Creek (large outlet)</td></tr>
<tr><td>Salt Creek Beach at Salt Creek service road</td></tr>
<tr><td>Salt Creek Beach at Strand Road</td></tr>
</table>

Table 6.4 (Cont'd)
Interim Wet Weather Receiving Water Limitations Expressed as Interim Wet Weather Allowable Exceedance Frequencies

Watershed Management Area	Water Body	Segment or Area	Interim Wet Weather Allowable Exceedance Frequencies		
			Total Coliform	Fecal Coliform	*Entero-coccus*
South Orange County (cont'd)	Pacific Ocean Shoreline	at San Juan Creek	44%	44%	48%
	San Juan Creek	lower 1 mile	44%	44%	47%
	San Juan Creek Mouth	at mouth	44%	44%	47%
	Pacific Ocean Shoreline	at Poche Beach	35%	35%	36%
		Ole Hanson Beach Club Beach at Pico Drain			
		San Clemente City Beach at El Portal Street Stairs			
		San Clemente City Beach at Mariposa Street			
		San Clemente City Beach at Linda Lane			
		San Clemente City Beach at South Linda Lane			
		San Clemente City Beach at Lifeguard Headquarters			
		under San Clemente Municipal Pier			
		San Clemente City Beach at Trafalgar Canyon (Trafalgar Lane)			
		San Clemente State Beach at Riviera Beach			
		Can Clemente State Beach at Cypress Shores			
San Luis Rey River	Pacific Ocean Shoreline	at San Luis Rey River mouth	45%	44%	47%
Carlsbad	Pacific Ocean Shoreline	at Moonlight State Beach	40%	40%	41%
San Dieguito River	Pacific Ocean Shoreline	at San Dieguito Lagoon mouth	33%	33%	36%

Table 6.4 (Cont'd)
Interim Wet Weather Receiving Water Limitations Expressed as Interim Wet Weather Allowable Exceedance Frequencies

Watershed Management Area	Water Body	Segment or Area	Interim Wet Weather Allowable Exceedance Frequencies Total Coliform	Fecal Coliform	*Entero-coccus*
Penasquitos	Pacific Ocean Shoreline	Torrey Pines State Beach at Del Mar (Anderson Canyon)	26%	26%	26%
Mission Bay	Pacific Ocean Shoreline	La Jolla Shores Beach at El Paseo Grande	37%	37%	37%
		La Jolla Shores Beach at Caminito del Oro			
		La Jolla Shores Beach at Vallecitos			
		La Jolla Shores Beach at Avenida de la Playa			
		at Casa Beach, Children's Pool			
		South Casa Beach at Coast Boulevard			
		Whispering Sands Beach at Ravina Street			
		Windansea Beach at Vista de la Playa			
		Windansea Beach at Bonair Street			
		Windansea Beach at Playa del Norte			
		Windansea Beach at Palomar Avenue			
		at Tourmaline Surf Park			
		Pacific Beach at Grand Avenue			
	Tecolote Creek	Entire reach and tributaries	49%	49%	51%
San Diego River	Forrester Creek	lower 1 mile	46%	43%	49%
	San Diego River	lower 6 miles	46%	43%	49%
	Pacific Ocean Shoreline	at San Diego River mouth at Dog Beach	46%	43%	51%
San Diego Bay	Chollas Creek	lower 1.2 miles	41%	41%	43%

(3) Interim Water Quality Based Effluent Limitations

In the case that interim receiving water limitations are exceeded after the end of the interim compliance schedules under Specific Provision 6.c.5, interim effluent limitations, expressed as required MS4 load reductions, will be used to determine whether MS4 discharges are causing or contributing to exceedances of interim receiving water quality limitations. To demonstrate MS4 the discharges are not causing or contributing to a exceedance of receiving water quality limitations, MS4 discharges must meet the required MS4 load reductions in Table 6.5.

Table 6.5
Interim Effluent Limitations as Allowable Loading Rates for MS4 Discharges to the Water Body

	Interim Effluent Limitations Expressed as Required % Load Reduction by MS4s					
	Dry Weather			Wet Weather		
Watershed	Total Coliform	Fecal Coliform	*Entero-coccus*	Total Coliform	Fecal Coliform	*Entero-coccus*
San Joaquin Hills/ Laguna Hills HSAs (901.11 and 901.12)	45.89%	45.86%	49.14%	23.43%	26.04%	25.63%
Aliso HSA (901.13)	47.74%	47.79%	49.57%	12.65%	13.31%	13.76%
Dana Point HSA (901.14)	47.52%	47.52%	49.49%	6.58%	7.43%	7.58%
Lower San Juan HSA (901.27)	36.48%	37.11%	47.47%	9.61%	6.41%	13.56%
San Clemente HA (901.30)	47.14%	47.12%	49.42%	11.93%	12.29%	12.63%
San Luis Rey HU (903.00)	19.07%	19.55%	43.69%	2.81%	1.56%	5.85%
San Marcos HA (904.50)	41.41%	41.28%	48.02%	9.24%	9.49%	10.10%
San Dieguito HU (905.00)	7.20%	10.36%	41.74%	2.15%	0.73%	3.86%
Miramar Reservoir HA (906.10)	48.25%	48.30%	49.71%	0.81%	1.00%	0.97%
Scripps HA (906.30)	48.22%	48.21%	49.63%	8.16%	10.57%	9.41%
Tecolote HA (906.5)	47.26%	47.30%	49.47%	8.26%	10.24%	9.08%
Mission San Diego/ Santee HSAs (907.11 and 907.12)	37.02%	34.72%	46.98%	19.07%	26.61%	21.37%

Chollas HSA (908.22)	92.06%	92.15%	98.46%	17.82%	24.84%	21.26%

(4) Interim Best Management Practices

(a) The Water Quality Improvement Plans for the applicable Watershed Management Areas in Table 6.0 must incorporate the Comprehensive Load Reduction Plans (CLRPs) required to be developed pursuant to Resolution No. R9-2010-0001. For segments or areas in Table 6.0 that have been delisted from the Clean Water Act Section 303(d) List of Water Quality Limited Segments, a CLRP is not required.

(b) The Responsible Copermittee must implement BMPs to support the achievement interim receiving water limitations under Specific Provision 6.c.(1) and 6.c.(2) for the segments or areas of the water bodies listed in Table 6.0.

(c) The Responsible Copermittees should coordinate any BMPs implemented to address this TMDL with Caltrans and owners/operators of small MS4s as possible.

(d) For Copermittees utilizing the Water Quality Improvement Plan compliance option, the strategies and activities contained in the Water Quality Improvement Plan accepted by the San Diego Water Board and adaptively managed as outlined in Provision B.6, F.1, and F.2, will serve as BMP-based WQBELs under the following conditions, as outlined in Provision B.3.a:

(1) A Responsible Copermittee requests that the Water Quality Improvement Plan be approved as the basis for compliance with the discharge prohibitions (A.1), receiving water limitations (A.2), and/or effluent limitations (A.3) in the letter of submittal to the San Diego Water Board;

(2) Reasonable assurance is demonstrated that the strategies and activities in the Water Quality Improvement Plan are expected to attain the interim receiving water limitations under Specific Provision 6.c.(1) and 6.c.(2) or interim load reduction requirements under Specific Provision 6.c.(3);

(3) The submitted schedule as outlined in Provision B.3 provides sufficient detail regarding the strategies and activities to be implemented to allow the Regional Board to use the schedule for compliance determination in a clear, specific, measurable, and enforceable manner; AND

(4) The Water Quality Improvement Plan is approved by the Regional Board Executive Officer and is implemented per the approved schedule and adapted pursuant to Provisions B.6, F.1, and F.2.

~~(3)~~(5)Interim Compliance Dates

The Responsible Copermittees must achieve the interim receiving water limitations under Specific Provisions 6.c.(2)(1) and 6.c.(~~2~~3)~~(b)~~ or the interim WQBELs under Specific Provisions 6.c.(3) by the interim compliance dates given in Table 6.~~5~~6 unless alternative interim compliance dates are provided in a Comprehensive Load Reduction Plan or Water Quality Improvement Plan accepted by the San Diego Regional Board Executive Officer.

Table 6.5
Interim Compliance Dates to Achieve Interim WQBELs

Watershed Management Area	Water Body	Segment or Area	Interim Compliance Dates: Interim Dry Weather WQBELs	Interim Compliance Dates: Interim Wet Weather WQBELs
South Orange County	Pacific Ocean Shoreline	Cameo Cove at Irvine Cove Drive – Riviera Way	April 4, 2016	April 4, 2021
		at Heisler Park - North		
	Pacific Ocean Shoreline	at Main Laguna Beach	April 4, 2016	April 4, 2021
		Laguna Beach at Ocean Avenue		
		Laguna Beach at Cleo Street		
		Arch Cove at Bluebird Canyon Road		
		Laguna Beach at Dumond Drive		
	Pacific Ocean Shoreline	Laguna Beach at Lagunita Place / Blue Lagoon Place at Aliso Beach	April 4, 2016	April 4, 2021
	Aliso Creek	Entire reach (7.2 miles) and associated tributaries: - Aliso Hills Channel - English Canyon Creek - Dairy Fork Creek - Sulfur Creek - Wood Canyon Creek	April 4, 2018	April 4, 2021
	Aliso Creek Mouth	at mouth	April 4, 2018	April 4, 2021
	Pacific Ocean Shoreline	Aliso Beach at West Street	April 4, 2016	April 4, 2021
		Aliso Beach at Table Rock Drive		
		100 Steps Beach at Pacific Coast Hwy at hospital (9th Avenue)		
		at Salt Creek (large outlet)		
		Salt Creek Beach at Salt Creek service road	April 4, 2017	April 4, 2021

		Salt Creek Beach at Strand Road	April 4, 2017	April 4, 2021

Table 6.5 (Cont'd)
Interim Compliance Dates to Achieve Interim WQBELs

Watershed Management Area	Water Body	Segment or Area	Interim Compliance Dates	
			Interim Dry Weather WQBELs	Interim Wet Weather WQBELs
South Orange County (cont'd)	Pacific Ocean Shoreline	at San Juan Creek	April 4, 2016	April 4, 2021
	San Juan Creek	lower 1 mile	April 4, 2018	April 4, 2021
	San Juan Creek Mouth	at mouth	April 4, 2016	April 4, 2021
	Pacific Ocean Shoreline	at Poche Beach	April 4, 2016	April 4, 2021
		Ole Hanson Beach Club Beach at Pico Drain	April 4, 2016	April 4, 2021
		San Clemente City Beach at El Portal Street Stairs	April 4, 2017	April 4, 2021
		San Clemente City Beach at Mariposa Street		
		San Clemente City Beach at Linda Lane	April 4, 2016	April 4, 2021
		San Clemente City Beach at South Linda Lane	April 4, 2018	April 4, 2021
		San Clemente City Beach at Lifeguard Headquarters	April 4, 2017	April 4, 2021
		under San Clemente Municipal Pier		
		San Clemente City Beach at Trafalgar Canyon (Trafalgar Lane)	April 4, 2018	April 4, 2021
		San Clemente State Beach at Riviera Beach	April 4, 2016	April 4, 2021
		Can Clemente State Beach at Cypress Shores	April 4, 2017	April 4, 2021
San Luis Rey River	Pacific Ocean Shoreline	at San Luis Rey River mouth	April 4, 2017	April 4, 2021
Carlsbad	Pacific Ocean Shoreline	at Moonlight State Beach	April 4, 2016	April 4, 2021
San Dieguito River	Pacific Ocean Shoreline	at San Dieguito Lagoon mouth	April 4, 2016	April 4, 2021

Table 6.5 (Cont'd)
Interim Compliance Dates to Achieve Interim WQBELs

Watershed Management Area	Water Body	Segment or Area	Interim Compliance Dates: Interim Dry Weather WQBELs	Interim Compliance Dates: Interim Wet Weather WQBELs
Penasquitos	Pacific Ocean Shoreline	Torrey Pines State Beach at Del Mar (Anderson Canyon)	April 4, 2016	April 4, 2021
Mission Bay	Pacific Ocean Shoreline	La Jolla Shores Beach at El Paseo Grande	April 4, 2016	April 4, 2021
		La Jolla Shores Beach at Caminito del Oro		
		La Jolla Shores Beach at Vallecitos		
		La Jolla Shores Beach at Avenida de la Playa		
		at Casa Beach, Children's Pool		
		South Casa Beach at Coast Boulevard		
		Whispering Sands Beach at Ravina Street		
		Windansea Beach at Vista de la Playa		
		Windansea Beach at Bonair Street		
		Windansea Beach at Playa del Norte		
		Windansea Beach at Palomar Avenue		
		at Tourmaline Surf Park		
		Pacific Beach at Grand Avenue		
	Tecolote Creek	Entire reach and tributaries		
San Diego River	Forrester Creek	lower 1 mile	April 4, 2018	April 4, 2021
	San Diego River	lower 6 miles		
	Pacific Ocean Shoreline	at San Diego River mouth at Dog Beach		
San Diego Bay	Chollas Creek	lower 1.2 miles	April 4, 2018	April 4, 2021

(6) Interim Compliance Determination

Compliance with interim compliance requirements of Specific Provision 6.c may be demonstrated via one of the following methods:

(a) There is no direct or indirect discharge from the Responsible Copermittee's MS4s to the receiving water;

(b) There are no exceedances of the applicable interim receiving water limitations under Specific Provision 6.c.(1) and 6.c.(2) in the receiving water at, or downstream of the Responsible Copermittee's MS4 outfalls;

(c) The Responsible Copermittee demonstrates applicable interim WQBELs under Specific Provision 6.c.(3) have been achieved;

(d) The Responsible Copermittee can demonstrate that exceedances of the applicable interim receiving water limitations under Specific Provision 6.c.(1) and 6.c.(2) in the receiving water are due to loads from natural sources or non-MS4 sources; OR

(e) The Responsible Copermittee has submitted and is fully implementing a Water Quality Improvement Plan, that is developed and adaptively managed as outlined in Provisions B, F.1 and F.2, is accepted by the San Diego Water Board, and meets the conditions of Specific Provision 6.c.(4).d.

~~e.~~d. SPECIFIC MONITORING AND ASSESSMENT REQUIREMENTS

(1) Monitoring and Assessment Requirements for Beaches

(a) Monitoring Stations

For beaches addressed by the TMDL, monitoring locations should consist of, at a minimum, the same locations used to collect data required pursuant to Order Nos. R9-2007-0001 and R9-2009-0002, and beach monitoring for Health and Safety Code section 115880.[37] If exceedances of the applicable interim or final receiving water limitations are observed in the monitoring data, additional monitoring locations and/or other source identification methods must be implemented to identify the sources causing the exceedances. The additional monitoring locations must also be used to demonstrate that the bacteria loads from the identified anthropogenic sources have been addressed and are no longer causing exceedances in the receiving waters.

(b) Monitoring Procedures

(i) The Responsible Copermittees must collect dry weather monitoring samples from the receiving water monitoring stations at least monthly. Dry weather samples collected from additional monitoring stations established to identify sources must be collected at an appropriate frequency to demonstrate bacteria loads from the identified sources have been addressed and are no longer causing exceedances in the receiving waters.

(ii) The Responsible Copermittees must collect wet weather monitoring samples from the receiving water monitoring stations at least once

[37] Commonly referred to as AB 411 monitoring

within the first 24 hours of the first storm event[38] of the rainy season (i.e. October 1 through April 30). Wet weather samples collected from receiving water stations and any additional monitoring stations established to identify sources must be collected at an appropriate frequency to demonstrate bacteria loads from the identified sources have been addressed and are no longer in exceedance of the allowable exceedance frequencies in the receiving waters.

(iii) Samples must be analyzed for total coliform, fecal coliform, and *Enterococcus* indicator bacteria.

(c) Assessment and Reporting Requirements

(i) The Responsible Copermittees must analyze the dry weather and wet weather monitoring data to assess whether the interim and final WQBELs for the Pacific Ocean Shoreline segments or areas listed in Table 6.0 have been achieved.

(ii) The monitoring and assessment results must be submitted as part of the Annual Reports required under Provision F.3.b of this Order.

(2) Monitoring and Assessment Requirements for Creeks and Creek Mouths

(a) Monitoring Stations

For creeks addressed by the TMDL, monitoring locations should consist of, at a minimum, a location at or near the mouth of the creek (e.g. Mass Loading Station or Mass Emission Station) and one or more locations upstream of the mouth (e.g. Watershed Assessment Station). If exceedances of the applicable interim or final receiving water limitations are observed in the monitoring data, additional monitoring locations and/or other source identification methods must be implemented to identify the sources causing the exceedances. The additional monitoring locations must also be used to demonstrate that the bacteria loads from the identified sources have been addressed and are no longer causing exceedances in the receiving waters.

(b) Monitoring Procedures

[38] Wet weather days are defined by the TMDL as storm events of 0.2 inches or greater and the following 72 hours. The Responsible Copermittees may choose to limit their wet weather sampling requirements to storm events of 0.2 inches or greater, or also include storm events of 0.1 inches or greater as defined by the federal regulations [40CFR122.26(d)(2)(iii)(A)(2)].

(i) The Responsible Copermittees must collect dry weather monitoring samples from the receiving water monitoring stations in accordance with the requirements of Provision D.

(ii) The Responsible Copermittees must collect wet weather monitoring samples from the receiving water monitoring stations within the first 24 hours of the first storm event[39] of the rainy season (i.e. October 1 through April 30).

(iii) Samples collected from receiving water monitoring stations must be analyzed for fecal coliform and *Enterococcus* indicator bacteria.

(c) Assessment and Reporting Requirements

(i) The Responsible Copermittees must analyze the receiving water monitoring data to assess whether the interim and final receiving water WQBELs for the creeks and creek mouths listed in Table 6.0 have been achieved.

(ii) The Responsible Copermittee must identify and incorporate additional MS4 outfall and receiving water monitoring stations and/or adjust monitoring frequencies to identify sources causing exceedances of the receiving water WQBELs.

(iii) The monitoring and assessment results must be submitted as part of the Annual Reports required under Provision F.3.b of this Order.

~~**f. COMPLIANCE DETERMINATION**~~

~~(1) Compliance with interim compliance requirements of Specific Provision 6.c.(2) may be demonstrated via one of the following methods:~~

~~(a) There is no direct or indirect discharge from the Responsible Copermittees' MS4s to the receiving water;~~

~~(b) There are no exceedances of the applicable receiving water limitations under Specific Provision 6.b.(1) in the receiving water at, or downstream of the Responsible Copermittees' MS4 outfalls;~~

~~(c) There are no violations of the applicable effluent limitations under Specific Provision 6.b.(2) at the Responsible Copermittees' MS4 outfalls;~~

[39] Wet weather days are defined by the TMDL as storm events of 0.2 inches or greater and the following 72 hours. The Responsible Copermittees may choose to limit their wet weather sampling requirements to storm events of 0.2 inches or greater, or also include storm events of 0.1 inches or greater as defined by the federal regulations [40CFR122.26(d)(2)(iii)(A)(2)]. If only one sample is collected for a storm event, the bacteria density for every wet weather day associated with that storm event shall be equal to the results from that one sample. If more than one sample is collected for a storm event, but not on a daily basis, the bacteria density for all the wet weather days not sampled shall be equal to the highest bacteria density result reported from samples collected. The exceedance frequency shall be calculated by dividing the number of wet weather days that exceed the single sample maximum REC-1 WQOs by the total number of wet weather days during the rainy season.

~~(d) There are no exceedances of the applicable interim receiving water limitations under Specific Provision 6.c.(2) in the receiving water at, or downstream of the Responsible Copermittees' MS4 outfalls;~~

~~(e) The Responsible Copermittees can demonstrate that exceedances of the applicable interim or final receiving water limitations under Specific Provision 6.b.(1)(a) or 6.c.(2) in the receiving water are due to loads from natural sources, AND pollutant loads from the Copermittees' MS4 are not causing or contributing to the exceedances; OR~~

~~(f) The Responsible Copermittees have submitted and are fully implementing a Water Quality Improvement Plan, accepted by the San Diego Water Board, which provides reasonable assurance that the interim compliance requirements will be achieved by the interim compliance dates.~~

~~(2) Compliance with WQBELs of Specific Provision 6.b may be demonstrated via one of the following methods:~~

~~(a) There is no direct or indirect discharge from the Responsible Copermittees' MS4s to the receiving water;~~

~~(b) There are no exceedances of the applicable receiving water limitations under Specific Provision 6.b.(1) in the receiving water at, or downstream of the Responsible Copermittees' MS4 outfalls;~~

~~(c) There are no violations of the applicable effluent limitations under Specific Provision 6.b.(2) at the Responsible Copermittees' MS4 outfalls; OR~~

~~(d) The Responsible Copermittees can demonstrate that exceedances of the applicable final receiving water limitations under Specific Provision 6.b.(1)(a) in the receiving water are due to loads from natural sources, AND pollutant loads from the Copermittees' MS4 are not causing or contributing to the exceedances.~~

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SAN DIEGO COPERMITTEE COMMENTS ON TENTATIVE ORDER NO. R9-2013-0001				
Permit Section	Tentative Order Page	Section Title	Reason for Proposed Changes/Comments	Proposed Changes
General Comment	Multiple	Multiple	The term "prohibit" is broader than Clean Water Act requirements, and should be changed to "effectively prohibit." CWA Provision 402(p) (3) (B) (ii) reads as follows: (B) Municipal Discharge – Permits for discharges from municipal storm sewers – (ii) shall include a requirement to <u>effectively prohibit</u> non-stormwater discharges into the storm sewer; (<u>Emphasis</u> added) The provision does not provide any reference to exemptions. Rather the Provision may be read that a permit shall "effectively prohibit non-stormwater discharges" but may exempt certain discharges that are not significant sources of pollutants from the prohibition. The Provision does not require a <u>full</u> prohibition but rather an <u>effective</u> prohibition. The operative word is "effective". The more precise and correct finding/provision should note that non-stormwater discharges are effectively prohibited (per 402 (p) (3) (B) (ii)). However discharges that are not significant sources of pollutants are exempted from the prohibition. In a practical sense the use of word "effective" provides flexibility to assess the impacts of relatively benign discharges such as landscape irrigation, air condition condensate, individual car washing, and non-emergency fire fighting flows or non-anthropogenic sources before instituting a prohibition.	Revise "prohibit" to "effectively prohibit" throughout the Permit when referring to non-storm water discharges.

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I. FINDINGS				
3 and throughout, as applicable	1	CWA NPDES Permit Conditions		Remove the following term in Finding 3 and throughout, as provided in the Strikeout: "~~storm water~~"
8	3	Point Source Discharges of Pollutants	Discharges may contain waste or pollutants, but it should not be presumed that they necessarily always contain waste or pollutants. In addition, it is inappropriate to consider all storm water and non-storm water discharges point source discharges.	Revise the text as follows: "Discharges from the MS4s <u>may</u> contain waste, as defined in the CWC, and pollutants that adversely affect the quality of the waters of the state. A discharge from an MS4 is a "discharge of pollutants from a point source" into waters of the U.S. as defined in the CWA. Storm water and non-storm water discharges from the MS4s <u>may</u> contain pollutants that cause or threaten to cause a violation of surface water quality standards, as outlined in the ~~Water Quality Control Plan for the San Diego Basin~~ ~~(~~Basin Plan~~)~~. ~~Storm water and non-storm water discharges from the MS4s are subject to the conditions and requirements established in the Basin Plan for point source discharges.~~ "
11	4	Runoff Discharges to Receiving Waters	Finding 11 is inconsistent with the definition of the MS4 in 40 C.F.R. 122.26, which does not include natural rivers and streams: "(8) *Municipal separate storm sewer* means a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains): (i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management	Revise the text as follows: "11. Runoff Discharges to Receiving Waters. The MS4s discharge runoff into lakes, drinking water reservoirs, rivers, streams, creeks, bays, estuaries, coastal lagoons, the Pacific Ocean, and tributaries thereto within the eleven hydrologic units comprising the San Diego Region. Historic and current development makes use of natural drainage patterns and features as conveyances for runoff. ~~Rivers, streams and creeks in developed areas used in this manner are part of the Copermittees' MS4s regardless of whether they are natural, anthropogenic, or partially modified features. In these cases, the rivers, streams and creeks in the developed areas of the Copermittees' jurisdictions are both an MS4 and receiving water.~~ Numerous receiving water bodies and water body segments have been designated as impaired by the San

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			agency under Provision 208 of the CWA that discharges to waters of the United States; (ii) Designed or used for collecting or conveying storm water; (iii) Which is not a combined sewer; and (iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.	Diego Water Board pursuant to CWA Provision 303(d)."
15	5	Non-Storm Water and Storm Water Discharges	This is a legal argument that is contrary to the plain language of the statute, which specifically states that 'Permits for discharges from municipal storm sewers… shall require controls to reduce the discharge of pollutants to the maximum extent practicable…"402(p)(3)(B)(iii). The maximum extent practicable standard applies to storm water and non-storm water discharges.	Revise the text as follows: "~~Non-storm water discharges from the MS4s are not considered storm water discharges and therefore are not subject to the MEP standard of CWA section 402(p)(3)(B)(iii), which is explicitly for Municipal… *Stormwater Discharges* (emphasis added)" from the MS4s.~~ Pursuant to CWA 402(p)(3)(B)(ii), non-storm water discharges into the MS4s must be effectively prohibited. <u>"Permits for discharges from municipal storm sewers shall require controls to reduce the discharge of pollutants to the maximum extent practicable…" 402(p)(3)(B)(iii)."</u>
27	8	Integrated Report and Clean Water Act Section 303(d) List.		Revise the last paragraph as follows: "Implementation of the requirements of this Order <u>will</u> ~~may~~ allow the San Diego Water Board to include surface waters impaired by discharges from the Copermittees' MS4s in Category 4 in the Integrated Report for consideration during the next 303(d) List submittal by the State to USEPA."
29	9	Unfunded Mandates	Finding 29 states that the Order does not constitute an unfunded mandate under Article XIIIB, Section 6 of the California Constitution. This finding has no legal effect because the Regional Board does not have jurisdiction to determine what is a state mandate, and therefore should be deleted. The Commission on State Mandates, the agency with exclusive jurisdiction over state mandate claims, determined that multiple requirements in the 2007 San Diego MS4 Permit were unfunded state mandates. This case is currently on appeal before the Third Appellate	Delete Finding 29.

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			District (Case No. C070357). Like the 2007 Permit, the Tentative Order exceeds the requirements of federal law, and the Copermittees reserve their right to challenge permit provisions exceeding federal law in the appropriate forum.	
II. PROVISIONS				
A. Prohibitions and Limitations				
A	13	Prohibitions and Limitations	The proposed Prohibitions and Limitation provisions may be construed as stand-alone provisions that could expose the Copermittees to state and federal enforcement actions, as well as to third party actions under the federal Clean Water Act's citizen suit provisions. Consistent with the recent 9th Circuit Court of Appeal decision (NRDC v. LA County), each provision of the permit could be read separately so if provision A.2.a states that "the MS4 must not cause or contribute to a violations of a water quality standard" then that is the stand-alone provision, and the accompanying language found in A.4 (Compliance with Discharge Prohibitions) regarding compliance may be considered irrelevant. As such, a clear linkage between the compliance provisions and the prohibitions, receiving water limitations, and effluent limitations must be established.	Insert the following sentence at the end of the introductory paragraph of Provision A: "<u>The process for determination of compliance with the Discharge Prohibitions (A.1), Receiving Water Limitations (A.2), and Effluent Limitations (A.3) is defined in Provision A.4.</u>"
A.1.a (and throughout, as applicable)	13	Discharge Prohibitions	Provision A.1.a prohibits certain discharges into waters of the state. NPDES permits under the authority of the Clean Water Act regulate discharges into navigable (surface) waters. Expanding the scope of the Discharge Prohibitions to waters of the state would expand the scope of the Permit to protect groundwater. This exceeds federal requirements and would represent an unfunded mandate. Other MS4 permits in California, including the Los Angeles County MS4 permit, protect "waters of the United States."	Throughout the Permit, change "waters of the state" to "waters of the United States", where applicable (and throughout the Tentative Order). Revise the text as follows: "…in receiving waters of the <u>US</u> ~~state~~ are <u>effectively</u> prohibited…"

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A.1.a A.1.c A.2.a	13 13 13	Prohibitions and Limitations	The Discharge Prohibitions do not establish a sufficient linkage with approved compliance schedules for TMDLs that have been incorporated into the Basin Plan. TMDLs adopted within the region include a schedule to provide MS4 Copermittees the time necessary to develop and implement a plan to achieve water quality standards in impaired waters. The compliance schedules for effective TMDLs have been incorporated into Attachment E, but these schedules are not included in Provision A.1 or A.2. By not referencing TMDL schedules, these provisions could result in violations of the permit even though the implementation compliance dates have not yet passed. Without modification, the Discharge Prohibitions *conflict* with TMDL compliance schedules. Language should be included to clarify that in instances where a TMDL is in place, or a TMDL is being developed, the Copermittees shall achieve compliance with these provisions as outlined in Attachment E (Specific Provisions for Total Maximum Daily Loads).	Revise A.1.a, A.1.c, and A.2.a by adding the following onto the end of each provision: "…, <u>unless such discharges are addressed by the Copermittee(s) through Provision A.1.d, A.3.b or A.4.</u>"
A.3.a, footnote 5	15	Technology Based Effluent Limitations	See comment for Finding 15.	Revise text as follows: "This does not apply to MS4 discharges which receive subsequent treatment to reduce pollutants in ~~storm water~~ discharges to the MEP…"
A.4	15	Compliance with Discharge Prohibition and Receiving Water Limitations	The Copermittees envision Water Quality Improvement Plans as the foundation for a compliance approach for the Discharge Prohibitions, RWLs, and Effluent Limitations. However, the language in Provision A does not clearly link compliance with the iterative process set forth in the Water Quality Improvement Plans. The Water Quality Improvement Plans should provide an optional mechanism to "raise the bar" with regards to the detail and quantitative analyses used to identify pollutant sources, implement BMPs to address those sources, and increase the number or size of BMPs until water quality standards are attained. However, as Provision A.4 is written, the envisioned	Revise the text as follows: "Each Copermittee must achieve compliance with Provisions A.1.a, A.1.c and A.2.a of this Order through timely implementation of <u>strategies,</u> control measures and other actions as specified in Provisions B and E of this Order, including any modifications. The Water Quality Improvement Plans required under Provision B must be designed and adapted to ultimately achieve compliance with Provisions A.1.a, A.1.c, and A.2.a, <u>and may be used for compliance determination as described in Provision B.3.a.(3).</u>

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			strategic compliance process falls short, and the Water Quality Improvement Plans do not have a meaningful linkage to Permit compliance. An unintended but significant consequence of this compliance uncertainty is that Copermittees will be faced with increased difficulty securing program funding because even substantial increases in funding would not eliminate the potential for non-compliance. The proposed approach for incorporating Water Quality Improvement Plan-based compliance option into the Permit is described in comments on Provision B.3.a.(3).	
A.4.a.(2)	15	Compliance with Discharge Prohibitions and Receiving Water Limitations	The Water Quality Improvement Plan should be responsive to new pollutants of concern if they are persistently exceeding standards and not be tied to a reactionary commitment based on a one time exceedance of a water quality objective.	Revise first sentence of Provision A.4.a.(2) as follows: "Upon a determination by either the Copermittees or the San Diego Water Board that discharges from the MS4 are causing or contributing to ~~a new~~ persistent indications of an exceedance…"
A.4.a.(2)	15	Compliance with Discharge Prohibitions and Receiving Water Limitations	See comment A.4.	Add new Provision A.4.a.(2)(c) as follows: "(c)For Copermittees who are implementing an Water Quality Improvement Plan pursuant to Provision B.2, the updated Water Quality Improvement Plan should provide reasonable assurance the updated strategies are expected to address the new exceedance(s)."
A.4.c	16	Compliance with Discharge Prohibitions and Receiving Water Limitations		Remove Provision A.4.c.
B. Water Quality Improvement Plans				
B	17	Water Quality Improvement Plans	The Copermittees request a revision to the Water Quality Improvement Plan goal statement. A concise goal statement that is more central to MS4 permitting is requested. This goal statement provides context to several	Revise the goal statement in the second sentence as follows: The goal of the Water Quality Improvement Plans is to

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			requested revisions to subsequent provisions.	~~protect, preserve, enhance,~~ 1) effectively prohibit non-storm water discharges into the MS4s, 2) reduce pollutants in discharges from the MS4s to the MEP, and ~~restore the~~ 3) support the attainment and reasonable protection, preservation, and enhancement of water quality and designated beneficial uses of waters of the state. This goal will be accomplished through an adaptive planning and management process that identifies the highest priority water quality conditions within a watershed and implements strategies through the jurisdictional runoff management programs to achieve improvements in the quality of discharges from the MS4s and receiving waters.
B	17	Water Quality Improvement Plans	The Copermittees request the Regional Board use Water Quality Improvement Plans to fully integrate watershed planning, BMP implementation, and Permit compliance determination and have proposed an approach for Water Quality Improvement Plans to form the basis for compliance as described in the comment below regarding the addition of a new subsection to B.3. Additional language is requested in the opening paragraph to Provision B to provide a linkage to the proposed revision to Provision B.3.	Add the following sentence at the end of the first paragraph in Provision B: Therefore, implementation of the Water Quality Improvement Plans also provides the basis for complying with Provisions A.1, A.2 and A.3, as described in Provision B.3.a.(3).
B.1	17	Watershed Management Areas	Allow Riverside County Copermittees to enroll and for a full watershed scale public process in the development of the Water Quality Improvement Plan for the Santa Margarita River Watershed.	Add an additional paragraph to B.1 that reads: "Development of the Water Quality Improvement Plan for the Santa Margarita River Watershed Management Area shall commence upon notification of coverage of the Riverside County Copermittees under this Order. Until this time, the County of San Diego shall use the water quality priorities in the Santa Margarita River Watershed Urban Runoff Management Plan, developed pursuant to Order No. R9-2007-0001, to guide implementation of Provisions D and E within its jurisdiction."
B.2.d.(1)(e) and B.2.d.(3)	21-22	Identification of MS4 Sources of	The Copermittees do not have jurisdiction to control MS4 discharges outside of their respective MS4s.	Delete Provisions B.2.d.(1)(e) and B.2.d(3).

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		Pollutants and/or Stressors		
B.2.e	23	Numeric Goals and Schedules	The requirement that "Final dates for achieving final numeric goals must not initially extend more than 10 years..." may be broadly misinterpreted as currently written with major implications. Based on conversations with Regional Board staff, it is understood that goals can take a number of forms and the "10 year" requirement is not intended as a requirement to attain all Basin Plan water quality standards within 10 years. However, to ensure this requirement is not misinterpreted by third parties, language should be added to make this clarification.	Add a footnote Provision B.2.e., as follows: "Achievement of final numeric goals within 10 years represents progress towards attainment of water quality standards, but is not a requirement to fully attain all applicable water quality standards or all priority receiving water conditions within 10 years." Revise text as follows: "… Numeric goals must be used to support Water Quality Improvement Plan implementation and measure progress towards addressing the highest priority water quality conditions identified under Provision B.2.c. Numeric goals are not enforceable compliance standards, effluent limitations, or receiving water limitations."…
B.3	24	Water Quality Improvement Strategies		Revise the text as follows: "…by ~~preventing or eliminating~~ effectively prohibiting non-storm water discharges to ~~and from~~ the MS4, reducing pollutants in ~~storm water~~ discharges from the MS4 to the MEP…"
B.3.a.	24	Water Quality Improvement Strategies and Schedules	The Copermittees request the Regional Board use Water Quality Improvement Plans to fully integrate watershed planning, BMP implementation, and Permit compliance determination. The Copermittees propose an optional compliance mechanism that Copermittees could chose to follow. To follow this optional path the Water Quality Improvement Plans would be required to demonstrate via a scientific analyses that the number and type of strategies and	To incorporate an option for Water Quality Improvement Plan-based compliance, add a new Provision "B.3.a.(3)" as follows: (3) Copermittees may elect to develop their Water Quality Improvement Plan to serve as an iterative, implementation-based compliance mechanism for the discharge prohibitions (A.1), receiving water limitations (A.2), and effluent limitations (A.3). To utilize the Water

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			activities to be implemented will attain discharge prohibitions, receiving water limitations, and effluent limitations. The analyses would be detailed in an optional *Reasonable Assurance Analysis*. The types of analyses that would be included a Reasonable Assurance Analysis – including efforts to quantify stormwater pollutant fate and transport and strategy/activity effectiveness – are beyond conventional stormwater planning efforts, and thus the Reasonable Assurance Analysis should be optional and not required. In order to qualify for the Water Quality Improvement Plan-based compliance mechanism, a Water Quality Improvement Plan would be [1] developed using rigorous, quantitative analyses to provide reasonable assurance that BMPs are expected to attain water quality standards and [2] sufficiently detailed in terms of the strategies and activities that will be implemented so that an quantitative analysis can be conducted. The proposed approach would allow the Regional Board to measure compliance in a clear, specific, measurable, and enforceable manner. In order to a Copermittee to qualify for the optional, Water Quality Improvement Plan-based compliance mechanism, the Copermittee would be required to [1] notify the Regional Board of its intent to pursue the optional compliance mechanism, [2] submit a *Reasonable Assurance Analysis*, , and [3] provide a sufficiently detailed implementation schedule.	Quality Improvement Plan-based compliance option, Copermittees shall conduct a Reasonable Assurance Analysis. The objective of the Reasonable Assurance Analysis shall be to demonstrate the strategies and activities of the Water Quality Improvement Plan will ultimately result in attainment of the discharge prohibitions (A.1), receiving water limitations (A.2), and effluent limitations (A.3). In order for a Copermittee to utilize the Water Quality Improvement Plan-based compliance option, the Regional Board Executive Officer must determine the following conditions are met: (1) The Copermittee requests that the Water Quality Improvement Plan be approved as the basis for compliance with the discharge prohibitions (A.1), receiving water limitations (A.2), and/or effluent limitations (A.3) in the letter of submittal to the San Diego Water Board as described in Provision F.1.(a); AND (2) The submitted Water Quality Improvement Plan includes a Reasonable Assurance Analysis that demonstrates that the strategies and activities in the Water Quality Improvement Plan will attain the applicable discharge prohibitions (A.1), receiving water limitations (A.2), and/or effluent limitations (A.3); AND (3) The submitted Water Quality Improvement Plan includes a schedule as outlined in Provision B.3.b that provides sufficient detail regarding the strategies and activities to be implemented to allow the Regional Board to use the schedule for compliance determination in a clear, specific, measurable, and enforceable

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				manner. If a Water Quality Improvement Plan-based compliance option is approved by the Regional Board Executive Officer, then in instances when the discharge prohibitions (A.1), receiving water limitations (A.2), and/or effluent limitations (A.3) are not met, the implementation of the strategies and activities contained in the Water Quality Improvement Plan will be used for determination of compliance with Provision A. That is, any determination of a Copermittee's compliance with Provision A shall be based on the following conditions: (1) The strategies and activities of the Water Quality Improvement Plan are implemented per the approved schedule outlined pursuant to Provision B.3.b and adapted pursuant to Provisions B.5, F.1, and F.2; AND (2) If exceedances persist notwithstanding implementations of the strategies and activities in the approved Water Quality Improvement Plan, then Responsible Copermittees revise the Water Quality Improvement Plan pursuant to Provision A.4.a, and implement the revised Water Quality Improvement Plan including additional or alternative activities per the schedule submitted with the revised Water Quality Improvement Plan. For cases when applicable discharge prohibitions (A.1), receiving water limitations (A.2), or effluent limitations (A.3) are not attained during the time period between a Copermittee's notification of intent to utilize a Water Quality Improvement Plan-based compliance option, pursuant to Provision F.1.(a), and Regional Board Executive Officer approval of the submitted Water Quality

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				Improvement Plan, determination of a Copermittee's compliance with Provision A shall be based on the following conditions: (1) All deadlines for development of a Water Quality Improvement Plan pursuant to Provision F.1.(a) and (b) are met; AND (2) The Water Quality Improvement Plan ultimately receives final approval.
B.5.a	25	Re-Evaluation of Priority Water Quality Conditions	The proposed revisions to Provision B.5 are intended to add a link with jurisdictional implementation efforts and to clarify receiving water conditions.	Revise first paragraph of B.5.a. as follows: "The priority receiving water quality conditions, and numeric goals and corresponding schedules, included…"
B.5.b.(2)	27	Adaptation of Strategies and Schedules		Revise the text as follows: "…reductions of non-storm water discharges to ~~and from~~ each Copermittee's MS4…"
B.5.b.(3)	27	Adaptation of Strategies and Schedules	See comment for Finding 15.	Revise the text as follows: "…reductions of pollutants in ~~storm water~~ discharges from each Copermittee's MS4…"
C. Action Levels				
C.1, footnote 7	28	Non-Storm Water Action Levels	Clarify that NALs are not enforceable compliance points.	Revise text as follows: "NALs are not considered ~~by the San Diego Water Board~~ to be enforceable limitations.
C.1.a C.1.b C.2.a C.2.b	28 30 31 32	Action Levels	The Draft Order in Provision B states that the goal of the Water Quality Improvement Plan is to identify the highest water quality priorities within a watershed and implement strategies to achieve improvements in the quality of discharge and receiving waters. Furthermore in Provision B.2.d the Copermittees are required to develop and use *interim and final numeric targets/goals* to measure progress towards the protection/enhancement of the receiving waters and beneficial uses. The choice of the target/goals of the watershed may be biological, chemical, or physical based	Revise the following Provisions, as indicated: C.1.a:"The following NALs must be incorporated, if the Copermittees do not establish numeric action levels within the Water Quality Improvement Plan based on watershed priorities: " C.1.b: "~~If not identified in Provision C.1.a~~, NALs must be identified, developed, and incorporated in the Water

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			and may include multiple criteria and/or indicators. The permit now provides a clear linkage between Provision B and Provision C and states that the Water Quality Improvement Plan should guide the customization of the NALs/SALs to meet the highest water quality priorities in a given watershed and that NALs/SALs will be used to assist Copermittees in reaching the goals specified in the Water Quality Improvement Plan. Although action levels will be used for several different purposes, the action levels defined in Provision C.1.a and C. 2.a are chemically based and may be in conflict with the selected watershed metrics. As an example, if the watershed metric is improved IBI scores for a water body, then NALs and SALs associated with water chemistry are unlikely to be the best metric to evaluate progress towards improving IBI scores or for assessing our implementation efforts. Thus, the chemically based NALs/SALs may direct resources away from the watershed priorities. Since Provision C indicates that there are three different purposes for the action levels, the permit should recognize that the action levels for each permit provision (B.4, D.4.a, and/or E.2) may be based on different constituents, metrics, and/or may be different values. A revision of the language in C.1.a and C.2.a stating that Tables C-1 to C-5 are only applicable if the Copermittees do not establish numeric action levels to support the Water Quality Improvement Plan would allow for the determination of appropriate numeric NALs and SALs per the intent of each permit provision.	Quality Improvement Plans…." C.2.a: "The following SALs for discharges of storm water from the MS4 must be incorporated, <u>if the Copermittees do not establish numeric action levels within the Water Quality Improvement Plan based on watershed priorities: </u> " C.2.b: "~~If not identified in Provision C.1.a~~, SALs must be identified, developed, and incorporated in the Water Quality Improvement Plans…."
C.1.a.(2) Table C-3	29	Non-Storm Water Action Levels	Refer to the California Toxics Rule (CTR) instead of including equations in the notes of Table C-3. The note to the table incorrectly sets the chronic CTR standard (Criterion Continuous Concentration; CCC) as both the	Revise the Table C-3 Notes as follows: * Action levels developed on a case-by-case basis (see below)

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			monthly average (AMAL) and daily maximum (MDAL) NALs. However, the acute CTR standard (Criterion Maximum Concentration; CMC) should be used instead of the chronic standard for the daily maximum. Another important reason to include the equations by reference is that the equations in the notes of Table C-3 also do not take into account that in some cases a site-specific water effects ratio may apply, which is considered in and allowed by the California Toxics Rule.	** Action levels developed on a case-by-case basis (see below), but calculated criteria are not to exceed Maximum Contaminant Levels (MCLs) under the California Code of Regulations, Title 22, Division 4, Chapter 15, Article 4, Provision 64431 The Cadmium, Copper, Chromium (III), Lead, Nickel, Silver and Zinc NALs for MS4 discharges to freshwater receiving waters will be developed on a case-by-case basis because the freshwater criteria are based on site-specific water quality data (receiving water hardness). For these priority pollutants, refer to ~~the following~~ 40 CFR 131.38.b.2 for details.~~) will be required:~~ ~~Cadmium (Total Recoverable) = exp(0.7852[ln(hardness)] - 2.715)~~ ~~Chromium III (Total Recoverable) = exp(0.8190[ln(hardness)] + 0.6848)~~ ~~Copper (Total Recoverable) = exp(0.8545[ln(hardness)] - 1.702)~~ ~~Lead (Total Recoverable) = exp(1.273[ln(hardness)] - 4.705)~~ ~~Nickel (Total Recoverable) = exp(.8460[ln(hardness)] + 0.0584)~~ ~~Silver (Total Recoverable) = exp(1.72[ln(hardness)] - 6.52)~~ ~~Zinc (Total Recoverable) = exp(0.8473[ln(hardness)] + 0.884)~~
C.2, footnote 9	31	Storm Water Action Levels	Clarify that SALs are not enforceable compliance points.	Revise text as follows: "SALs are not considered ~~by the San Diego Water Board~~ to be enforceable limitations.
D. Monitoring and Assessment Requirements				
D.1	33	Receiving Water	About one year of lead time is needed to plan and secure	The Copermittees must develop and conduct a program to

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		Monitoring Requirements	the resources and contracting mechanisms to conduct monitoring programs. If the Order is adopted on March 1, 2013, then the Water Quality Improvement Plan would be submitted to the Regional Board by September 2014. The Water Quality Improvement Plan could be accepted by the Regional Board as early as 60 days after submittal (by November 2014) and as late as 6 months after submittal (by February 2015). Budgeting for the next fiscal year usually begins in October. Without an approved Water Quality Improvement Plan, it will be difficult to plan and secure the necessary funding. Therefore, to accommodate budgeting cycles, transitional monitoring should be required until the implementation monitoring schedule proposed in the Water Quality Improvement Plan is approved. Allowing this flexibility will allow time for the necessary resources to be secured by the WMA. Moreover, individual Water Quality Improvement Plans may likely be adopted at different times by the Regional Board and incorporating the implementation schedule of monitoring within the Water Quality Improvement Plan will increase the efficiency of the process.	monitor the condition of the receiving waters in each Watershed Management Area during dry weather and wet weather. Following acceptance of the Water Quality Improvement Plans <u>and schedule for implementation of monitoring</u> for each Watershed Management Area, the Copermittees must conduct long-term receiving water monitoring during implementation of the Water Quality Improvement Plan to assess the long term trends and determine if conditions in receiving waters are improving. This change is incorporated in *Proposed Changes* to Provision D below:
D.1.a	33	Transitional Receiving Water Monitoring	See comment D.1	Until the monitoring requirements <u>and implementation schedule for monitoring</u> of Provisions D.1.b-e are incorporated into a Water Quality Improvement Plan that is accepted by the San Diego Water Board pursuant to Provision F.1, the Copermittees must conduct the following receiving water monitoring in the Watershed Management Area:
D.1.a.(1)	33	Transitional Receiving Water Monitoring	The Copermittees request removal of Coastal Storm Drain Monitoring Program from Transient Receiving Monitoring. The San Diego Copermittees' Report of Waste Discharge (2011) demonstrated a limited relationship (less than 2 %) between receiving water concentrations/exceedances and storm drain concentrations/exceedances in dry weather. <u>Duplicative Effort</u> - Many storm drain outfalls/receiving waters will be monitored as part of the Bacteria TMDL or the	Revise Provision D.1.a.(1) as follows: (1) Continue the receiving water monitoring programs required in Orders Nos. R9-2007-0001 <u>(Attachment A, Provision II. A. 1-5),</u> R9-2009-0002, and R9-2010-0016;

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			transient MS4 Outfall Program in D.2.a.(2).	
D.2	42	MS4 Outfall Discharge Monitoring Requirements	See comment D.1.	Revise Provision D.2. as follows: "The Copermittees must develop and conduct a program to monitor the discharges from the MS4 outfalls in each Watershed Management Area during dry weather and wet weather. Following acceptance of the Water Quality Improvement Plans and schedule for implementation of monitoring for each Watershed Management Area…"
D.2.a	42	Transitional MS4 Outfall Discharge Monitoring	See comment D.1.	Revise Provision D.2.a. as follows: "Until the monitoring requirements and schedule for implementation of monitoring of Provisions D.2.b-c are incorporated into a Water Quality Improvement Plan that is accepted by the San Diego Water Board pursuant to Provision F.1
D.2.a.(2)	43	Transitional Dry Weather MS4 Outfall Discharge Field Screening Monitoring	See comment D.1.	Revise Provision D.2.a.(2) as follows: "Until the monitoring requirements and the monitoring implementation schedule described in ~~of~~ Provision D.2.b are incorporated into a Water Quality Improvement Plan that is accepted by the San Diego Water Board pursuant to Provision F.1…"
D.2.a.(2)(a)	43-44	Transitional Dry Weather MS4 Outfall Discharge Field Screening Monitoring Frequency	To clarify that the maximum number of outfall inspections required annually per Copermittee is 500, per the limit on the number of major MS4 outfalls for field screening specified in CFR40CFR$122.26(d)(2)(iv)(D)(6) - "in large municipal separate storm sewer systems, no more than 500 cells need to have identified field screening points"	Revise Provision D.2.a.(2)(a) as follows: (a) Transitional Dry Weather MS4 Outfall Discharge Field Screening Monitoring Frequency Each Copermittee must field screen the MS4 outfalls in its inventory developed pursuant to Provision D.2.a.(1) as follows: (i) For Copermittees with less than 125 major MS4 outfalls that discharge to receiving waters within a Watershed Management Area, at least 80 percent of the outfalls must be visually inspected two times per year during dry weather conditions. For Copermittees with jurisdiction in more than one WMA, this requirement is limited to 500 inspections annually per Provision D.2.a.(2)(a)(iv).

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				(ii) For Copermittees with 125 major MS4 outfalls or more, but less than or equal to 500, that discharge to receiving waters within a Watershed Management Area all the outfalls must be visually inspected at least annually during dry weather conditions. For Copermittees with jurisdiction in more than one WMA, this requirement is limited to 500 inspections annually per Provision D.2.a.(2)(a)(iv). (iii) For Copermittees with more than 500 major MS4 outfalls that discharge to receiving waters within a Watershed Management Area, at least 500 outfalls must be visually inspected at least annually during dry weather conditions. Copermittees with more than 500 major MS4 outfalls within a Watershed Management Area must identify and prioritize at least 500 outfalls to be inspected considering the following: [a] Assessment of connectivity of the discharge to a flowing receiving water; [b] Reported exceedances of NALs in water quality monitoring data; [c] Surrounding land uses; [d] Presence of constituents listed as a cause for impairment of receiving waters in the Watershed Management Area listed on the CWA Provision 303(d) List; and [e] Flow rate. For Copermittees with jurisdiction in more than one WMA, this requirement is limited to 500 inspections annually, per Provision D.2.a.(2)(a)(iv).
D.2.a.(3)	45	Transitional Wet Weather MS4 Outfall Discharge Monitoring	See D.1	Revise Provision D.2.a.(3) as follows: "Until the monitoring requirements and the monitoring implementation schedule described in ~~of~~ Provision D.2.c are incorporated into a Water Quality Improvement Plan that is accepted by the San Diego Water Board pursuant to Provision F.1…"
D.2.a.(3)(a)	46	Transitional Wet	Reduce the number of transitional wet weather MS4 outfall	Add an additional paragraph to D.2.a.(3)(a) that reads:

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		Weather MS4 Outfall Discharge Monitoring Stations	discharge monitoring stations for the Santa Margarita River Watershed Management Area to be proportional to the area of the watershed within the County of San Diego until such time the County of Riverside Copermittees are notified of coverage. After such time, the number of wet weather MS4 outfall discharge monitoring stations will be increased to five (5) as defined in D.2.(3).(a).	"<u>The County of San Diego shall select at least two (2) transitional wet weather MS4 outfall discharge monitoring stations for the portion of the Santa Margarita River Watershed Management Area within its jurisdiction until the Riverside Copermittees are enrolled under this Order. After the Riverside Copermittees are enrolled, the Watershed Management Area Copermittees shall select at least five (5) transitional wet weather MS4 outfall discharge monitoring stations consistent with the requirements above.</u>"
D.2.a.(3)(b)	46	Transitional Wet Weather MS4 Outfall Discharge Monitoring Frequency	Reduce the frequency of sampling from annual to once during the 2-year transition period, because San Diego Copermittees have already satisfied the intent of this provision to provide baseline MS4 data. The 2007 Permit MS4 program will be completed in 2013 and characterizes baseline MS4 conditions through a statistically robust random sampling program (over 160 samples collected to date), in addition to targeted monitoring at selected sites. Collectively, the San Diego Copermittees also have performed storm event composite sampling for more than 150 wet weather MS4 discharge events to derive event mean concentrations and estimate the loading from single family residential, commercial and industrial land uses. The current First flush requirement skews the data set towards very early season conditions. Need samples representing a broader range of conditions to produce more representative data to better characterize seasonal/hydrological variation, and produce more accurate loading estimates. Logistically difficult to get equipment and personnel ready/available to monitor all sites in any one event. Propose minimum 10% of samples be First Flush, with at least one per WMA.	Revise Provision D.2.a.(3)(b) as follows: (b) Transitional Wet Weather MS4 Outfall Discharge Monitoring Frequency Each wet weather MS4 outfall discharge monitoring station selected pursuant to Provision D.2.a.(3)(a) must be monitored twice during the wet season (October 1 – April 30<u>) in the transitional period</u>. ~~One~~ <u>The</u> wet weather monitoring event<u>s shall be selected to be representative of the range of hydrological conditions experienced in the region. At least 10% of samples</u> must be conducted during the first wet weather event of the wet season<u>, to include at least one such sample in each Watershed Management Area</u>~~, and one wet weather monitoring event at least a month after the first wet weather event of the wet season.~~

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D.2.b.(2)(b)(i)	49	Non-Storm Water Persistent Flow MS4 Outfall Discharge Monitoring Frequency	The tentative order currently requires monitoring twice annually of at least 10 MS4 outfalls per WMA in which a jurisdiction is present; this adds up to 322 outfalls at one time across the region. The current requirement, as written, would significantly restrict available resources to follow-up on the top priorities - particularly in mid-size jurisdictions. The analytical requirements twice a year for mid-size cities would cost significantly more than the current dry weather program. Jurisdictions vary in size, population and thus number of major MS4 outfalls. Our recommendation is for an equitable approach: Assume 5 (unless a jurisdiction has less than 5) instead of 10 per jurisdiction within each WMA in which a jurisdiction is present. The total then equals 172 outfalls regionally instead of 322 (we proposed 69 on Sept 14th).	Revise Provision D.2.b.(2)(b)(i) as follows: "Based on the prioritization of major MS4 outfalls developed under Provision D.2.b.(2)(a), each Copermittee must identify, at a minimum, the ~~10~~ 5 highest priority major MS4 outfalls with non-storm water persistent flows that the Copermittee will monitor within each Watershed Management Area within its jurisdiction. If a Copermittee has less than 5 major outfalls within a WMA, the Copermittee shall monitor all of its major outfalls with persistent flows within that WMA."
D.2.b.(2)(e)(iii)	51	Non-Storm Water Persistent Flow MS4 Outfall Discharge Analytical Monitoring	Allow increased flexibility to developers of the Water Quality Improvement Plans to determine the appropriate analytes necessary to track and eliminate the prioritized persistent flows for specific Watershed Management Areas. Increase efficiency by increasing flexibility of analytical requirements in D.2.b & Table D-8 (p. 51): • Allow flexibility in Water Quality Improvement Plan to focus analytical testing and • After initial identification of issue, allow analytical testing reduced to key pollutants that exceed WQOs and aid in source abatement	Revise Provision D.2.b.(2)(e)(iii) as follows: (iii) During development of the Water Quality Improvement Plan, for each WMA, consider the following sources to select constituents for ~~C~~ collection of grab or composite samples to be analyzed ~~for the following constituents~~ at a qualified analytical laboratory: [a] Constituents contributing to the highest priority water quality conditions identified in the Water Quality Improvement Plan, [b] Constituents listed as a cause for impairment of receiving waters in the Watershed Management Area listed on the CWA Provision 303(d) List, [c] Constituents for implementation plans or load reduction plans (e.g. Bacteria Load Reduction Plans, Comprehensive Load Reduction Plans) developed for watersheds where the Copermittees are listed responsible parties under the TMDLs in Attachment E to this Order, [d] Applicable NAL constituents, and [e] Constituents listed in Table D-8~~, unless the~~ (iv) Copermittees may adjust the analytical list for a given WMA in successive monitoring events ~~has~~ to add or

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				eliminate constituents based on ~~historical~~ data that can demonstrate or provide justification ~~that~~ regarding the need or lack of need for analysis of ~~the~~ specific constituents ~~is not necessary~~. (~~i~~v) If the Copermittee identifies and eliminates the source of the persistent flow non-storm water discharge, analysis of the sample is not required.
D.2.c	52	Wet Weather MS4 Outfall Discharge Monitoring	Outfall monitoring is generally not an efficient or effective way of identifying sources of pollutants within urban watersheds. Source identification will be undertaken in the context of Special Studies (Provision D.3), as directed by the Water Quality Improvement Plan strategies to address specific issues in WMAs. The outfall monitoring data will be used to help design those strategies.	Revise Provision D.2.c. as follows: "c. Wet Weather MS4 Outfall Discharge Monitoring The Copermittees must perform wet weather MS4 outfall monitoring to identify ~~sources of~~ pollutants in storm water discharges from the MS4s in the Watershed Management Area, and provide information to help guide source identification efforts. The Copermittees must conduct the following wet weather MS4 outfall discharge monitoring within the Watershed Management Area: (1) Wet Weather MS4 Outfall Discharge Monitoring Stations The Copermittees may adjust the wet weather MS4 outfall discharge monitoring locations and frequencies in the Watershed Management Area, as needed, to identify ~~sources of~~ pollutants in storm water discharges from MS4s in the Watershed Management Area in accordance with the highest priority water quality conditions identified in the Water Quality Improvement Plan, provided the number of stations is at least equivalent to the number of stations required under Provision D.2.a.(3)(a). (2) Wet Weather MS4 Outfall Discharge Monitoring Frequency The Copermittees must monitor the wet weather MS4 outfall discharge monitoring stations in the Watershed Management Area at an appropriate frequency to identify ~~sources of~~ pollutants in storm water discharges from the MS4s causing or contributing to the highest priority water quality conditions identified in the Water Quality

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				Improvement Plan."
D.3.a D.3.d	54 55	Special Studies	Special studies are typically multi-year efforts, requiring planning, funding approval/allocation, implementation, and analysis. Allow for special studies to be counted that are *initiated* during the current permit term as well as under the new permit term. Otherwise, unexpected delays (e.g., due to fire storms, etc.) could result in permit noncompliance. Flexibility is needed to maintain scientific rigor of studies and to accommodate variation in hydrological conditions, etc… Several Special Studies are currently ongoing. Planning and schedule for implementation of new Special Studies will be included within each Water Quality Improvement Plan, subject to RWQCB approval. In addition, the Copermittees request the number of Special Studies be reduced from 3 to 2 per WMA and from 2 to 1 for Regional Studies in consideration of the planning period required to develop the Monitoring and Assessment Plan required as part of the Water Quality Improvement Plan.	Revise Provision D.3.a.as follows: "a. Within the term of this Order, the Copermittees must ~~develop and implement~~ initiate the following special studies: (1) At least two ~~three~~ special studies in each Watershed Management Area to address pollutant and/or stressor data gaps and/or develop information necessary to more effectively address the pollutants and/or stressors that cause or contribute to highest priority water quality conditions identified in the Water Quality Improvement Plan. (2) At least one ~~two~~ special study~~ies~~ for the San Diego Region to address pollutant and/or stressor data gaps and/or develop information necessary to more effectively address the pollutants and/or stressors that are impacting receiving waters on a regional basis in the San Diego Region. (3) One of the two ~~three~~ special studies in each Watershed Management Area may be replaced by a special study implemented pursuant to Provision D.3.a.(2)…" Revise Provision D.2.d. as follows: "d. Special studies initiated prior to the ~~acceptance of the Water Quality Improvement Plan~~ term of this Order that meet the requirements of Provision D.3.b and are ~~completed~~ implemented during the term of this Order may be utilized to fulfill the special study requirements of Provision D.3.a. "

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D.4	56-63	Assessment Requirements	Assuming that the overall purpose is to assess progress in reducing concentrations and loads of pollutants in runoff, the issue is that *annual* assessments of progress in load reductions won't provide useful information and will divert resources from program implementation, the high variability of water quality data and relatively small annual changes in loading and quality (≤10%) can't be overcome with reasonable numbers of samples. A longer assessment term is needed for meaningful analysis.	See proposed changes below.
D.4.b.(1)(a)(ii)	57	Non-Storm Water Discharges Reduction Assessments	Need to ensure timing for reporting will be compatible with completion of assessment.	Revise Provision D.4.b.(1)(a)(ii) as follows: "(ii) Based on the data collected pursuant to Provisions D.2.b, the assessments required under Provision D.4.b.(1)(c) must be included when complete in the ~~first~~ Annual Report required pursuant to Provision F.3.b.(1), and annually thereafter. "

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D.4.b.(1)(c)(iv)	58	Non-Storm Water Discharges Reduction Assessments	Proposed Dry Weather method for calculation of jurisdictional loads: extrapolate from monitored major MS4 outfalls with persistent flows to remainder of major MS4 outfalls with persistent flows collectively for each jurisdiction in each WMA.	Revise Provision D.4.b.(1)(c)(iv) as follows: "(iv) Each Copermittee must analyze the data collected pursuant to Provision D.2.b, and utilize a model or other method, to calculate or estimate the non-storm water volumes and pollutant loads collectively discharged from all the major MS4s outfalls in its jurisdiction identified as having persistent dry weather flows during the monitoring year. These calculations or estimates must be updated annually. [a] Each Copermittee must calculate or estimate: ~~[a]~~ Annual non-storm water volumes and pollutant loads collectively discharged from the Copermittee's major MS4 outfalls to receiving waters within the Copermittee's jurisdiction~~, with an estimate of the percent contribution from each known and suspected source for each MS4 outfall~~; [b] Each Copermittee must ~~Annual non-storm water volumes and pollutant loads~~ identify and quantify, where feasible, sources of non-stormwater flows ~~from areas or facilities subject to~~ not subject to the Copermittee's legal authority that are discharged from the Copermittee's major MS4 outfalls to downstream receiving waters."
D.4.b.(1)(c)(v)	58	Non-Storm Water Discharges Reduction Assessments	Loads will be calculated annually per previous comment, but strategic assessments should not be required more than once per permit term.	Revise Provision D.4.b.(1)(c)(v) as follows: "(v) Each Copermittee must review the data collected pursuant to Provision D.2.b and findings from the assessments required pursuant to Provision D.4.b.(1)(c)(i)-(iv) ~~on an annual basis~~ once per Permit term to:"
D.4.b.(2)(a)(ii)	59	Storm Water Pollutant Discharges Reduction Assessments	Need to ensure timing for reporting will be compatible with completion of assessment. Very important also to reference specifically the assessments that will occur annually (only D.4.b.(c)(i) and (ii)).	Revise Provision D.4.b.(2)(a)(ii) as follows: "(ii) Based on the data collected pursuant to Provision~~s~~ D.2.c., the assessments required under Provisions D.4.b.(2)(c)(i) and (ii) must be included when complete in the ~~first~~ Annual Report required pursuant to Provision F.3.b.(1), and annually thereafter."

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D.4.b.(2)(b)	59	Storm Water Pollutant Discharges Reduction Assessments	Proposed Wet Weather method for calculation of jurisdictional loads: extrapolate from monitored major MS4 outfalls to area-wide discharge from jurisdictional area within each WMA. Do not extrapolate wet weather data to individual (non-monitored) outfalls, as this is not technically supportable. The proposed method is a more effective means of establishing jurisdictional accountability. Per discussion with RWQCB staff, have consolidated calculation requirements in proposed language, given the added area-based jurisdictional computational approach.	Revise Provision D.4.b.(2)(b) as follows: "(b) Based on the transitional wet weather MS4 outfall discharge monitoring required pursuant to Provision D.2.a.(3) the Copermittees must assess and report the following: (i) ~~The Copermittees must a~~Analyze the monitoring data collected pursuant to Provision D.2.a.(3), and utilize a watershed model or other method, to calculate or estimate storm water volumes and pollutant loads discharged from the MS4s in each Copermittee's jurisdiction within the Watershed Management Area. The Copermittees must calculate or estimate the following for each monitoring year: [a] The average storm water runoff coefficient for each land use type within the Watershed Management Area; [b] The volume of storm water and pollutant loads discharged from each of the Copermittee's ~~major~~ monitored MS4 outfalls in its jurisdiction to receiving waters within the Watershed Management Area for each storm event with measurable rainfall greater than 0.1 inch; ~~[c] The pollutant loads discharged from each of the Copermittee's major MS4 outfalls in its jurisdiction to receiving waters within the Watershed Management Area for each storm event with measurable rainfall greater than 0.1 inch; and~~ ~~[d] The percent contribution of storm water volumes and pollutant loads discharged from each land use type within the drainage basin to each of the Copermittee's major MS4 outfalls in its jurisdiction to receiving waters within the Watershed Management Area for each storm event with measurable rainfall greater than 0.1 inch.~~

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				[c] The total flow volume and pollutant loadings discharged from the Copermittee's jurisdiction within the Watershed Management Area over the course of the wet season, extrapolated from the data produced from the monitored outfalls. (ii) Identify modifications to the wet weather MS4 outfall discharge monitoring locations and frequencies necessary to identify ~~sources~~ pollutants in storm water discharges from the MS4s in the Watershed Management Area pursuant to Provision D.2.c.(1)."
D.4.b.(2)(c)	60	Storm Water Pollutant Discharges Reduction Assessments	(c)(ii): Clarify connection to improvement of strategies and Water Quality Improvement Plans in Provision B, and eliminate technically-infeasible ranking of outfalls based on extrapolated wet weather data. (c)(iii): Loads will be calculated annually per previous comment, but strategic assessments should not be required more than once per permit term.	Revise Provision D.4.b.(2)(c) as follows: (c) Based on the wet weather MS4 outfall discharge monitoring required pursuant to Provision D.2.c the Copermittees must assess and report the following: (i) The assessments required pursuant to Provision D.4.b.(2)(b); (ii) Based on the data collected and applicable SALs in the Water Quality Improvement Plan, analyze and compare the monitoring data to the analyses and assumptions used to develop the Water Quality Improvement Plans, including strategies developed per Provision B.3, and evaluate whether those analyses and assumptions should be updated as a component of the adaptive management efforts under Provision B.5, ~~rank the MS4 outfalls in the Watershed Management Area according to potential threat to receiving water quality, and produce a prioritized list of major MS4 outfalls~~ for follow-up action to update the Water Quality Improvement Plan; (iii) The Copermittees must review the data collected pursuant to Provision D.2.c and findings from the assessments required pursuant to Provisions D.4.b.(2)(c)(i)-(ii) ~~on an annual basis~~ once per Permit term to:

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D.4.d.(2)	62	Integrated Assessment of Water Quality Improvement Plan	The integrated assessment should be based on more than one year of data, and strategic assessments should not be required more than once per permit term. Information will be shared among monitoring personnel and stormwater program managers on an ongoing basis, and monitoring data will be used to assess program needs and data gaps annually per prior provisions (c.f., Provisions D.4.b.(c)(i) and (ii), with proposed revisions above). This information will then be used in adopting annual budgets and related resource planning.	Revise Provision D.4.d.(2) as follows: (2) The Copermittees must re-evaluate the water quality improvement strategies for the Watershed Management Area during the term of this Order pursuant to Provision B.5.b. The re-evaluation and recommendations for modifications to the water quality improvement strategies and schedules must be provided in the ~~Annual Reports required pursuant to Provision F.3.b, and provided in the~~ Report of Waste Discharge pursuant to Provision F.5.b. The water quality improvement strategies for the Watershed Management Area must be re-evaluated as follows:
E. Jurisdictional Runoff Management Programs				
E	64	Jurisdictional Runoff Management Programs	Minor grammatical correction in the first sentence.	Revise the first sentence of Provision E as follows: "The purpose of this provision is for each Copermittee to implement a program to control the contribution of pollutants to and the discharges from the MS4 with<u>in</u> its jurisdiction.
E and throughout	64	Jurisdictional Runoff Management Programs	Language should reflect Clean Water Act, which requires Copermittees to effectively prohibit non-stormwater discharges <u>into the MS4</u>; and implement controls to reduce the discharge of pollutants <u>from the MS4</u> to the maximum extent practicable. Language should be used and modified, as appropriate, throughout the Permit for consistency with federal regulations.	Revise the second sentence of Provision E as follows: "The goal of the jurisdictional runoff management programs is to implement strategies that effectively prohibit non-storm water discharges to the MS4 and reduce the discharge of pollutants <u>from the MS4</u> ~~in storm water~~ to the MEP."
E	64	Jurisdictional Runoff Management Programs	Clarify that County of San Diego jurisdictional runoff management program implementation will based on the water quality priorities identified in the Santa Margarita River Watershed Urban Runoff Management Plan (required in Order No. R9-2007-0001) until a Water Quality Improvement Plan for the Santa Margarita River Watershed Management Area is approved.	Add to the first paragraph: "<u>For the Santa Margarita River Watershed Management Area, the County of San Diego shall use the water quality priorities in the Santa Margarita River Watershed Urban Runoff Management Plan (developed pursuant to Order No. R9-2007-0001) to guide jurisdictional runoff management program implementation until notified by the San Diego Water Board that the Water Quality Improvement Plan developed in conjunction with the Riverside Copermittees has been approved</u>."

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E	64	Jurisdictional Runoff Management Programs	As stated in the introduction to the Provision B (Water Quality Improvement Plans) "The purpose of this provision is to develop Water Quality Improvement Plans that guide the Copermittees' jurisdictional runoff management programs…" However, the provisions do not clearly allow for the appropriate modification of the JRMP requirements (increases, decreases, and/or replacement of activities) contained in the permit, with justification provided and subject to public input, to support adaptive management of programs.	Include language into the introductory provision that clearly indicates that the JRMP requirements contained in Provision E may be modified to allow for implementation of the JRMP consistent with the Water Quality Improvement Plan if appropriate justification is provided. In addition, add the following: Modification of Jurisdictional Runoff Management Program Requirements Modifications shall be considered and where selected, proposed according to the process in Provision B.5. Proposed modifications may increase, decrease, and/or replace minimum requirements identified in Provision E.
E.1.a.	64	Legal Authority Establishment and Enforcement		Revise text as follows: "… to control pollutant discharges ~~into and~~ from its MS4"
E.1.a.(2)	64	Legal Authority Establishment and Enforcement	Sites regulated under the Construction and Industrial General Permits are regulated elsewhere and through alternative means. Clarification is necessary for sites that are not regulated under the respective General Permits.	Revise Provision E.1.a.(2) as follows: "Control the contribution of pollutants in discharges of runoff associated with industrial and construction activity to its MS4 and control the quality of runoff from industrial and construction sites that do not~~, including industrial and construction sites which~~ have coverage under the statewide General Permit for Discharges of Storm Water Associated with Industrial Activities (Industrial General Permit) or General Permit for Discharges of Storm Water Associated with Construction Activities (Construction General Permit)~~, as well as to those sites which do not~~; "
E.1.a.(4) E.1.a.(5)	64 64	Legal Authority Establishment and Enforcement	The Copermittees do not have jurisdiction to control MS4 discharges outside of their respective MS4s and the Regional Board does not have the authority to require interagency agreements to grant such jurisdiction, particularly for those agencies not subject to the Order (Caltrans, Native American Tribes, Military installations,	Revise Provision E.1.a.(4) and E.1.a.(5) as follows: ~~"Control through interagency agreements among Copermittees the contribution of pollutants from one portion of the MS4 to another portion of the MS4;"~~ and ~~"Control, by coordinating and cooperating with other owners of the MS4 such as Caltrans, the U.S. federal~~

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			etc.).	~~government, or sovereign Native American Tribes, through interagency agreements, where possible, the contribution of pollutants from their portion of the MS4 to the portion of the MS4 within the Copermitee's jurisdiction;"~~ "Coordinate, as possible, with other agencies to minimize the contribution of pollutant discharges from the Copermittee's portion of the MS4 to portions of the MS4 under another agency's jurisdiction and from other agency's portions of the MS4 to the portion of the MS4 under the Copermittee's jurisdiction"
E.2.a	65	Non-Storm Water Discharges	The addition of "to the extent allowable by law", as referenced from the Phase II Regulations, limits Copermittees responsibility to those that they have the legal authority to implement. Copermittees cannot implement programs outside of what they have legal authority to do. In addition, some non-storm water discharges are authorized under the permit unless the Copermittee or San Diego Water Board determines they are a source of pollutants in receiving waters of the U.S., as consistent with 40 CFR 122.26(d)(2)(iv)(B)(1). Language should be provided to account for subsection E.2.a.(3).	Revise Provision E.2.a. as follows: "To the extent allowable by law, ~~E~~each Copermittee must address all non-storm water discharges as illicit discharges, where the likelihood exists that they are a source of pollutants to waters of the U.S."
E.2.a.(1)	66	Non-Storm Water Discharges	Uncontaminated pumped groundwater is the only category under this Provision that is required to be permitted under an NPDES Permit. It should be added to the initial paragraph and the remainder of the bullets should be added to E.2.a.(3), as consistent with 40 CFR 122.26(d)(2)(iv)(B)(1). No justification is provided in the fact sheet for inclusion of discharges from foundation drains, water from crawl space pumps, or from footing drains as requiring NPDES permits for the entire region. This exceeds CWA standards and there is no evidence that the Regional Board has considered the economic cost of enacting such measures under this permit. The reasoning provided in the fact sheet cites 40 CFR 122.26(d)(2)(iv)(B)(1), applicable to	Revise Provision E.2.a.(1) as follows: "Discharges of non-storm water to the MS4 from uncontaminated pumped groundwater ~~the following categories~~ must be addressed as illicit discharges where there is evidence that suggests that they are the source of pollutants to waters of the U.S., unless the discharge has coverage under NPDES Permit No. CAG919001 (Order No. R9-2007-0034, or subsequent order) for discharges to San Diego Bay, or NPDES Permit No. CAG919002 (Order No. R9-2008-0002, or subsequent order) for discharges to surface waters other than San Diego Bay: ~~(a) Uncontaminated pumped ground water;~~

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			"receiving waters of the US". Groundwater is not a receiving water of the US and, thus, the added footnote is inapplicable and inappropriate. While "the Director may include permit conditions that either require municipalities to prohibit or otherwise control any of these discharges where appropriate" (55 FR 48037), there is no justification provided to support these discharges as appropriate to require NPDES permits or that they have been "identified by the municipality [or the Regional Board] as sources of pollutants to waters of the United States". 40 CFR 122.26(d)(2)(iv)(B)(1). Water from foundation drains, crawl space pumps, and footing drains has not been identified as a source of pollutants to waters of the US and should be included under Provision E.2.a.(3). The footnote is inapplicable since groundwater is not a water of the US. In the future, based on data collected through the Monitoring Program and as part of the Water Quality Improvement Plan, Copermittees or the Regional Board may include any category of discharges determined to be a source of pollutants based on evidence that such discharge is causing or contributing pollutants to the receiving waters through the MS4. The "blanket" prohibition of the listed sources creates an unnecessary burden and potentially costly requirement that may yield little if any benefit. Footnotes 19 and 20 (E.2.a.3) provide a technical/engineering distinction between types of groundwater discharges that has no direct linkage to pollutants. Furthermore, it is unlikely that the location of the pipes and other features will be identifiable in the field or in any records; making it a burdensome investigative effort for discharges having no impact on water quality. Lastly, there are no reliable and readily available records (or a definition)	~~(b) Discharges from foundation drains[19];~~ ~~(c) Water from crawl space pumps; and~~ ~~(d) Water from footing drains[19]."~~ And delete Footnotes 19 and 20.

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			for the “highest historical groundwater table”.	
E.2.a.(2)	66	Non-Storm Water Discharges	Limit to within the Copermittee’s jurisdiction per prior comments and reword the applicable permitting portion to allow flexibility for any subsequent NPDES permits that may be issued.	Revise Provision E.2.a.(2) as follows: "Discharges of non-storm water from water line flushing and water main breaks to the MS4 must be addressed as illicit discharges unless the discharge has coverage under a valid NPDES Permit, ~~No. CAG 679001 (~~Order No. R9-2010-0003, or a subsequent order~~)~~. This includes water line flushing and water main break discharges from water purveyors under the Copermittee’s jurisdiction that have been issued a water supply permit by the California Department of Public Health or federal military installations."
E.2.a.(3)	66-67	Non-Storm Water Discharges	Non-storm water sources should be limited to anthropogenic sources of pollutants within the Copermittees jurisdiction to enable to Copermittees to address those sources in which they have control over. Also, see comment E.2.a.1.	Revise Provision E.2.a.(3) as follows: Limit the source of pollutants in receiving waters to anthropogenic sources identified as an illicit discharge within the Copermittees jurisdiction and add water from crawl space pumps. In addition, remove footnote 19.
E.2.a.(4)	67	Non-Storm Water Discharges	See comment E.2.a, as consistent with 40 CFR 122.26(d)(2)(iv)(B)(1).	Revise Provision E.2.a.(4) as follows: Add “or similar means where the Copermittee of the San Diego Water Board identifies those discharges as a source of pollutants to waters of the U.S.”
E.2.a.(4)(a)	67	Non-Storm Water Discharges	Individual buildings may require substantial structural modifications to redirect air conditioning condensation to landscaped areas. Redirection should be encouraged instead of required. In addition, air conditioning condensate should be permitted to be directed to the sanitary sewer.	Revise Provision E.2.a.(4)(a) as follows: “The discharge of air conditioning condensation ~~must~~ should be directed to landscaped areas, other pervious surfaces where feasible, or to the sanitary sewer;”
E.2.a.(4)(b)	67	Non-Storm Water Discharges	Complete removal of residential car washing activities is unrealistic and resources would be better used to educate the public. Public outreach has proven to be also effective in minimizing water and detergent use and encouraging the use of commercial facilities.	Revise Provision E.2.a.(4)(b) as follows: “~~(i)~~ The discharge of wash water must be encouraged through public outreach and education (i) to be directed to landscaped areas or other pervious surfaces where feasible, and (ii) to m~~M~~inimize the use of water for vehicle washing, use as little washing detergent and other vehicle wash products as possible, wash vehicles at commercial wash facilities, and implement other practices or behaviors that will prevent the discharge of pollutants associated with

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				individual residential vehicle washing from entering the MS4; and”
E.2.a.(4)(c)	67	Non-Storm Water Discharges		Revise Provision E.2.a.(4)(c) as follows: “Dechlorinated swimming pool discharges <u>should be managed as to:</u>”
E.2.a.(5)(a)(i)	68	Non-Storm Water Discharges	Building fire suppression system maintenance discharges should not be considered an illicit discharge if BMPs are implemented to prevent discharge of pollutants to the MS4.	Revise Provision E.2.a.(5)(a)(i) as follows: Add “<u>unless BMPs are implemented to prevent the discharge of pollutants to the MS4.</u>”
E.2.a.(7)	68	Non-Storm Water Discharges	Allowable discharges should not be treated the same as illicit discharges. This requirement will limit the Copermittee’s ability to focus on priorities identified in Water Quality Improvement Plan and focus resources that could be used for reduction of illicit discharges on authorized discharges. This standard is more stringent than that applied by the State to Areas of Special Biological Significance.	Revise Provision E.2.a.(7) as follows: “Each Copermittee must, where feasible, reduce or <u>effectively</u> eliminate non-storm water discharges listed under Provisions E.2.a.(1)-(4) into its MS4 ~~whether or not the non-storm water discharge has been identified as an illicit discharge~~, unless a non-storm water discharge is identified as a discharge authorized by a separate NPDES permit.”
E.2.b.(1)(d)	69	Prevent and Detect Illicit Discharges and Connections	MS4 and Private Outfalls should be clearly defined consistent with the Code of Federal Regulations.	Revise Provision E.2.b.(1)(d) as follows: “All known locations of <u>Major</u> MS4 outfalls and private outfalls that discharge runoff collected from areas within the Copermittee’s jurisdiction,”
E.2.b.(4)	69-70	Prevent and Detect Illicit Discharges and Connections	Spill response should be limited to waters of the U.S. and is not applicable to soil contamination under an NPDES permit.	Revise Provision E.2.b.(4) as follows: “Each Copermittee must implement practices and procedures (including a notification mechanism) to prevent, respond to, contain, and clean up any spills that may discharge into the MS4 within their jurisdiction from any source. The Copermittee must coordinate with spill response teams to prevent to the extent possible entry of spills into the MS4, and prevent contamination of <u>waters of the U.S.</u> ~~surface water, ground water, and soil~~.”
E.2.b.6	70	Prevent and Detect Illicit Discharges and Connections	Copermittees cannot control other agencies or MS4s outside their jurisdiction.	Revise Provision E.2.b.(6) as follows: "(6) Each Copermittee <u>shall</u> ~~must~~ coordinate, when necessary, with upstream Copermittees and/or entities to prevent illicit discharges from upstream sources into the MS4 within its jurisdiction."
E.2.d.(1)(d)	70	Investigate and Eliminate Illicit	Natural sources should be excluded to prevent diversion of resources for follow-ups on exceedances where the source	Revise Provision E.2.d.(1)(d) as follows: “Pollutants identified as causing or contributing to an

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		Discharges and Connections	has been determined as natural, versus focusing efforts on controllable sources.	exceedance of a NAL in the Water Quality Improvement Plan where the source has not been identified as natural; and"
E.2.d.(2)	71	Investigate and Eliminate Illicit Discharges and Connections	TCBMPs may be part of the MS4 and specifically designed to receive and contain pollutants. The language, as written, is inconsistent with the TCBMP requirements prescribed in Provision E.3.a of the proposed permit.	Revise Provision E.2.d.(2) as follows: "Each Copermittee must implement procedures to investigate and inspect portions of its MS4 that, based on reports or notifications, field screening and monitoring, or other appropriate information, indicate a reasonable potential of ~~receiving, containing, or~~ discharging pollutants to receiving waters within the Copermittees jurisdiction due to illicit discharges, illicit connections, or other sources of non-storm water."
E.2.d.(2)(c)	71		Clarify requirements for follow-up investigations on non-Storm Water flows; ensure consistency with Provision D and earlier Provision E requirements.	Revise Provision E.2.d.(2)(c) as follows: "(c) In accordance with the procedures defined in Provision E.2.d.(1), ~~E~~ each Copermittee must investigate and seek to identify the source(s) of discharges of non-storm water where flows are observed in and from the MS4 during the field screening required pursuant to Provision D.2.b.(1) as follows: (i) Obvious illicit discharges (i.e., unusual color or odor) must be immediately investigated to identify the source(s) of non-storm water discharges; "
E.2.d.(2)(d)(ix)	72	Investigate and Eliminate Illicit Discharges and Connections	The requirement to provide "a rationale for why a discharge does not pose a threat to water quality and/or does not require additional investigation" is not consistent with E.2.d.(3).	Revise Provision E.2.d.(2)(d)(ix) as follows: "(ix) If a source cannot be identified and the investigation is not continued, document the response per the requirements of Provision E.2.d.(3)~~a rationale for why a discharge does not pose a threat to water quality and/or does not require additional investigation."~~
E.2.d.(2)(e)	72	Investigate and Eliminate Illicit Discharges and Connections	Clarify requirements for follow-up investigations on non-Storm Water flows; ensure consistency with Provision D and earlier Provision E requirements. In addition, the example of "pooled" water is an unreasonable expectation based on over 10 years of dry weather monitoring data collected by the Copermittees that	Revise Provision E.2.d.(2)(e) as follows: " (e) Each Copermittee must ~~track~~ document and, if readily identifiable in accordance with Provision E.2.d.(1) procedures, seek to identify the source(s) of non-storm water discharges from the MS4 where there is evidence of non-storm water having been discharged into or from the MS4 (e.g., ~~pooled~~ flowing water), in accordance with MS4

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			clearly demonstrates the presence of pooled water in parts of the MS4 where no illegal or illicit discharges can be found after exhaustive investigations. Pooled water may result from past storm discharges due to minor imperfections or settling of the MS4 infrastructure. Flowing water should be set as the standard for investigating illicit or illegal discharges instead of pooled water.	outfall discharge monitoring requirements in Provisions D.2.a.(2) and D.2.b."
E.3	73	Development Planning	The Provisions of E.3 regulating storm water flow exceed the requirements of federal law. See <u>Virginia Department of Transportation v. U.S. EPA</u>, Civil Action No. 1:12-CV-775 (E.D. Va. Jan 3, 2013) (holding that EPA exceeded its authority under the Clean Water Act when it regulated storm water flow as a "surrogate" for pollutant discharges).	Acknowledge that affected provisions of E.3 regulating storm water flow exceed federal law.
E.3	73	Development Planning	No jurisdictional limitations are provided in this section. As a result, language in the subsections may be interpreted as expanding Copermittee requirements outside their MS4 jurisdiction. In addition how the Copermittees implement their program should be a decision left to the Copermittees. In rare instances a requirement listed within the permit may not be legal for the jurisdiction to impose upon an applicant.	Revise Provision E.3. as follows: "Each Copermittee<u>, within their respective jurisdictions and to the extent that they may lawfully impose requirements,</u> must ~~use their land use and planning authorities to~~ implement a development planning program…"
E.3.a	73	BMP Requirements for All Development Projects	Added language to clarify that not all the prescribed BMPs in Provision E.3.a. are applied to every project. These BMPs are applied as practical and feasible and as applicable based on the sites condition and nature of development.	Revise Provision E.3.a. as follows: "Each Copermittee<u>, as practical and feasible,</u> must prescribe the following BMP requirements during the planning process (i.e. prior to project approval and issuance of grading or building permits) for all development projects (regardless of project type or size), where local permits are issued, including unpaved roads and flood management projects<u>, except emergency projects implemented for the protection of persons and property</u>:"

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E.3.a.(1)(b)	74	BMP Requirements for All Development Projects	Include "unless authorized by the San Diego Water Board Executive Officer" because Hydromodification Mitigation may need to occur within receiving waters to address watershed water quality issues. This aligns with Regional Board staff suggestion that the 401 permit process should be streamlined to allow alternative compliance opportunities to mitigate and/or improve water quality conditions within a waterway. Delete "waters of the state". According to the definition of "Waters of the State," "<u>all</u> water in the State is considered to be Waters of the State". Thus the MS4 itself could be considered waters of the state and therefore structural BMPs cannot be constructed within the MS4. Therefore a stormdrain filter insert would be prevented, as would a bioretention device or basin holding state waters. The intent is to protect natural receiving waters, not to prevent the use of structural BMPs in the MS4. Removing "or waters of the state" will protect the natural receiving waters from construction and will protect the receiving waters from potential MS4 pollution.	Revise Provision E.3.a.(1)(b) as follows: "Structural BMPs must not be constructed within a waters of the U.S. <u>unless authorized by the San Diego Water Board Executive Officer</u>~~or waters of the state~~."
E.3.b.(1)(b) and E.3.b.(1)(c)	75	Definition of Priority Development Project	Since SUSMP requirements have been in effect since 2001, will start seeing some redevelopment projects that were subject to previous SUSMPS. Therefore, the 50% rule for redevelopment projects should apply only to projects that were not subject to any previous SUSMP requirements.	Revise Provision E.3.b.(1)(b) as follows: "Those redevelopment projects that create, add, or replace at least 5,000 square feet of impervious surfaces on an already developed site, and the redevelopment project is a Priority Development Project category listed under Provision E.3.b.(2)… where redevelopment results in an increase of more than fifty percent of the impervious surfaces of a previously existing development<u> and was not subject to previous Priority Project Development requirements</u>…". Add Provision E.3.b.(1)(c) as follows: <u>(c) Projects where redevelopment results in an increase of more than fifty percent of impervious surfaces of a</u>

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				previously existing development, and the existing development was subject to previous Priority Project Development Requirements, only the altered portion of development is subject to the new Priority Development Project requirements."
E.3.b.(2)	76	Priority Development Project Categories	Considerable staff resources are spent on understanding the complex set of rules in order to correctly apply them to each project. A simpler set of rules for the determination of whether or not a project is a Priority Development Project will greatly improve government efficiency and allow more focus on reviewing the project's compliance with performance requirements, thus resulting in greater overall Permit effectiveness. The proposed change is consistent with the current draft, while making the rules simpler. The definitions of each category are in Appendix C.	Delete items b through h and replace with the following: " (b) Development projects that create 5,000 square feet or more of impervious surfaces (collectively over the entire project site), and support one or more of the following uses (see Appendix C for definitions): i. Automotive repair shop ii. Restaurant iii. Parking lot iv. Street, road, highway, freeway and driveway v. Retail gasoline outlet (RGO) (c) Development projects that create 2,500 square feet or more of impervious surfaces (collectively over the entire project site) and where the project will directly discharge to an Environmentally Sensitive Area (see Appendix C for definitions)."
E.3.b.(2)(d)	76	Priority Development Project Categories	A separate Hillside Development category is unnecessary and redundant. Projects that grade on a natural slope that is twenty-five percent or greater require special consideration during the construction stage of the project, which is addressed elsewhere in the Permit. Local ordinances are very strict about adequate post-construction stabilization of hillside areas. Development projects that drain to a slope of sensitive habitat will be subject to the Environmentally Sensitive Area category. Removal of this category will facilitate the establishment of simpler rules as described above, while still keeping the same level of standards.	Delete this Provision.
E.3.b.(2)(e)	76	Priority Development Project Categories	The definition of a direct discharge has been established to mean that the project is releasing flows directly into the receiving water. If the project drains into an MS4 connection	If comment E.2.b.(2) is not incorporated, revise the last sentence of Provision E.3.b.(2)(e) as follows: "…means outflow from a drainage conveyance system

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			which serves existing developed areas before discharging to receiving water, this is not a direct discharge. Added language for clarification.	that collects runoff from the subject development or redevelopment site <u>not commingled with flows from adjacent</u> lands and terminates at or in receiving waters within the ESA."
E.3.b.(2)(g)	76	Priority Development Project Categories	This requirement was present in the prior permit; however, the residential driveways clause was added under the proposed permit. Including residential driveways as a PDP will require unnecessary, burdensome PDP process without proportional water quality benefits. Driveways experience low daily traffic trips compared to highways and roads.	If comment E.2.b.(2) is not incorporated, revise Provision E.3.b.(2)(g) as follows: "Streets, roads, highways, <u>and</u> freeways, ~~and driveways~~. This category is defined as any paved impervious surface that is 5,000 square feet or more used for the transportation of automobiles, trucks, motorcycles, and other vehicles."
E.3.b.(3)(a)	77	Priority Development Project Exemptions	The three methods listed as adequate for mitigating the minimal impacts that sidewalks, bicycle lanes and trails would have upon receiving waters should also be applied to driveways. Driveways typically have only very light vehicle usage and because they are linear it is possible to be very effective at removing pollutants and reducing runoff by techniques such as sloping the driveway toward a sufficiently sized landscape area and disconnecting from the MS4. The San Diego Model SUSMP currently has specific design parameters for controlling this type of design to ensure adequate effectiveness, and the BMP Design Manual Update that is require as part of this permit can further improve these design parameters using the latest information such as recent studies by Caltrans on the effectiveness of vegetated filter strips adjacent to major highways. The Manual's detailed design guidance on effective practices will allow an "over the counter" design review, rather than subjecting the public to unnecessarily burdensome requirements to submit the extensive technical documents that accompany more significant projects.	Add "<u>driveways</u>" to the list of project types that can qualify for this exemption.
E.3.b.(3)(b)	77	Priority Development Project Exemptions	All municipal roadway projects should only be subject to the USEPA guidance regarding Managing Wet Weather with Green Infrastructure: Green Streets.	Replace the current language in Provision E.3.b.(3)(b) as follows: <u>"Any paved impervious surface that is 5,000 square feet</u>

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			The Ventura County NPDES MS4 Permit, the Santa Ana Region permits for Orange County, San Bernardino County, and Riverside County, and the Greater Los Angeles MS4 Permit provide that streets, roads, and highways follow USEPA guidance regarding Managing Wet Weather with Green Infrastructure: Green Streets to the maximum extent practicable. Roadways are different than other development projects as there are significant constraints to implementation of BMPs that need to be considered such as limited right-of-way, utilities, geotechnical and structural concerns, street trees, parking, and fire truck access among others. The USEPA guidance considers these constraints where the PDP requirements do not. Even in new roadways implementing hydromodification requirements can disturb a significant area of land which has its own environmental impacts including changing the natural hydrology which is antithetical to the LID approach.	or more used for the transportation of automobiles, trucks, motorcycles, and other vehicles that follows the USEPA guidance regarding Managing Wet Weather with Green Infrastructure: Green Streets, or equivalent standards, to the maximum extent practicable." ~~(b) Retrofitting of existing paved alleys, streets or roads that meet the following criteria:~~ ~~(i) Must be two lanes or less; AND~~ ~~(ii) Must be a retrofitting project implemented as part of an alternative compliance project option under Provision E.3.c.(3)(b)(v) to achieve the performance requirements of Provisions E.3.c.(1) and/or E.3.c.(2) for a Priority Development Project; AND~~ ~~(iii) Designed and constructed in accordance with the USEPA Green Streets guidance.[24]~~
E.3.b.(3)(c)(ii) E.3.b.(3)(c)(iii)	77 78	Priority Development Project Exemptions	Provide more flexibility for a jurisdiction to accept other comparable certification standards. In some cases a project may be already pursuing a certification from a different organization (such as Envision or SITES) and they should be allowed to get their credits that way rather than having to additionally comply with a second set of certification requirements. In addition, specifying "structural" BMPs is unnecessary. These types of projects could meet the performance requirements using non-structural BMPs.	Revise Provisions E.3.b.(3)(c)(ii) and E.3.b.(3)(c)(iii) and add a Provision (iv) as follows: "(ii) Designed and constructed ~~to be certified~~ to meet requirements for certification under the U.S. Green Building Council (USGCB) Leadership in Energy and Environmental Design (LEED) for Homes green building certification program, receiving at least four (4) Surface Water Management credits under the Sustainable Sites category, or other locally accepted certification of equivalent effectiveness; ~~OR~~ (iii) Designed and constructed with ~~structural~~ BMPs that will achieve ~~the~~ equivalent performance to the requirements of Provisions E.3.c.(1) and E.3.c.(2) onsite, OR

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				(iv) Designed and constructed with structural BMPs that meet minimum performance standards, as outlined in the BMP Design Manual."
E.3.b.(3)(c)(iv)	78	Priority Development Project Exemptions	This exemption allows small individual residential projects to apply minimum BMPs that meet a minimum performance standards without going through the burdensome PDP review and approval process including; preparation of a full PDP study, and maintenance, verifications, and inspection of permanent treatment control BMPs. Under the current proposed language, single family residence as small as 5,000 sf may be subject to PDP requirements, and is lumped in with industrial and commercial development; The potential pollutants generated by small residential are not as significant as industrial or commercial and can be effectively reduced by effective source control and minimum permanent BMPs.	Add Provision E.3.b.(3)(c)(iv)as follows: "(iv) Designed and constructed with structural BMPs that meet minimum performance standards, as outlined in the BMP Design Manual."
E.3.b.(3)(d)(i) E.3.b.(3)(d)(ii)	78	Priority Development Project Exemptions	See comments for E.3.b.(3)(c)(ii) and E.3.b.(3)(c)(iii).	Revise Sections E.3.b.(3)(d)(i) and E.3.b.(3)(d)(ii) and add a Provision (iii) as follows: "(i) Designed and constructed ~~to be certified~~ to meet requirements for certification under the U.S. Green Building Council (USGCB) Leadership in Energy and Environmental Design (LEED) for Homes green building certification program, receiving at least four (4) Surface Water Management credits under the Sustainable Sites category, or other locally accepted certification of equivalent effectiveness; OR (ii) Designed and constructed with ~~structural~~ BMPs that will achieve ~~the~~ equivalent performance to the requirements of Provisions E.3.c.(1) and E.3.c.(2) onsite~~.~~; OR (iii) Designed and constructed with structural BMPs that

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				meet minimum performance standards, as outlined in the BMP Design Manual."
E.3.c	78	Priority Development Projects Structural BMP Performance Requirements	Water Quality Improvement Plans allow Copermittees to define priorities on a watershed basis and to tailor programs and BMPs based on the specific needs of each watershed. The structural BMP performance requirements are an example of a prescriptive one-size-fits-all approach. The sizing criteria are the same for all projects regardless of pollutant removal efficiencies, soil retention capacities, or susceptibility to erosion. Encouraging watershed-specific performance requirements to be developed within the Water Quality Improvement Plans will allow for watershed specific flexibility while providing the same level of protection needed.	Revise Provision E.3.c as follows: "In addition to the BMP requirements listed for all development projects under Provision E.3.a, Priority Development Projects must also implement structural BMPs that conform to performance requirements below. Alternatively, watershed-specific performance requirements may be developed as part of a Water Quality Improvement Plan; these requirements would replace the general performance requirements below. Watershed-specific requirements must provide at least equivalent protection as the general performance requirement below."
E.3.c.(1)(a)(ii)	78	Storm Water Pollutant Control BMP Requirements	Language should be consistent with pre-project language used in Provision E.3.c.(2)(a).	Revise Provision E.3.c.(1)(a)(ii) as follows: "The volume of storm water that would be retained onsite prior to the project ~~if the site was fully undeveloped and naturally vegetated~~, as determined using continuous simulation modeling or other techniques based on site-specific soil conditions and ~~typical native~~ vegetative cover."
Footnote 26	78	Storm Water Pollutant Control BMP Requirements	Include language to clarify that the 85th design capture volume refers to first flush and it is a particular volume that corresponds to 85 percent of all the rain events for the area.	Revise Footnote 26 as follows: "Where the Copermittees will use isopluvial maps to determine the 85^{th} percentile storm event in areas lacking rain data, the Copermittees must describe their method for using isopluvial maps in its BMP Design Manuals. The volume is a single event-based volume that occurs after an extended dry period."
E.3.c.(2)(a)	80	Hydromodification Management BMP Requirements	The Tentative Order proposed requirement to match predevelopment hydrographs (flow rates and duration) is the exception to the current hydromodification requirement found in other parts of the state. Specifically, the following permits/programs require hydromodification controls to match pre-project conditions: Region 2, Region 4, Region	Revise Provision E.3.c.(2)(a) as follows: "Post-project runoff flow rates and durations must not exceed pre-project ~~development (naturally occurring)~~ runoff flow rates and durations by more than 10 percent (for the range of flows that result in increased potential for erosion, or degraded instream habitat conditions

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			5, Region 8, Caltrans and draft Phase 2 MS4. Region's 4 MS4 permit, Order No. R4-2012-0175 was recently adopted on November 8, 2012. Thus, there is very recent precedent to use pre-project conditions as a reference for hydromodification. Additionally, requiring matching the predevelopment hydrograph may impose mitigation beyond a project's impacts. Pre-project standard is the appropriate nexus to project impacts. In the case of new development, where open land is to be converted to impervious area, the hydromodification controls are required to match the pre-project condition, which equates to the pre-development, naturally occurring, condition. In these situations the pre-development conditions were based on Natural Resources Conservation Service soil maps and existing topography and vegetation. In cases where redevelopment projects increase impervious area as compared to the existing condition, hydromodification controls were required to mitigate for the impacts of the added impervious surfaces. The San Diego Copermittees have invested considerable time and resources to develop a technically sound and defensible hydromodification management plan (HMP). The San Diego Copermittees determined, during the development of the San Diego HMP, that the flow control design criteria should be based on flow duration matching to the pre-project condition and not the pre-development condition. This determination was made based upon the following. • Prior HMP implementation precedent in the State of California, specifically in Santa Clara and Contra Costa Counties, mandated flow duration matching to the pre-project condition. • Following consultation with leading geomorphologists in	downstream of Priority Development Projects)."

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			the State of California, the San Diego Copermittees determined that in areas of significant existing urbanization the receiving streams had shown an ability to attain a new channel equilibrium based upon the developed flow conditions. • Redevelopment practices often decrease the existing site's impervious area, especially with the 2007 Low Impact Development (LID) requirements. In such cases, the post-project site impervious area contributing to the receiving stream would be smaller and, based on the improvement relative to pre-project conditions, no hydromodification requirements would be required. • The Copermittees stated a desired goal of encouraging redevelopment projects for multiple planning, economical, and water quality purposes. From a hydromodification perspective, increasing redevelopment project implementation would invariably decrease the conversion of existing open space. The Copermittees were careful to avoid implementing hydromodification requirements on beneficial redevelopment projects if the redevelopment project decreased the site impervious area as compared to existing conditions. San Diego Copermittees have worked closely with Southern California Coastal Water Research Project (SCCWRP) during the development of the HMP. SCCWRP published technical report 667, Hydromodification Assessment and Management in California, dated April 2012. This report describes the "flow-duration control standards…require that the post-project discharge rates and durations may not deviate above the pre-project discharge rates and durations by more than a specific percent…and this approach is a dramatic improvement over earlier methods."	

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			Furthermore, the Copermittees are concerned that using "pre-development (naturally occurring)" reference condition as applied to sites that are, in fact, developed would expose the Copermittees to significant litigation risk and may be unenforceable. We are concerned this would subject the Copermittees to liability under the takings clauses of the U.S. and California Constitutions and the Mitigation Fee Act because of the questionable nexus between a project's impacts on hydromodification and the hydromodification management measures in the Draft Tentative Order. When imposing a condition on a development permit, a local government is required under the federal and state constitutions to establish that the condition bears a reasonable relationship to the impacts of the project. This rule applies even to legislatively enacted requirements and impact fees or exactions.[1]Moreover, fees imposed on a discretionary ad hoc basis are subject to heightened scrutiny under a two-part test. First, local governments must show that there is a substantial relationship between the burden created by the impact of development and any fee or exaction.[2] Second, a project's impacts must bear a "rough proportionality" to any development fee or exaction.[3] Under California law, the *Nollan/Dolan* heightened scrutiny test also applies to in-lieu fees.[4] The Legislature has memorialized these requirements in the Mitigation Fee Act which establishes procedures that local governments must follow to impose impact fees.[5] Irrespective of whether the hydromodification management	

[1] Building Indus. Ass'n v. City of Patterson, 171 Cal. App. 4th 886, 898 (2009).
[2] Nollan v. California Coastal Comm'n, 483 U.S. 825, 837 (1987).
[3] *Dolan v. City of Tigard*, 512 U.S. 374, 391 (1994).
[4] *Ehrlich v. City of Culver City*, 12 Cal. 4th 854, 876 (1996).
[5] Cal. Gov't Code §§ 66000-66025.

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			requirements are implemented by legislative act or on an ad hoc basis, the Copermittees' attempt to enforce them as proposed in the Tentative Order would likely result in claims alleging unconstitutional takings of private property and violations of the Mitigation Fee Act. This is because a developer could argue that limiting hydromodification impacts of already developed property to its "naturally occurring" state would not have a legally sufficient nexus to the impact of the development project.	
E.3.c.(2)(a)(ii)	80	Hydromodification Management BMP Requirements	A stable, naturally vegetated channel is a balance of sediment supply, channel geometry, longitudinal slope, channel material and size, and type, size and cover of channel vegetation. When a concrete channel is restored it is not just a process of removing the concrete. A naturally vegetated channel must be engineered in a configuration that will not be subject to hydromodification from the existing and any future discharges that may occur in the channel. This requires a larger channel cross Provision to convey flood control peak discharges, usually a wider channel and sometimes grade control structures. These existing concrete channels are typically in urbanized areas. Since the naturally vegetated channel must be engineered to convey all flows, additional hydromodification controls in the watersheds draining to these channels would provide no benefit at significant construction and perpetual maintenance costs.	Delete Provision E.3.c.(2)(a)(ii). ~~For artificially hardened channels, analysis to identify the lower boundary must use characteristics of a natural stream segment similar to that found in the watershed. The lower boundary must correspond with the critical channel flow that produces the critical shear stress that initiates channel bed movement or erodes the toe of the channel banks.~~
E.3.c.(2)(b)	80	Hydromodification Management BMP Requirements	The current Tentative Order language as written is unclear and implies that each development project will be required to conduct studies and compensation for the loss of sediment supply specifically on site. However, the ability to compensate for the loss of sediment supply has not yet been fully researched, nor have practices yet been	Revise Provision E.3.c.(2)(b) as follows: <u>"In accordance with the BMP Design Manual, projects shall preserve or provide compensation for significant losses of sediment supply anticipated as a result of development.</u> ~~Post project runoff flow rates and durations~~

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			developed. Therefore the ability to require sediment compensation on a project by project basis is not yet validated or possible. SCCWRP technical report 667 cites that management approaches to compensate for the loss of sediment supply are necessary but "continues to prove challenging because, the effects of urban development on sediment supply in different geologic settings are not well understood and poorly represented in current models." The proposed change would allow the Copermittees to study and adapt to how sediment supply should appropriately be managed. Research may determine that sediment compensation would be addressed more appropriately on a regional or local level. The BMP Design Manual is a suitable mechanism to handle this evolving science over time, where the Copermittees can specify requirements and update the plan and practices as research advances.	~~must compensate for the loss of sediment supply due to the development project, should loss of sediment supply occur as a result of the development project."~~
E.3.c.(2)(d)(i) through (iii)	80	Hydromodification Management Exemptions	The permit should clearly reference the recently Board adopted Resolution No. R9-2010-0066, a Resolution for Approval of the Hydromodification Management Plan for the San Diego County. The SD Copermittees developed a technically sound HMP with a Technical Advisory Committee (TAC) and input from all stakeholders. This HMP has only been in effect for two years. In accordance with the adopted resolution, the SD Copermittees have embarked on a 5-year monitoring project to validate the HMP parameters and design criteria. The SD Copermittees are not aware of any current scientific data that would suggest the SD HMP is no longer effective or needs adjustment prior to the completion of their current monitoring project. It is appropriate to incorporate the approved resolution authorizing the SD HMP into the Permit and allow implementation and monitoring during this Permit cycle.	Revise Provision E.3.c.(2)(d) as follows: "(i) Discharges storm water runoff into existing underground storm drains discharging directly to water storage reservoirs, lakes, enclosed embayments, tidally influenced waters, or the Pacific Ocean; (ii) Discharges stormwater runoff into conveyance channels whose bed and bank are stabilized (e.g. concrete lined, an engineering interlocking paver, gabion system, etc.) all the way from the point of discharge to water storage reservoirs, lakes, enclosed embayments, tidally influenced waters, or the Pacific Ocean; ~~(ii)~~ (iii) Is a redevelopment Priority Development Project that meets the alternative compliance requirements of Provision E.3.c.(3)(b)(ii); or

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				~~(iii)~~ (iv) Discharges storm water runoff into other areas identified by the San Diego Water Board as exempt, including those exemptions recognized in the 2010 San Diego Hydromodification Plan, approved by the San Diego Water Board Resolution No. R9-2010-0066, from the requirements of Provisions E.3.c.(2)(a)-(b). "
E.3.c.(3)	80	Alternative Compliance to Onsite Structural BMP Performance Requirements	The proposed language allows the alternative compliance program to be optional and gives Copermittees the discretion to exercise the program if it is determined to be beneficial and practical for the municipality. The permit as currently written could create an expectation that the Copermittees manage offsite mitigation for private developments. There are many factors to be considered when administering a mitigation program, including: overhead program management and administrative costs, availability of land, long term maintenance responsibilities and costs, variability and lack of accurate cost estimates for BMP construction and maintenance costs.	Revise Provision E.3.c.(3) as follows: "(3) Alternative Compliance to Onsite Structural BMP Performance Requirements Alternative compliance is an optional program for each jurisdiction to utilize if it is determined to provide an equivalent or greater benefit to the watershed than onsite compliance. Where alternative compliance is allowed, the determination of the responsible party to execute the onsite alternative compliance is at the jurisdiction's discretion and in accordance with policies set in place in the individual jurisdiction or in coordination with other jurisdictions, agencies, or Copermittees:"
E.3.c.(3)(a)(i)	81	Alternative Compliance to Onsite Structural BMP Performance Requirements-Applicability		Revise text as follows: "…implementation of the alternative compliance option will have an equal or greater overall water quality benefit…"
E.3.c.(3)(a)(ii)	81	Alternative Compliance to Onsite Structural BMP Performance Requirements-Applicability	Stream rehabilitation projects should be designed by a biologist and/or a hydrologist. Other certified professionals may have more specific knowledge to a particular stormwater design than an engineer or architect. Other applicable certifications could include LEED, QSD, CPESC, CPSWQ, Envision, SITES, or certifications that do not currently exist but may exist in the future.	Revise Provision E.3.c.(3)(a)(ii) as follows: The alternative compliance options must be designed by a registered professional engineer, geologist, architect, biologist, hydrologist, landscape architect, or other appropriate certified professional;
E.3.c.(3)(a)(iii)	81	Alternative Compliance to Onsite Structural	To be consistent with E.3.c.(3)(a)(i) which requires alternative compliance with greater water quality benefit for the Watershed Management Area.	Revise Provision E.3.c.(3)(a)(iii) as follows: The alternative compliance options must be implemented within the same ~~hydrologic unit~~ Watershed Management

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		BMP Performance Requirements-Applicability		Area as the Priority Development Project, and preferably within the same hydrologic subarea;
E.3.c.(3)(a)(iv)	81	Alternative Compliance to Onsite Structural BMP Performance Requirements-Applicability	This language suggests that the alternative compliance must be downstream of the PDP. However, this may not be necessary if HMP improvement is needed in the upper watershed instead of the lower watershed. SCCWRP Technical Report 667 concludes that "hydromodification management should be considered in the context of an overall watershed-scale strategy that targets maintenance and restoration of critical processes in the critical locations in the watershed." However, the current language in the tentative order limits the ability to utilize alternative compliance, including using a regional BMP constructed to mitigate for increases in flow. All PDPs must treat for water quality to the MEP to prevent polluted stormwater from entering MS4 and receiving waters. (vi) and (vii) sufficiently protect the watershed as a whole. Delete this language to remove this conflict.	Delete Provision E.3.c.(3)(a)(iv). ~~Receiving waters must not be utilized to convey storm water runoff to the alternative compliance options~~
E.3.c.(3)(a)(v)	81	Alternative Compliance to Onsite Structural BMP Performance Requirements - Applicability	Without deletion this would render Alternative Compliance through E.3.c(3)(b)(v) invalid as it would mean that all runoff from a PDP must be treated by Alternative Compliance that is physically in series with the PDP and not a separate site discharging to the same watershed as described in E.3.c(3)(a)(iii).	Delete Provision E.3.c.(3)(a)(v). ~~The pollutants in storm water runoff from the Priority Development Project must be treated to the MEP by the alternative compliance options prior to being discharged to receiving waters~~
E.3.c.(3)(b)(ii)	82	Alternative Compliance Project Options	This is an exemption listed in E.3.c.(2)(d)(ii). Other locally accepted certification programs should be made available. See same comment for sections E.3.b.(3)(c) & (d)	Revise Provision E.3.c.(3)(b)(ii) as follows: "The Copermittee may ~~allow~~ exempt redevelopment Priority Development Projects ~~to comply with~~ from the hydromodification management BMP performance requirements of Provision E.3.c.(2) where the project is designed and constructed to be certified under the USGCB LEED for New Construction and Major Renovations green building certification program, or other locally accepted certification of equivalent effectiveness."
E.3.c.(3)(b)(iii)	82	Alternative	Minor clarification.	Revise Provision E.3.c.(3)(b)(iii) as follows:

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		Compliance Project Options		"The Copermittee may allow Priority Development Projects greater than 100 acres in total project size (or smaller than 100 acres in size yet part of a larger common plan of development that is over 100 acres) to comply with the onsite structural BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2)~~.~~ under ~~The Priority Development Project must comply with~~ the following conditions: _"
E.3.c.(3)(b)(iv) [b]	83	Alternative Compliance Project Options	Without this change, this language would dictate that the alternative flow control be downstream of the PDP, when the downstream area may not benefit from any HMP control. By locating areas within the watershed that are in need of hydromodification mitigation, alternative compliance can be directed to areas that will have the greatest benefit for the watershed as a whole. This is in agreement with recommendations made in the SCCWRP technical report 667 which concludes that "hydromodification management should be considered in the context of an overall watershed-scale strategy that targets maintenance and restoration of critical processes in the critical locations in the watershed."	Revise Provision E.3.c.(3)(b)(iv)[b] as follows: "The Copermittee may allow Priority Development Projects to utilize offsite regional BMPs to comply with the hydromodification management BMP performance requirements of Provision E.3.c.(2) if the offsite regional BMPs ~~have the capacity to manage the storm water flows rates and durations from the site such that the receiving waters are protected from the potential for increased erosion that would be caused if the unmanaged portion of the runoff was discharged from the site~~ <u>will have a greater overall receiving water benefit within the Watershed Management Area than implementation of the hydromodification controls onsite</u>."
E.3.c.(3)(b)(vi)	84	Alternative Compliance Project Options	Minor clarification.	Revise Provision E.3.c.(3)(b)(vi) as follows: "The channel, stream, or habitat rehabilitation project cannot be utilized for pollutant treatment ~~except~~ <u>unless constructed with an artificial wetland.</u> ~~where artificial wetlands are constructed and located upstream of receiving waters."~~
E.3.c.(3)(c)	854	Alternative Compliance In-Lieu Fee Option	Add "or" to indicate that operation and maintenance may be a separate option as indicated in E.3.c.(3)(c)(iii).	Revise Provision E.3.c.(3)(c) as follows: "The Copermittee may develop and implement an alternative compliance in-lieu fee option, individually or with other Copermittees and/or entities, as a means for designing, developing, constructing, operating and<u>/or</u> maintaining offsite alternative compliance projects under Provision E.3.c.(3)(b). Priority Development Projects allowed to utilize the alternative compliance in-lieu fee

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				option must comply with the following conditions:"
E.3.c.(3)(c)(i)	84	Alternative Compliance In-Lieu Fee Option	Minor clarification.	Revise Provision E.3.c.(3)(c)(i) as follows: "The in-lieu fee must be transferred to the Copermittee (for public projects) or an escrow account (for private projects) prior to the construction initiation date ~~constructed~~ of the Priority Development Project ~~is initiated~~."
E.3.c.(3)(c)(ii)	84	Alternative Compliance In-Lieu Fee Option	Include "operation and maintenance" since it is included in E.3.c.(3)(c)(ii)[d].	Revise Provision E.3.c.(3)(c)(ii) as follows: "If the in-lieu fee is applied to the development, design, ~~and~~ construction, operation and maintenance of offsite alternative compliance projects, the following conditions must be met:"
E.3.c.(3)(c)(ii) [b]	85	Alternative Compliance In-Lieu Fee Option	Multiple PDPs joining into an alternative compliance regional BMP will require a longer timeline in order to generate enough funding to begin the planning, design, permitting, and construction of the regional BMP. In addition, multiple permits will likely be necessary from multiple government agencies (party agreements, jurisdictional agreements, Army Corp of Engineers, 401, 404, maintenance agreements, etc), thus slowing the timeline of completion of the alternative compliance project. If the alternative compliance project must be completed within the first 4 years of the first project to fund, then the complexity or size of the project will be limited and may serve as a deterrent to the use of the alternative compliance option.	Revise Provision E.3.c.(3)(c)(ii)[b] as follows: "The offsite alternative compliance projects must be constructed as soon as possible, but no later than 8 4 years after the certificate of occupancy is granted for the first Priority Development Project that contributed funds toward the construction of the offsite alternative compliance projects, unless a longer period of time is authorized by the San Diego Water Board Executive Officer."
E.3.c.(3)(c)(ii) [c]	85	Alternative Compliance In-Lieu Fee Option	Delete redundant and ambiguous language	Delete Provision E.3.c.(3)(c)(ii)[c]. ~~The in-lieu fee for the Priority Development Project must include mitigation of the pollutant loads and increased storm water flow rates and durations that are allowed to discharge from the site before the offsite alternative compliance projects are constructed; and~~
E.3.c.(3)(c)(ii) [d]	85	Alternative Compliance In-Lieu Fee Option	A reasonable timeframe must be established to base the fee upon, however that time frame must be relevant to the type of project being constructed and its anticipated	Revise Provision E.3.c.(3)(c)(ii)[d] as follows: The in-lieu fee must ~~also~~ include the cost to operate and maintain the offsite alternative compliance projects for the

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			lifespan.	anticipated life of the constructed priority development project.
E.3.c.(3)(c)(iii)	85	Alternative Compliance In-Lieu Fee Option	Minor clarification.	Revise Provision E.3.c.(3)(c)(iii) as follows: If the in-lieu fee ~~is applied~~ applies only to the operation and maintenance of offsite alternative compliance projects that have already been constructed, the offsite alternative compliance projects must allow the Priority Development Project to comply with the onsite structural BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2).
E.3.c.(5)(a)(vi)	86	Infiltration and Groundwater Protection	Treatment for infiltration BMPs should only be required if significant pollutant levels are present.	Revise Provision E.3.c.(5)(a)(vi) as follows: "Infiltration BMPs must not be used for areas of industrial or light industrial activity, and other high threat to water quality land uses and activities as designated by each Copermittee, unless runoff does not exceed Basin Plan water quality standards or runoff is first treated or filtered to remove pollutants prior to infiltration; and"
E.3.e(1)(c)	88	Structural BMP Approval and Verification Process	When easements and agreements are publicly recorded, information is conveyed during the sale of the property. Therefore this sentence is not necessary.	Revise Provision E.3.e.(1)(c) as follows: Each Copermittee must require and confirm that appropriate easements and ownerships are properly recorded in public records~~. And the information is conveyed to all appropriate parties when there is a change in project or site ownership.~~
E.3.e.(2)(a)	89	Priority Development Project Inventory and Prioritization	Copermittees update databases on a regular basis to input new projects, track inventory, import/export data for daily activities, and pull data on an annual basis for reporting.	Revise Provision E.3.e.(2)(a) as follows: Each Copermittee must develop, maintain, and update ~~at least annually~~ regularly, a watershed-based database to track and inventory all Priority Development Projects and associated structural BMPs within its jurisdiction. Inventories must be accurate and complete beginning from January 2002 for the San Diego County Copermittees, February 2003 for the Orange County Copermittees, and July 2005 for the Riverside County Copermittees, where data is available.
E.3.e.(2)(a)(vi)	89	Priority Development Project Inventory	In some cases, corrective actions or resolutions are not needed if no violations were found. Therefore they would only be entered into the database "when applicable".	Revise Provision E.3.e.(2)(a)(vi) as follows: Corrective actions and/or resolutions when applicable.

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		and Prioritization		
E.4	90	Construction Management	The language has been updated so that the Copermittee can define which construction projects will be inventoried within its jurisdictional program. Not all jurisdictions apply permits the same way, therefore each needs the ability to address their processes in regards to construction projects. This will eliminate projects in the inventory that are issued local building or construction permits but have no ground disturbance, e.g. plumbing, electrical, mechanical, decks, patios, etc.	Add the following after the first paragraph of Provision E.4.: a. "Construction Program Management Each copermittee must define in the Jurisdictional Runoff Management Plan the following: (1) Define construction sites to be inventoried, such as sites that involve any ground disturbance or soil disturbing activities. (2) Define a process for confirming adequate construction BMP implementation for non-inventoried sites. Non-inventoried sites involve minor construction activities that are not anticipated to create storm water pollution such as interior improvements, plumbing, electrical and mechanical work. "
E.4.a.(4)	91	Project Approval Process	Language is redundant and unnecessary because applicable permits are included as an attachment of the project's SWPPP as required under the Construction General Permit.	Revise Provision E.4.a.(4) as follows: Delete language as shown: "Verify that the project applicant has obtained coverage under ~~applicable permits, including, but not limited to~~ the Construction General Permit. ~~, Clean Water Act Section 401 Water Quality Certification and Section 404 Permit, and California Department of Fish and Game Streambed Alteration Agreement.~~"
E.4.b.(1)(d)	91	Construction Site Inventory and Tracking	The anticipated completion date is often unknown and can fluctuate based on unpredictable and unforeseen circumstances. Keeping track of accurate dates in an inventory would be difficult and would not add significant value to the database. Construction Inspectors keep a close eye on the progress of projects and would not need to rely on inventory data to achieve effective stormwater management and oversight. Once a project is completed, the date can be entered into the database.	Revise Provision E.4.b.(1)(d) as follows: "The project start and ~~anticipated completion~~ completed dates;"
E.4.d.(1)(a)	93	Inspection	Minor clarification.	Revise Provision E.4.d.(1)(a) as follows:

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		Frequency		Each Copermittee must conduct inspections at all inventoried sites, including high threat to water quality sites, at an appropriate frequency for each phase of construction to ~~ensure~~ confirm the site reduces the discharge of pollutants in storm water from construction sites to the MEP, and prevents non-storm water discharges from entering the MS4.
E.4.d.(3)(c)	94	Inspection Tracking and Records	Considerable staff resources would be spent on calculating the amount of rainfall since last inspection and this information is not useful. This information would be really subjective if there is no nearby rain gauge. Instead, the current weather conditions observed during the inspection is more useful and easy data to capture.	Revise Provision E.4.d.(3)(c) as follows: ~~Approximate amount of rainfall since last inspection;~~ Weather condition during inspection;
E.5.a	95	Existing Development Inventory and Tracking	Adding the term "reasonable potential to discharge", consistent with the Clean Water Act, allows flexibility for the Copermittees to determine priorities. The term "may discharge" is too broad and will limit Copermittees ability to focus on jurisdictional and watershed priorities. The focus needs to be on significant pollutant load discharges so inspections and enforcement can actually succeed in receiving water pollutant load reductions versus spending an exhaustive amount of time and money inspecting sites that discharge no pollutant loads, but "may" discharge pollutant loads, even though unlikely to do so.	Revise Provision E.5.a. as follows: "Each Copermittee must maintain an annually updated watershed-based inventory of all the existing development that has the reasonable potential to ~~may~~ discharge a pollutant load to and from the MS4".
E.5.a.(1)(d)(vii) E.5.a.(2)(f)	96 96	Existing Development Inventory and Tracking	Mobile home parks are outside the jurisdiction of the Copermittees. They are regulated by the state.	Revise Provision E.5.a.(1)(d)(vii) as follows: ~~"Mobile home park"~~ Revise Provision E.5.a.(2)(f) as follows: "(f) ~~Identification if an area is a~~ Common Interest Areas (CIAs) / Home Owner Associations (HOAs)~~, or~~ and ~~mobile home parks~~; "
E.5.b	97	Existing Development BMP Implementation and Maintenance	See comment E.5.a.	Revise Provision E.5.b. as follows: "Each Copermittee must designate a minimum set of BMPs required for all inventoried existing development with the reasonable potential to discharge pollutant loads

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				to their MS4, including special event venues."
E.5.b.(1)(a)	97	Existing Development BMP Implementation and Maintenance	Required use of pollution prevention methods will be extremely difficult to enforce. Pollution prevention is proven to be more effective through public behavioral changes via public outreach and education.	Revise Provision E.5.b.(1)(a) as follows: "Each Copermittee must ~~require~~ promote the use of pollution prevention methods by the commercial, industrial, and municipal facilities and areas in its inventoried existing development through public outreach."
E.5.c	99	Existing Development Inspections	See comment E.5.a.	Revise Provision E.5.c. as follows: "Each Copermittee must conduct inspections of inventoried existing development that have been identified by the Copermittee as having the reasonable potential to discharge pollutant loads from their MS4 to ensure compliance with applicable local ordinances and permits, and the requirements of this Order."
E.5.c.(1)(a)(i)	99	Inspection Frequency	See comment E.5.a. The schedule for inspections should be limited to the permit term because the permit cannot require or enforce schedules beyond the term of the permit.	Revise Provision E.5.C.(1)(a)(i). as follows: "At a minimum, inventoried existing development that has been identified by the Copermittee as having the reasonable potential to discharge pollutant loads to and from their MS4 must be inspected once ~~every five years~~ during the permit term."
E.5.c.(1)(a)(v)	99	Inspection Frequency	Volunteer and patrol programs fall under the category of valid public complaints and should be clairified as such in the fact sheet. Volunteer and patrol programs may not have enforcement authority, requiring follow-up by the Copermittees. This Provision should be limited to Copermittees municipal and contract staff with some level of enforcement authority.	Revise Provision E.5.c.(1)(a)(v) as follows: "Inventoried existing development must be inspected by the Copermittee, as needed, in response to valid public complaints and findings from the Copermittee's municipal and contract staff ~~or volunteer monitoring or patrol program~~ inspections."
E.5.c.(2)(a)(i) through (iii)	100	Inspection Content	The addition of "if present" is necessary for clarification. Otherwise, it implies that an inspection must take place to observe an actual discharge which is an unpredictable event (would require inspector to be present for a long period of time waiting for such an event to take place).	Revise Provision E.5.c.(2)(a)(i) through (iii) as follows: "(i) Visual inspections of actual non-storm water discharges, if present; (ii)Visual inspections of actual or potential discharge of pollutants, if present; (iii)Visual inspections of actual or potential illicit connections, if present; and…"

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E.5.d	101	Existing Development Enforcement	Limiting language should be included for the Copermittee's jurisdiction. The existing development inventory and enforcement should be limited to development with the reasonable potential to discharge pollutants.	Revise Provision E.5.d.as follows: "Each Copermittee must enforce its legal authority established pursuant to Provision E.1 for all its inventoried existing development <u>identified by the Copermittee as having the reasonable potential to discharge pollutant loads from the MS4 within their jurisdiction</u>, as necessary, to achieve compliance with the requirements of this Order, in accordance with its Enforcement Response Plan pursuant to Provision E.6."
E.5.e	101	Strategies to Address the Highest Priority Water Quality Conditions	Resource re-allocation will assist in neutralizing costs for any channel rehabilitation/retrofit projects undertaken by the Copermittees and will have a more significant likelihood of improving water quality than monitoring.	Add: the following text to Provision E.5.e.: "<u>(4) Upon Regional Board approval and in lieu of monitoring during any given year, the Copermittees may reallocate resources originally authorized for water quality monitoring for retrofit and/or rehabilitation project(s) if those projects occur at a location where monitoring is conducted, for a maximum of two nonconsecutive years during the Permit term."</u>
E.6.b.(5)	104	Enforcement Response Approaches and Options	Criminal penalties should be limited to intentional or criminally negligent acts.	Revise Provision E.6.b.(5)(e) as follows: (5) Administrative and criminal <u>(if intentional or criminally negligent)</u> penalties; (a)
E.6.e.(1)	105	Reporting of Non-Compliant Sites	San Diego Water Board notice should be consistent with 40 CFR §122.41(l)(6) and the State of California Construction General Permit. The requirements should be 24 hour verbal notice and five day written notification	Revise Provision E.6.e.(1) as follows: "Each Copermittee must notify the San Diego Water Board in writing within ~~2 working days~~ <u>5 calendar days</u> of issuing <u>escalated</u> enforcement…"
E.7	106	Public Education and Participation		"…discharge of pollutants <u>from the MS4</u> ~~in storm water~~ to the MEP"
E.7.a.(1)	106	Public Education	There is specific emphasis on pesticides, herbicides and fertilizers. The rationale for the specificity of these topics is unclear. Given the emphasis on showing changes in water quality, education efforts should be focused on activities that address the pollutants of concern and behaviors that are tied to water quality issues. Therefore, each Copermittee, by jurisdiction and watershed, should identify, determine and prioritize the activities that address priorities consistent with Provision B.	Revise Provision E.7.e.(1) as follows: "Educational activities, public information activities, and other appropriate outreach activities intended to reduce pollutants ~~associated with the application of pesticides, herbicides and fertilizer in storm water discharges~~ <u>of concern</u> from the MS4 to the MEP<u>. Activities shall be determined and prioritized by Copermittees by jurisdiction and/or watershed (Provision B) to address the highest threats to water quality (such as pesticides, herbicides and</u>

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				fertilizers, used oil, toxic waste, etc. and to facilitate the proper management and disposal of used oil and toxic waste, etc.)…"
E.7.a.(2)	106	Public Education	There is specific emphasis on used oil and toxic material disposal. The rationale for the specificity in education topics is unclear. As stated above, Copermittees should be able to target education efforts on the pollutants and behaviors most commonly linked to the water quality issues within their respective jurisdictions and watersheds. Thus, this Provision is incorporated in the changes proposed above and would become part of E.7.a.1.	Move Provision E.7.a(2) into E.7.a(1).
F. Reporting				
F.1	109-110	Water Quality Improvement Plans	Based on the mock WQIP development process completed by stakeholders in recent months, the Copermittees have developed an alternative submittal schedule for the WQIPs. The alternative submittal schedule would provide additional information on potential BMP strategies with the first submittal (Priority Conditions and Potential Strategies), but allow for more time to develop numeric goals, detailed JRMP commitments, and Reasonable Assurance Analysis with the second submittal (Numerical Goals and Water Quality Improvement Strategies and Schedules) and approval from elected officials for final submittal (Water Quality Improvement Plan submittal). The revised timeline better reflects the schedule needed by Copermittees to develop robust WQIPs, but also provides additional information early in the process for stakeholder review. These requested changes are outlined in the comments below.	See the changed in the attached revised Permit to section F.1, as described in the comments below.
F.1.a.(1)	109	Priority Water Quality Conditions	The stakeholders' mock WQIP process has highlighted elements of the WQIP development process that could be	Revise Provision F.1.a.(1) as follows:

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			revised to better reflect the Copermittees' internal processes. For the early submittal, it is preferred to submit Priority Water Quality Conditions and Potential Strategies. Selection of specific strategies will be important, but an initial step is proposed at the 6-month mark to establish a level of understanding regarding the "menu" of options including terminology, BMP types, etc. The effort to develop numeric goals, however, will require more analyses, considering the array of pollutants and beneficial uses that will need to be considered. As such, it is requested that numeric goals be moved to the second WQIP submittal (as opposed to the first submittal). Finally, with the first submittal is when a Copermittee should express its intent to pursue an iterative, WQIP-based compliance mechanism using a Water Quality Improvement Plan with Reasonable Assurance Analysis, per our comments on Provision B.3.a.	(1) Priority Water Quality Conditions and Potential Strategies ~~Numeric Goals~~ (a) The Copermittees must implement a public participation process to solicit data and information to be utilized in the development and identification of the priority water quality conditions for the Watershed Management Area. (b) The Copermittees are encouraged to involve the public and key stakeholders as early and often as possible during the development of the priority water quality conditions and ~~numeric goals~~ potential strategies to be included in the Water Quality Improvement Plan. (c) Within 6 months after the commencement of coverage under this Order, the Copermittees must develop and submit the Water Quality Improvement Plan requirements of Provision B.2.a-d and a list of potential strategies that will be considered for the draft Water Quality Improvement Plan to the San Diego Water Board. Each Copermittee selecting the option to develop a Water Quality Improvement Plan to serve as an iterative, implementation-based compliance mechanism per Provision B.3.a.(3) must also indicate their intent to pursue the option in the submittal. The San Diego Water Board will issue a public notice and solicit public comments on the Water Quality Improvement Plan for a minimum of 60 days. (d) The Copermittees must consider revisions to ~~revise~~ the priority water quality

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				conditions ~~and~~ ~~numeric goals~~ based on public comments received and must respond to ~~and/or~~ recommendations or direction from the San Diego Water Board Executive Officer.
F.1	109 and 110	Water Quality Improvement Plans	The public comment process for the WQIP submittals will be open to a wide array of stakeholders and the Regional Board staff. There is potential that some comments may conflict with one another, and may conflict with comments provided by the Regional Board EO. The language in the Permit suggests that each comment requires a revision. Each comment should be considered, but some comments may not result in a revision. The Copermittees agree, however, that all comments from the Regional Board Executive Officer must be responded to.	Revise Provisions F.1.a.(1).(d), F.1.a.(2).(c), and F.1.b.(3) as follows: "The Copermittees must consider revisions to ~~revise~~ the priority water quality conditions ~~and~~ ~~numeric goals~~ based on public comments received and must respond to ~~and/or~~ recommendations or direction from the San Diego Water Board Executive Officer."
F.1.a.(2)	109	Water Quality Improvement Strategies and Schedules	Modifications to the second WQIP submittals are proposed, based on the stakeholders' mock WQIP development process. The commitments to implement strategies/BMPs associated with JRMPs were highlighted as a major challenge of the second WQIP submittal. The 9-month timeline does not allow sufficient time to develop JRMP commitments, particularly if an optional Reasonable Assurance Analysis will be developed. A 16-month timeline is needed for Copermittees to engage elected officials/management on the draft WQIP numeric goals and resulting WQIP commitments (strategies, activities, etc.) to meet those goals. Furthermore, as mentioned above, it is requested that numeric goals be submitted with the second WQIP submittal (as opposed to the first submittal).	Revise Provision F.1.a.(2) as follows: (2) Numeric Goals and Water Quality Improvement Strategies and Schedules (a) The Copermittees are encouraged to involve the public and key stakeholders as early and often as possible during the development of the numeric goals and water quality improvement strategies and schedules to be included in the Water Quality Improvement Plan. (b) Within ~~9~~ 16 months after the commencement of coverage under this Order, the Copermittees must develop and submit the Water Quality Improvement Plan requirements of Provisions B.2.e and B.3 to the San Diego Water Board. Each Copermittee selecting the option to develop a Water Quality Improvement Plan to serve as an iterative, implementation-based compliance mechanism per Provision B.3.a.(3) must also submit a draft Reasonable Assurance Analysis. The San Diego Water Board will issue a public notice and solicit public

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				comments on the Water Quality Improvement Plan for a minimum of 60 days. (c) The Copermittees must consider revisions to ~~revise~~ the numeric goals and water quality improvement strategies and schedules based on public comments received ~~and/or~~ and must respond to recommendations or direction from the San Diego Water Board Executive Officer.
F.1.b.(1)	110	Water Quality Improvement Plan Submittal	Based on the comment above, and to allow Copermittees at least two months to respond to comments received during the 60-day comment period on the draft WQIP and provide four months for elected officials to approve the final WQIPs and incorporated commitments (strategies, activities, etc.), a total of 24 months are requested for final WQIP submittal. In this manner, the timeline from draft WQIP development to Regional Board submittal would proceed as follows: O 16 months: Draft WQIP O 18 months: comment period ends O 20 months: revise WQIPs O 24 months: Copermittee approval of WQIPs and submit to RB The 24-month timeline is considered reasonable, as it comprises the first two years of the Permit cycle, while the remaining three years can be focused on WQIP implementation. Also, Clarify that the Santa Margarita River Water Quality Improvement Plan is not due until 18 months after the Riverside County Copermittees are covered under this order.	Revise Provision F.1.b.(1) as follows: (1) Within ~~18~~ 24 months after the commencement of coverage under this Order, the Copermittees for each Watershed Management Area must submit a complete Water Quality Improvement Plan in accordance with the requirements of Provision B to the San Diego Water Board. Each Copermittee selecting the option to develop a Water Quality Improvement Plan to serve as an iterative, implementation-based compliance mechanism per Provision B.3.a.(3) must also submit a final Reasonable Assurance Analysis. The Santa Margarita River Watershed Management Area must submit a complete Water Quality Improvement Plan in accordance with the requirements of Provision B to the San Diego Water Board 18 months after the Riverside Copermittees are covered under this Order. The San Diego Water Board will issue a public notice and solicit public comments on the Water Quality Improvement Plan for a minimum of 30 days.
F.1.b	109	Water Quality Improvement Plan	For WQIP implementation to be feasible, Copermittees must have at least one full fiscal year budgeting cycle within	Add Provision F.1.b.(5) as follows:

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		Submittal	which to seek additional funding to implement the WQIP from our governing bodies (i.e., City councils and County supervisors).	(5) Copermittees must commence with implementation of the Water Quality Improvement Plan no later than the fiscal year (July 1) following San Diego Water Board approval of the Water Quality Improvement Plan.
F.3.b.(1)	112	Annual Reports	The Annual Report for monitoring and assessment programs typically requires seven months to prepare. Lead time is needed to plan and secure the resources and contracting mechanisms to conduct monitoring programs. Therefore, If the Order is adopted on March 1, 2013, then the Water Quality Improvement Plan would be submitted to the SDRWQCB by September 2014. The Water Quality Improvement Plan could be accepted by SDRWQCB as early as 60 days after submittal (November 2014). This would then require the first Annual Monitoring and Assessment Report to be due on January 30, 2015. This report would only include one year of transitional monitoring instead of two. To rectify this, modify the reporting deadline such that it is the following January 31st of the conclusion of the monitoring season of September 30th.	Revise Provision F.3.b.1 as follows: "(1) The Copermittees for each Watershed Management Area must submit an Annual Report for each reporting period no later than January 31 of the following year. The annual reporting period consists of two periods: 1) July 1 to June 30 of the following year for the jurisdictional runoff management programs, 2) October 1 to September 30 of the following year for the monitoring and assessment programs. The first Annual Report must be prepared for the reporting period beginning July 1 after commencement of coverage under this Order, and upon San Diego Water Board determination that the Water Quality Improvement Plan meets the requirements of this Order to June 30 in the following year for the jurisdictional runoff management programs.~~,~~The first Annual Report must be prepared for the reporting period beginning 50 days after adoption of this Order and the January 31st following the first September 30th (conclusion of monitoring season) after the San Diego Water Board determines that the Water Quality Improvement Plan meets the requirements of this Order ~~September 30 in the following year~~ for the monitoring and assessment programs. Annual Reports must be made available on the Regional Clearinghouse required pursuant to Provision F.4. Each Annual Report must include the following:"
F.3.b.(3)	113	Annual Reports	Originators of data are legally responsible for their data and should enter the data into CEDEN. It is not always possible for Copermittees to verify the veracity or quality of third party data. The quality control data requirements of CEDEN do not easily allow third parties to successfully enter data	Revise Provision F.3.b.3.e as follows: "(3) Each Copermittee must provide any data or documentation utilized in developing the Annual Report upon request by the San Diego Water Board. ~~Any~~ Copermittee monitoring data utilized in developing the

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			without the associated detailed laboratory QA/QC data, detailed knowledge of the field protocols employed, and the ability to verify SWAMP comparability. There are also often difficulties associated with the practical aspects of data formatting to meet the requirements of the CEDEN data checker; these issues could be very difficult or impossible to resolve with third party data. The draft requirement would likely discourage Copermittees from seeking out third party data sets, as Copermittees would be in violation of the Permit if data could not readily be uploaded to CEDEN.	Annual Report must be uploaded to the California Environmental Data Exchange Network (CEDEN).[32] Any Copermittee monitoring and assessment data utilized in developing the Annual Report must be provided on the Regional Clearinghouse required pursuant to Provision F.4."
F.3.c	114	Regional Monitoring and Assessment Report	This report appears to be duplicative with the Integrated Assessment of Water Quality Improvement Plan (Provision D.4.d) that is also due with the Report of Waste Discharge. Please clarify the intent of these reports and if the same modify accordingly.	Delete Provision F.3.c. ~~a. REGIONAL MONITORING AND ASSESSMENT REPORT~~ ~~(1) The Copermittees must submit a Regional Monitoring and Assessment Report no later than 180 days in advance of the expiration date of this Order. The Regional Monitoring and Assessment Report may be submitted as part of the Report of Waste Discharge required pursuant to Provision F.5.b. The Copermittees must review the receiving water and MS4 outfall discharge monitoring data collected pursuant to Provisions D.1 and D.2, and findings from the assessments required pursuant to Provision D.4, to assess the following:~~ ~~(a) The beneficial uses of the receiving waters within the San Diego Region that are protected or must be restored;~~ ~~(b) The progress toward restoring impacted beneficial uses in the receiving waters within the San Diego Region; and~~ ~~(c) Pollutants or conditions of emerging concern that may impact beneficial uses in the receiving waters within the San Diego Region.~~ (2) ~~The Regional Monitoring and Assessment Report must include recommendations for improving the implementation and assessment of the Water Quality Improvement Plans and jurisdictional runoff~~

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				~~management programs.~~ (3) ~~Each Copermittee must provide any data or documentation utilized in developing the Regional Monitoring and Assessment Report upon request by the San Diego Water Board. Any monitoring and assessment data utilized in developing the Regional Monitoring and Assessment Report must be provided on the Regional Clearinghouse required pursuant to Provision F.4.~~
F.3.c.(3)	114	Regional Monitoring and Assessment Report	[*Applies if provision not stricken per prior comment:*] Originators of data are legally responsible for their data and should enter the data into CEDEN. It is not always possible for Copermittees to verify the veracity or quality of third party data. The quality control data requirements of CEDEN do not easily allow third parties to successfully enter data without the associated detailed laboratory QA/QC data, detailed knowledge of the field protocols employed, and the ability to verify SWAMP comparability. There are also often difficulties associated with the practical aspects of data formatting to meet the requirements of the CEDEN data checker; these issues could be very difficult or impossible to resolve with third party data. The draft requirement would likely discourage Copermittees from seeking out third party data sets, as Copermittees would be in violation of the Permit if data could not readily be uploaded to CEDEN.	If Provision F.3.c.(3) is not removed, revise Provision F.3.c.(3) as follows: "(3) Each Copermittee must provide any data or documentation utilized in developing the Regional Monitoring and Assessment Report upon request by the San Diego Water Board. Any monitoring and assessment data <u>collected by Copermittees</u> ~~utilized~~ in developing the Regional Monitoring and Assessment Report must be provided on the Regional Clearinghouse required pursuant to Provision F.4."
F.4	115	Regional Clearinghouse	The Copermittees require language clarification that the regional clearinghouse may be maintained by another agency.	Add the following footnote to the first paragraph of Provision F.4: "<u>The Copermittee may elect to develop and maintain the clearinghouse(s) provided by other Copermittees or agencies.</u>"
F.5	116-117	Report of Waste Discharge	See comment F.4.	Add similar language from F.4 to a footnote.
G. Principal Watershed Copermittee Responsibilities				
G	118	Principal Watershed	Coordinating and developing, with the other Copermittees, the requirements of Provisions F.3.c, F.4, and F.5.b of this	Remove requirement that Principal Copermittee can only be Principal Copermittee for 2 watersheds and clarify that

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		Copermittee Responsibilities	Order.	all Copermittees have some level of commitment, not just the Principal Watershed Copermittee.
H. Modification of Programs				
H	119	Modification of Programs	Modifications of programs are allowed under the Water Quality Improvement Plan as part of the iterative process and adaptive management. Language should be added to that effect or there may be annual amendments to the Order.	Revise Provision H.3. as follows: "Proposed modifications <u>outside of the Water Quality Improvement Plan process</u> that are not minor require amendment of this Order in accordance with this Order's rules, policies, and procedures."
H	119	Modification of Programs	The reopener for the Project I Beaches and Creeks Bacteria TMDL is scheduled to fall within the term of this Permit (April 2016). This TMDL is a major component of TMDL requirements incorporated into this Permit, and should be acknowledged in Provision H. Other TMDLs may be reopened during this Permit as well. The Regional Board should express a good faith effort to revise this Order based on the revised TMDL requirements.	Add Provision H.5, as follows: <u>5. The San Diego Water Board may re-open and modify this order at any time prior to its expiration, after opportunity for public comment and a public hearing, if the Basin Plan Amendments for any of the TMDLs in Attachment E are revised by the San Diego Regional Board. Should a TMDL Basin Plan Amendment be revised and adopted by the Regional Board, then the Regional Board will re-open this Order as soon as possible to update the TMDL requirements in Attachment E to reflect the revised Basin Plan Amendment.</u>
I. Standard Permit Provisions and General Provisions				
			N/A	None.
Attachment A. Discharge Prohibitions				
			N/A	None.
Attachment B. Standard Permit Provisions and General Provisions				
Attachment B	B1-B5	Standard Permit Provisions and General Provisions	This attachment incorporates the standard NPDES permit provisions as identified in 40 CFR 122.41. Although correctly transposed from the regulations the provisions are obviously developed for a traditional point source permit (i.e. wastewater permit). As such there are a number of standard provision that pose challenges to the Copermittees to comply with. Clarification is requested on a number of the provisions.	See specific changes noted below.
Attachment B;	B-7	Bypass	This provision requires the Copermittees to notify the	Delete this provision.

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1.m			Regional Board whenever an anticipated or unanticipated bypass will occur. Given the nature of storm events and the fact that stormwater treatment BMPs include bypass provisions to protect the BMP integrity it would appear that the Copermittees would have to notify the Regional Board anytime a storm is predicted to ensure compliance with the provision. This provision was crafted for typical wastewater discharges and has little relevance to stormwater.	
Attachment B, 2.h	B-12	NPDES Permitted Non-Storm Water Discharges		Add the following text at the end of the Provision: "<u>A Copermittee will not be held responsible for pollutants in its MS4 discharge originating from an NPDES-permitted non-storm water discharge.</u>
Attachment B, 2.i.2	B-12	Monitoring	The timeline for retention of records is in conflict with similar retention provisions under Att B.1.j.(2)	Align requirements or delete either Provision.
Attachment C. Acronyms, Abbreviations and Definitions				
Attachment C	C-2	Definitions – Automotive Repair Shop	This is no change to the definition in E.3.b, but relocates the definition to Appendix C for consistency with the rest of the document. The square footage threshold is retained in Provision E.3.b because this is a regulatory specific rather than a definition.	Add the following definition: <u>Automotive Repair Shop – a facility that is categorized in any one of the following Standard Industrial Classification (SIC) codes: 5013, 5014, 5541, 7532-7534, or 7536-7539 or equivalent NAICS code.</u>
Attachment C	C-2	Definitions – Best Management Practices	Include in the definition that BMPs may be used in place of numeric effluent limits.	Reinstate the previous definition as follows: "<u>In the case of municipal discharge permits, BMPs may be used in the place of numeric effluent limits.</u>
Attachment C	C-3	Definitions – Channel Rehabilitation and Improvement	The term channel rehabilitation and Improvement is used in the permit but is not adequately defined. Adding a definition with clarify which projects that would fit under this category.	Add the following definition: <u>Channel Rehabilitation and Improvement – Remedial measures or activities for the purpose of improving or restoring the environmental health of streams, channels or river streams. Techniques may vary from in-stream restoration techniques to off-line stormwater management practices installed in the system corridor or upland areas. Rehabilitation techniques may include, but are not limited</u>

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				to the following: riparian zone restoration, constructed wetlands, bank stabilization, channel modifications, and daylighting of drainage systems. Effectiveness may be measured in various manners, including: assessments of habitat, reduced streambank erosion, and restoration of water and sediment transport balance.
Attachment C	C-3	Definitions – Construction Site	Update the definition for Construction site to define the area to be disturbed and narrow definition to work outside of a facility.	Revise the definition of Construction Site as follows: "…soil disturbing activities greater than 10,000 square feet…excavation. This does not include interior construction activities such as interior remodeling, plumbing, electrical, or mechanical work."
Attachment C	C-3	Definitions - Copermittee	Add clarification that the San Diego Region is Region 9.	Add: "..Region (Region 9) …"
Attachment C	C-3	Definitions - Development Project	More concise and specifies development projects that have land disturbance, in line with Grading Ordinance definitions.	Edit the following definition as follows: **Development Projects** - Construction, rehabilitation, redevelopment, or reconstruction of any public or private ~~residential~~ projects involving land disturbance activities ~~industrial, commercial, or any other projects~~.
Attachment C	C-4	Definitions – Direct Discharge to an Environmentally Sensitive Area	The "Environmentally Sensitive Area" definition found elsewhere in Appendix C would remain unchanged. This new definition would support interpretation of the Priority Development Project category titled "Environmentally Sensitive Areas" (E.3.b(d)) and remove much current confusion that applicants and reviewers have in interpreting these rules. In discussions with Regional Board staff we have learned specifically what their concern is regarding a direct hydraulic connection between the development project and the specially protected areas. We feel that this language adequately addresses that concern while providing the most succinct language that can be interpreted reasonably well for a wide range of development scenarios.	Add the following definition: Direct Discharge to an Environmentally Sensitive Area – Flow that is conveyed overland a distance of 200 ft or less from the development to the ESA, or conveyed in a pipe any amount of distance as an isolated flow from the development to the ESA (i.e. not commingled with flows from adjacent lands).
Attachment C	C-4	Definitions – Household		Revise the text as follows: "… other hazardous wastes"

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		Hazardous Waste		
Attachment C	C-5	Definitions - Inland Surface Waters	Change the definition to include waters of the U.S. not State.	Replace the definition as follows: "**Inland Surface Waters –** Includes all surface waters of the U.S. that do not include the ocean, enclosed bays, or estuaries."
Attachment C	C-5	Definitions – Low Impact Development Best Management Practices	Minor grammatical correction.	Revise the definition as follows: "that emphasize conservation ~~s~~and the use of on-site natural features"
Attachment C	C-6	Definitions - Major Outfall	Minor grammatical correction	"…with a drainage area of more…"
Attachment C	C-6	Definitions – Maximum Extent Practicable (MEP)		Revise the text as follows: "The technology-based standard established by Congress in CWA Provision 402(p)(3)(B)(iii) for ~~storm water~~ discharges of pollutants that operators of MS4s must meet. Technology-based standards establish the level of pollutant reductions that dischargers must achieve, typically by treatment or by a combination of source control and treatment control BMPs. MEP generally emphasizes pollution prevention and source control BMPs primarily (as the first line of defense) in combination with treatment methods serving as a backup (additional line of defense)."
Attachment C	C-7	Definitions – MS4	The addition of CWA language to the definition of MS4 limits Copermittees' responsibilities to within their jurisdiction and strengthens support that Copermittees are not responsible for discharges in MS4s that they do not operate.	Revise text as follows: "… Which is not part of the Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.~~26~~22. Copermittees need only comply with permit conditions relating to discharges from the municipal separate storm sewers for which they are operators." 40 CFR §122.21(a)(vi).
Attachment C	C-7	Definitions – Non-Storm Water		Revise text as follows: All discharges to and from a MS4 that do not originate from precipitation events (i.e., all discharges from a MS4 other than storm water). Non-storm water includes illicit

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				discharges<ins>,</ins> ~~and~~ NPDES permitted discharges, <ins>and the discharges described in Provision E(2)(a)(3)-(5).</ins>
Attachment C	C-8	Definitions - Outfall	Add the definition of outfall and cite the Federal Regulations.	Add the following definition: <ins>**Outfall** - *Outfall* means a *point source* as defined by 40 CFR 122.2 at the point where a municipal separate storm sewer discharges to waters of the United States and does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels or other conveyances which connect segments of the same stream or other waters of the United States and are used to convey waters of the United States. 40 C.F.R. 122.26(b)(9).</ins>
Attachment C	C-8	Definitions – Parking Lot	This is no change to the definition in E.3.b, but relocates the definition to Appendix C for consistency with the rest of the document. The square footage threshold is retained in Provision E.3.b because this is a regulatory specific rather than a definition.	Add the following definition: <ins>Parking Lot – a land area or facility for the tempraory parking or storage of motor vehicles used personally, for business, or for commerce.</ins>
Attachment C	C-8	Definitions – Pre-Development Runoff Conditions	The definition for Pre-Development Runoff Conditions should be the exact language EPA used in the Federal Register at 64 FR §68761. We acknowledge the removal of language referencing natural watershed hydrology before human induced alterations. Jurisdictions cannot require project applicants to match post-project hydrograph to the pre-development hydrograph because it may impose mitigation beyond the project's impacts. The pre-project standard provides the appropriate nexus to the project impacts, as is the standard followed by CEQA.	Revise the definition as follows: ~~Pre-Development~~ Pre-Project Runoff Conditions – "Runoff conditions that exist~~ed~~ onsite <ins>immediately</ins> before the ~~existing development was constructed, or exists onsite before~~ planned development activities occur. <ins>Pre-development is not intended to be interpreted as that period before any human-induced land disturbance has occurred. 64 FR 68761</ins>."
Attachment C	C-8	Definitions – Properly Designed	A definition of "Properly Designed," which mentioned in Source Control BMP Requirements is not mentioned in the definitions Provision of Attachment C. As currently written, the permit authorizes subjective broad authority and deference to the Regional Board in interpretation of the definitions, if not included. This term requires a definition.	Add the following definition: "<ins>**Properly Designed –** Designed in accordance with the Copermittee's BMP Design Manual and/or any appropriate design requirements set forth by the Copermittee and based on widely accepted design criteria</ins>."

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Attachment C	C-8	Definitions – Public Education, Outreach, and Participation	Neither Public Education and Outreach, nor Public Participation are mentioned in the definitions Provision of Attachment C. Please add definitions for these non-structural BMPs.	Add the following definition: "<u>Public Education, Outreach and Participation – Programs to educate residents, businesses and visitors about the importance of water quality and water quality programs so that they will support local efforts and understand their role in protecting receiving waters. The Education and Outreach Program will increase knowledge and awareness, improve attitudes toward storm pollution prevention, and provide a foundation for changing behaviors that contribute to storm water pollution.</u>"
Attachment C	C-8 through C-9	Definitions - Redevelopment	The current San Diego permit R9-2007-0001 Definition for Redevelopment states "Redevelopment does not include trenching and resurfacing associated with utility work; resurfacing and reconfiguring surface parking lots and existing roadways." Resurfacing and reconfiguration of parking lots should still be included in this sentence as these actions are not increasing impervious surfaces and are necessary for ongoing maintenance (pothole repair, root intrusion, damage repair, etc).	Revise the following definition: Redevelopment – "The creation, addition, and/or replacement of impervious surface on an already developed site <u>through construction or alteration of the existing footprint</u>" …Redevelopment does not include trenching and resurfacing associated with utility work; resurfacing existing roadways; <u>resurfacing, cutting and reconfiguring of surface parking lots</u>; new sidewalk construction, pedestrian ramps, or bike lane on existing roads; and routine replacement of damaged pavement, such as pothole repair."
Attachment C	C-9	Definitions - Restaurant	This is no change to the definition in E.3.b, but relocates the definition to Appendix C for consistency with the rest of the document. The square footage threshold is retained in Provision E.3.b because this is a regulatory specific rather than a definition.	Add the following definition: <u>Restaurant – a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC code 5812).</u>
Attachment C	C-9	Definitions – Retail gasoline outlet	No prior definition existed, so one was created for consistency with the other priority development project categories. The square footage threshold is retained in Provision E.3.b because this is a regulatory specific rather than a definition.	Add the following definition: <u>Retail gasoline outlet (RGO) – a business that sells automotive or truck fuel to the general public.</u>
Attachment C	C-9	Definitions - Retrofitting	Minor edit to improve understanding of when retrofitting is appropriate.	Revise the following definition:

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				"**Retrofitting** – Storm water management practice put into place after development has occurred in watersheds where the practices previously did not exist <u>or are ineffective</u>…"
Attachment C	C-10	Definitions – Street, Road, Highway, Freeway, and Driveway	This is no change to the definition in E.3.b, but relocates the definition to Appendix C for consistency with the rest of the document. The square footage threshold is retained in Provision E.3.b because this is a regulatory specific rather than a definition.	Add the following definition: <u>Street, Road, Highway, Freeway and Driveway – "Any paved impervious surface that is used for the transportation of automobiles, trucks, motorcycles, and other vehicles."</u>
Attachment C	C-10	Definitions – Waters of the state	This language should be limited based on the intent of the definition (natural water sources) and should not be interpreted to include man-made structures that collect runoff for the sole purpose of flow volume/velocity and/or pollutant reduction, such as a wet pond. Circumstance and condition should be considered as part of determination whether a water body is a water of the state.	"**Waters of the State** - Any water, surface or underground, including saline waters within the boundaries of the State [CWC Provision 13050 (e)]. The definition of the Waters of the State is broader than that for the Waters of the United States in that all water in the State is considered to be a Waters of the State ~~regardless of circumstance or condition~~."
Attachment D. Jurisdictional Runoff Management Program Annual Report Form				
			N/A	None.
Attachment E. Specific Provisions for Total Maximum Daily Loads Applicable to Order No. R9-2013-0001				
Attachment E. (General)	E-1 through E-47	Specific Provisions for Total Maximum Daily Loads Applicable to Order No. R9-2013-0001	The organization of the TMDL provisions could be improved to help more clearly outline the interim and final requirements and schedules. The Copermittees recommend a reformat that would be easier to follow and has a clearer connection between receiving water limitations, effluent limitations, BMP requirements, and compliance determination.	As shown in the attached revised Permit, revise the organizational structure of the TMDL Specific Provisions, using the following outline: (a) Applicability (b) Final TMDL Compliance Requirements (c) Interim TMDL Compliance Requirements (d) Monitoring and Assessment
Attachment E. (General)	E-1 through E-47	Compliance Determination sub-sections for each TMDL	As discussed in comments under Provision B, the Copermittees have fully embraced using WQIPs as an integral component of our programs, and would like to extend the role of WQIPs into TMDL compliance determination.	Incorporate a WQIP-based compliance option (BMP-based WQBELs) into the Compliance Determination sections of Attachment E (consistent with the comment on the revisions to Provision B.3.a) , with the WQIPs serving as the compliance mechanism.

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			There is regulatory precedent for including WQIP-based compliance mechanisms ("BMP-based WQBELs") as a TMDL compliance option. State and federal law do not require the use of numeric effluent limitations for MS4 Copermittees, but rather encourage flexible implementation of best management practices through an iterative process. Specifically, the choice to include either management practices or numeric limitations in MS4 permits is within the regulatory agency's discretion, and on the question of whether MS4 permits must contain numeric effluent limitations, the court upheld EPA's use of iterative BMPs in place of numeric effluent limitations for storm water discharges. (See Defenders of Wildlife v. Browner, 191 F.3d 1159, 1166-1167 (9th Cir. 1999)[6] The findings of California's Stormwater Blue Ribbon Panel, which was convened specifically to examine the feasibility of incorporating numeric effluent limits in stormwater permits, ultimately concluded that numeric limits were generally infeasible across all three stormwater activities (municipal, industrial, and construction), with a few exceptions (*The Feasibility of Numeric Effluent Limits Applicable to Discharges of Stormwater Associated with Municipal, Industrial and Construction Activities, June 19, 2006*). Additionally, state law and policy does not require the use of numeric effluent limitations in MS4 permits. In 2009, the State Water Board affirmed this approach in a precedential order, stating: "[it] is our intent that federally mandated TMDLs be given substantive effect. Doing so can improve the efficacy of California's NPDES storm water permits. This is not to say that a wasteload allocation will result in	As shown in the attached revised Permit, the following sub-bullet would be incorporated into the interim and final Compliance Determination sections for each TMDL: "The Responsible Copermittee has submitted and is fully implementing a Water Quality Improvement Plan that is developed and adaptively managed as outlined in Provisions B, F.1 and F.2, is accepted by the San Diego Water Board, and meets the conditions of Specific Provision x.x.(x).x."

[6] See also California Regional Water Quality Control Board San Diego Region - Fact Sheet / Technical Report For Order No. R9-2010-0016 / NPDES NO. CAS0108766.

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			numeric effluent limitations for municipal storm water dischargers. Whether a future municipal storm water permit requirement appropriately implements a storm water wasteload allocation will need to be decided on the regional water quality control board's findings *supporting either the numeric or non-numeric* effluent limitations contained in the permit." (Order WQ 2009-0008, In the Matter of the Petition of County of Los Angeles and Los Angeles County Flood Control District, at p. 10 (emphasis added).) Furthermore, a memo issued in 2010 by EPA directors Hanlon and Keehner describes how permitting agencies have discretion to use BMP-based WQBELs for MS4 Permits: "The permitting authority's decision as to how to express the WQBELs(s), either as numeric effluent limitations or BMPs, including BMPs accompanied by numeric benchmarks, should be based on an analysis of the specific facts and circumstances surrounding the permit, and/or the underlying WLA, including the nature of the stormwater discharge, available data, modeling results or other relevant information." In a July 23, 2012 comment letter from EPA to the Los Angeles Regional Board on the recent LA County MS4 Permit regarding that Board's use of this approach,, EPA stated: "This is consistent with EPA guidance in its updated memorandum of November 10, 2010 concerning the incorporation of WLAs into stormwater permits, available at: http://www.epa.gov/npdes/pubs/establishingtmdlwla revision.pdf. This memorandum recommends the use of numeric effluent limits when feasible, and notes that BMP-	

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			based approaches are appropriate in cases where the administrative record for the permit quantitatively demonstrates the BMPs required by the permit will be sufficient to ensure compliance with the WLAs. This has also been a long-standing EPA policy dating back to EPA's previous 2002 guidance memorandum concerning the incorporation of WLAs into stormwater permits, available at: http://www.epa.gov/npdes/pubs/final-wwtmdl.pdf." The WQIPs could 1) demonstrate that BMP-based approaches are appropriate and 2) provide the necessary information so that the administrative record for the permit can demonstrate the BMPs required by the permit will be sufficient to ensure compliance with the WLAs.	
Attachment E. (General)	E-1 through E-47	Best Management Practice sub-sections for each TMDL	The "Best Management Practices" subsections for each TMDL should incorporate the WQIP-based compliance concept as proposed in the proposed revisions to Provision B.3, and describe the steps that Copermittees must take for WQIPs and BMP-based WQBELs to be approved by the Regional Board as a compliance mechanism. It is important to note that this approach would be subject to public review and Regional Board approval, and thus this approach has many "checkpoints" where the Regional Board is able to determine whether WQIP-based compliance (BMP-based WQBELs) is appropriate given the approach and level of rigor in the WQIP. Furthermore, the WQIPs would provide sufficient detail regarding the strategies and activities to be implemented, which would allow the Regional Board to use the schedule for compliance determination in a clear, specific, measurable, and enforceable manner.	As shown in the attached revised Permit, insert a new Best Management Practices sub-bullet in the interim and final TMDL Compliance Requirements sections for each TMDL as follows: (a) For Copermittees utilizing the WQIP-based compliance option, the strategies and activities contained in the WQIP accepted by the San Diego Water Board and adaptively managed as outlined in Provision B.6, F.1, and F.2, will serve as BMP-based WQBELs under the following conditions, as outlined in Provision B.3.a: (1) A Responsible Copermittee requests that the Water Quality Improvement Plan be approved as the basis for compliance with the discharge prohibitions (A.1), receiving water limitations (A.2), and/or effluent limitations (A.3) in the letter of submittal to the San Diego Water

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				Board; (2) Reasonable assurance is demonstrated that the strategies and activities in the Water Quality Improvement Plan are expected to attain the final receiving water limitations or final WQBELs under Specific Provision xx.y; (3) The submitted schedule as outlined in Provision B.3 provides sufficient detail regarding the strategies and activities to be implemented to allow the Regional Board to use the schedule for compliance determination in a clear, specific, measurable, and enforceable manner; AND (4) The WQIP is approved by the Regional Board Executive Officer and is implemented per the approved schedule and adapted pursuant to Provisions B.6, F.1, and F.2.
Attachment E. (General)	E-1 through E-47	Specific Provisions for Total Maximum Daily Loads Applicable to Order No. R9-2013-0001	The Receiving Water Limitations associated with TMDLs should not be referred to as Water Quality Based Effluent Limitations (WQBELs). The Copermittees are only responsible for their discharges to receiving waters not for concentrations in receiving waters. Receiving water quality can be affected by multiple sources, including agriculture and other sources that are permitted by this Board. A WQBEL is a restriction on the quantity or concentration of a pollutant that may be *discharged from a point source* into a receiving water that is necessary to achieve an applicable water quality standard in the receiving water (See 40 CFR § 122.2; NPDES Permit Writer's Manual, Appendix A. Categorizing the Receiving Water Limitations as WQBELs is inconsistent with federal regulations and standard permitting practices and could subject the Copermittees to	As shown in the attached revised Permit, for each TMDL, clearly separate receiving water limitations from Water Quality Based Effluent Limitations using separate sub-section headers.

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			Mandatory Minimum Penalties.	
Attachment E. (General)	E-1 through E-47	Specific Provisions for Total Maximum Daily Loads Applicable to Order No. R9-2013-0001	The Order needs to clearly describe the linkage between receiving water limitations and effluent limitations. The effluent limitations should be used to determine whether Copermittees are causing or contributing to exceedances of receiving water limitations. They are not a standalone provision. If receiving water limitations are met, then the effluent limitations are not applicable.	For each Water Quality Based Effluent Limitations sub-section, insert language to describe how WQBELs and RWLs are linked. As shown in the attached revised Permit, the corresponding WQBEL sub-section for each TMDL should open with language similar to the following: "In the case that receiving water limitations are exceeded after the end of the compliance schedules under Specific Provision E.X.x, effluent limitations will be used to determine whether MS4 discharges are causing or contributing to exceedances of receiving water quality limitations. To demonstrate MS4 discharges are not causing or contributing to an exceedance of receiving water quality limitations, MS4 discharges must meet the concentration-based effluent limitations in Table X.X." Similarly interim and final compliance schedules should reflect this as well. As shown in the attached revised Permit, the Interim and Final Compliance Schedule sub-sections for each TMDL should include language similar to the following: "The Responsible Copermittee must be in compliance with the final receiving water limitations or final WQBELs under Specific Provision E.X."
Attachment E. (General)	E-1 through E-47	Specific Provisions for Total Maximum Daily Loads Applicable to Order No. R9-2013-0001	Concentration-based effluent limitations should be applied on a watershed-basis, not outfall by outfall. The Copermittees should have flexibility to address the highest impact outfalls, and not be required to *address every single outfall* (e.g., there is little environmental benefit to construct	For each Water Quality Based Effluent Limitations table with concentration-based WQBELs, insert a footnote to allow Copermittees to manage stormwater quality on a watershed basis. As shown in the attached revised Permit, the footnote for

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			BMPs to control outfalls with relatively low *loadings* that do not affect receiving water conditions). If the approach is outfall-by-outfall (instead of watershed basis), then the costs of compliance will be MUCH higher as nearly every outfall will require an action/BMP regardless of whether or not the loading has an effect on the receiving water. The Copermittees can protect receiving waters by ensuring that discharge concentrations are below the effluent limitations on a *flow-weighted* basis. If one outfall is slightly higher than the WQBEL concentration, but another is below the WQBEL concentration then the MS4s have not impacted water quality as long as the flow-averaged concentration is below the effluent limitation.	each concentration-based WQBEL table would read as follows: "Concentrations shall be determined on a flow-weighted basis across all outfalls within a jurisdiction, not outfall-by-outfall."
Attachment E.1.b (Chollas Creek Diazinon TMDL)	E-3	Water Quality Based Effluent Limitations	The Chollas Creek Diazinon TMDL is based on an erroneous target. The TMDL set the numeric targets equal to the California Department of Fish and Game (CDFG) Water Quality Criteria for the protection of freshwater aquatic organisms from diazinon (Menconi and Cox 1994). The acute and chronic targets equal 0.08 ug/L and 0.05 ug/L, respectively. However, an error in a data point contained in the CDFG criteria was found. In a letter dated May 19, 2004, from Chris Ingersoll (US Geological Survey) to Lenwood Hall (University of Maryland), Mr. Ingersoll discusses an error in the 96-h LC50 of 0.2 ug/L for *Gammarus fasciatus* reported by Johnson and Finley (1980) and by Mayer and Ellersieck (1986). Mr. Ingersoll's letter notes that based on his review of the data sheets, the 96-h LC50 should have been reported as 2 ug/L and not 0.2 ug/L, which was used to calculate the criteria. In a letter dated July 30, 2004 from Brian Finlayson (CA Department of Fish and Game) to Joe Karkoski (Central Valley Regional Water Quality Control Board), Mr. Finlayson confirms that a transcription error occurred and suggests that these data	Replace the receiving water limitation with the recalculated Criterion Maximum Concentration (aka acute criterion) and the Criterion Continuous Concentration (aka chronic criterion) of 0.16 ug/L and 0.10 ug/L, respectively. Set the acute and chronic effluent limitations as 90% of the criteria (same approach as the TMDL) equal to 0.144 ug/L and 0.09 ug/L, respectively.

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			cannot be used in the calculation of the criteria. Mr. Finlayson suggests the recalculated Criterion Maximum Concentration (aka acute criterion) and the Criterion Continuous Concentration (aka chronic criterion) should be 0.16 ug/L and 0.10 ug/L, respectively. Additionally, USEPA published aquatic life water quality criteria for diazinon in December 2005 (EPA-822-R-05-006), which established acute and chronic criteria equal to 0.17 ug/L. Incorporation of the Chollas Creek Diazinon TMDL into the MS4 permit based on the CDFG criteria is inappropriate given the fact these criteria are known to be faulty. The receiving water limitations and effluent limitations should either 1) be removed until the TMDL can be corrected or 2) the recalculated CDFG or USEPA criteria should be utilized. The TMDL assumed, at the time, the CDFG criteria were correct and their use in setting targets and corresponding WLAs was appropriate. However, new information is available that demonstrates those criteria are faulty. Thus, replacement of the receiving water limitations and effluent limitations, would be consistent with the assumptions of the WLAs because the WLAs were intended to implement the narrative toxicity and pesticide objectives in the Basin Plan. As stated on page 16 of the TMDL Staff Report: “By setting the numeric targets equal to the CDFG Water Quality Criteria for diazinon, the Regional Board is quantitatively interpreting the narrative water quality objective of “no toxics in toxic amounts” to mean “no diazinon concentrations in Chollas Creek in excess of 0.08 µg/L for any 1 hour period or in excess of 0.05 µg/L for any 4-day period”. The pesticide water quality objective is interpreted in the same way.”	
Attachment E.2.b	E-5	Water Quality Based Effluent	The California Toxics Rule (CTR) establishes dissolved	Add the WER term to the receiving water limitations acute

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(Shelter Island Dissolved Copper TMDL)		Limitations	saltwater criteria that are expressed as a function of a Water-Effect Ratio (WER). The WER is set equal to 1.0 unless a site-specific study has been completed. The WER term was incorporated into the Chollas Creek Dissolved Metals TMDL.	and chronic criteria and the effluent limitations, tables 2.1 and 2.2, respectively. Add the following footnote to both tables: "The Water Effect Ratio (WER) is assumed to be 1.0 unless there is a site-specific and chemical-specific WER."
Attachment E.2 (Shelter Island Dissolved Copper TMDL)	E-6	Compliance Determination	The TMDL envisioned MS4s would implement management practices to reduce copper loadings to the Shelter Island Yacht Basin (SIYB). As stated on page 53 of the TMDL Staff Report: "The Regional Board will amend Order No. 2001-01, "Waste Discharge Requirements for Discharges of Urban Runoff from the Municipal Separate Storm /Sewer Systems" to require that discharges of copper into SIYB waters not increase from existing loadings… The order could also be amended to require BMPs designed to reduce copper loading into SIYB, and/or monitoring for copper in the runoff management plan pertinent to SIYB."	Allow for BMP-based WQBELs, as envisioned when the TMDL was adopted. As shown in the attached revised Permit, a new Compliance Determination sub-bullet for each TMDL (for both final and interim WLAs) should be added as follows: "(e) The Responsible Copermittees have submitted and are fully implementing an Water Quality Improvement Plan that is developed and adaptively managed as outlined in Provisions B, F.1 and F.2, is accepted by the San Diego Water Board, and meets the conditions of Specific Provision x.x.(x).x."
Attachment E.3.b (Rainbow Creek Watershed Nutrient TMDL)	E-9 of redline	Specific Provisions for Total Maximum Daily Loads Applicable to Order No. R9-2012-0011	The Rainbow Creek TMDL for Total Nitrogen and Phosphorous does not include Wasteload Allocations for the County of San Diego Copermittees. The TMDL only contains Load Allocations. Load allocations should not be implemented through an NPDES permit. It is inappropriate to simply "re-name" the Load Allocations as Wasteload Allocations.	Strike the following TMDL from Attachment E in its entirety: Total Maximum Daily Loads for Total Nitrogen and Total Phosphorus in Rainbow Creek Watershed
Attachment E.3.b (Rainbow Creek Watershed Nutrient	E-10	Water Quality Based Effluent Limitations	Notwithstanding the previous comment, the TMDL clearly states which dischargers are subject to wasteload/load reductions that must be incorporated into their respective permits. For example the TMDL Technical Report states: "nutrient wasteload reductions will eventually be incorporated into Caltrans statewide NPDES storm water	If not striken entirely, add the following compliance determination method to Specific Provisions 3 "The Responsible Copermittee is using its legal authority to reduce nutrient discharges from the land uses identified under Specific Provision 3.b.(2).(b) to the maximum extent practicable."

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TMDL)			permit." Similar language cannot be found regarding incorporating nutrient wasteload and/or load reductions into the County of San Diego's NPDES permit. The only NPDES permit-related requirement imposed upon the County of San Diego is "to require increasingly stringent best management practices" for nutrient discharges to or from the MS4 within the watershed. Furthermore, the Technical Report states that "any Regional Board enforcement action taken will be against individual dischargers and not the County of San Diego."	
Attachment E.4.b (Chollas Creek Dissolved Metals TMDL)	E-12	Compliance Determination	The TMDL envisioned MS4s would implement actions to reduce metals loadings to Chollas Creek. As stated on page 4 of the BPA: "Actions to meet the WLAs in discharges to Chollas Creek will be required in WDRs that regulate MS4 discharges, industrial facility and construction activity stormwater discharges, and groundwater extraction discharges in the Chollas Creek watershed." Additionally, as stated on page 1 of the State Water Board's Resolution (No. 2008-00054) approving the BPA: "The amendment requires actions to be taken to implement management practices to ensure compliance with water quality criteria."	Allow for BMP-based WQBELs, as envisioned when the TMDL was adopted. As shown in the attached revised Permit, a new Compliance Determination sub-bullet for each TMDL (for both final and interim WLAs) should be added as follows: "(e) The Responsible Copermittees have submitted and are fully implementing an Water Quality Improvement Plan that is developed and adaptively managed as outlined in Provisions B, F.1 and F.2, is accepted by the San Diego Water Board, and meets the conditions of Specific Provision x.x.(x).x."
Attachment E.5.b (Baby Beach and Shelter Island Bacteria TMDL)	E-16	Final Water Quality Based Effluent Limitations	The WLAs from the Baby Beach and Shelter Island Bacteria TMDL include percent reductions that should be incorporated into the Order. These percent reductions would allow the Copermittees to plan and implement BMPs in a manner that best reflects the TMDL load reduction requirements. The load reduction requirements would also facilitate BMP-based compliance mechanisms and allow the WQIPs to be better integrated with TMDL requirements.	Incorporate load-based effluent limitations into the Specific Provisions for the Baby Beach and Shelter Island Bacteria TMDL. As shown in the attached revised Permit, a new Table 5.2b should be added to the Final WQBEL sub-section, including the % reductions required by the TMDL. These % reductions should be linked to the concentration-based effluent limitations with an "OR" statement.

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Permit Section	Tentative Order Page	Section Title	Reason for Proposed Changes/Comments	Proposed Changes
			For the Baby Beach and Shelter Island Bacteria TMDL, there were certain conditions that required ZERO reduction by MS4s. The effluent limitations should reflect these TMDL expectations.	
Attachment E.6.a.(5)	E-21	Applicability	Since adoption of the Project I Bacteria TMDL, the Copermittees have submitted data analysis to the Regional Board to demonstrate that 303(d) listings for San Marcos HA, San Dieguito River HA, and Los Penasquitos HA were incorrectly applied to REC beneficial uses. The Regional Board has concurred with the findings for each HA and stated that these HAs are "not subject to further action under Resolution No. R9-2010-0001." Similar responses are expected for the other HAs.	Add the following text to Section 6.a.(5): "See table 6.0<u>; Consistent with Basin Plan Amendment (Resolution No. R9-2010-0001, p. A-2); specific beach segments from some of the Pacific Ocean shorelines listed in Table 6.0 have been delisted from the 2008 (sic 2010) 303(d) list that was approved by the San Diego Board on December 16, 2009, and therefore are not subject to the requirements of Attachment E as long as monitoring data continues to support compliance with water quality standards."</u>
Attachment E.6.b (Project I Beaches and Creeks Bacteria TMDL)	E-24	Water Quality Based Effluent Limitations	The total coliform WQO only applies ocean waters, and should not be applied to creeks. The freshwater (creek) receiving water limitations in the TMDL do <u>not</u> include total coliform.	As shown in the attached revised Permit, apply the footnote 4 to total coliform receiving water limitations and WQBELs and specify the following: "Total coliform limitations apply only to segments of areas of Pacific Ocean Shoreline listed in Table 6.0."
Attachment E.6.b (Project I Beaches and Creeks Bacteria TMDL)	E-24 through E-25	Water Quality Based Effluent Limitations	The WLAs from the Project I Bacteria TMDL include allowable loadings and percent reductions that should be incorporated into the Order. These percent reductions would allow the Copermittees to plan and implement BMPs in a manner that best reflects the TMDL load reduction requirements. The load reduction requirements would also facilitate BMP-based compliance mechanisms and allow the WQIPs to be better integrated with TMDL requirements.	Incorporate load-based effluent limitations into the Specific Provisions for Project I Bacteria TMDL. As shown in the attached revised Permit, a new Table 6.2b should be added to the Final WQBEL sub-section, specifying the % reductions required by the TMDL. These % reductions should be linked to the concentration-based effluent limitations with an "OR" statement.
Attachment E.6.c	E-30	Compliance Schedule	Similarly, the interim effluent limitations should reflect the % reductions required by the TMDL. The TMDL requires a	Incorporate load-based, interim effluent limitations into the

SAN DIEGO COPERMITTEE COMMENTS ON TENTATIVE ORDER NO. R9-2013-0001				
Permit Section	Tentative Order Page	Section Title	Reason for Proposed Changes/Comments	Proposed Changes
(Project I Beaches and Creeks Bacteria TMDL)			50% reduction, so the % reductions applied to the final effluent limitations should be divided by two and included as interim WQBELs.	Specific Provisions for Project I Bacteria TMDL. As shown in the attached revised Permit, a new Table 6.5 should be added to the Interim WQBEL sub-section, specifying the % reductions required by the TMDL. These % reductions, which are 50% of the reductions required for final WQBELs, should be linked to the interim concentration-based effluent limitations with an "OR" statement.
Attachment E.6.b (Project I Beaches and Creeks Bacteria TMDL)	E-30	Interim Compliance Dates	The CLRPs to be submitted by Copermitees propose interim compliance dates, as allowed by the Project I Bacteria TMDL, to meet the 50% reduction milestone for dry and wet weather. The CLRPs submitted by Copermittees may not all propose the same interim compliance dates and the Permit should acknowledge the flexibility allowed by the TMDL (see page 68 of Attachment A of the Basin Plan Amendment) to revise the interim compliance dates via the CLRPs. In fact, this scheduling flexibility was a primary "incentive" for Copermitees to develop CLRPs instead of BLRPs.	Revise the Order to reflect the flexibility allowed by the TMDL. As shown in the attached revised Permit, add language to the interim compliance dates section to allow interim compliance date flexibility, as follows: "…unless alternative interim compliance dates are provided in a Comprehensive Load Reduction Plan or Water Quality Improvement Plan accepted by the San Diego Regional Board Executive Officer."
Attachment E.6.b (Project I Beaches and Creeks Bacteria TMDL)	E-31 and 32 of redline	Final Receiving Water Limitations and Final WQBELs	The Basin Plan Amendment for the Project I Bacteria TMDL contains Receiving Water Limitations. These Receiving Water Limitations should be incorporated directly into the Permit. However, Attachment E contains Receiving Water Limitations that do not match those from the TMDL. The Regional Board should not revise or translate the RWLs from the TMDL, they should be incorporated directly. The RWLs incorporated into Attachment E have several discrepancies with the RWLs in the TMDL, including application of single sample targets to the dry weather RWLs and application of total coliform RWLs for inland waters.	Replace entirely the RWLs in the Permit with those from the TMDL, which separates RWLs into RWLs for beaches (Table 6.1) and RWLs for Creeks (Table 6.2). The TMDL RWLs should be *pasted directly* from the Basin Plan Amendment (Attachment A, page 52).

SAN DIEGO COPERMITTEE COMMENTS ON TENTATIVE ORDER NO. R9-2013-0001				
Permit Section	Tentative Order Page	Section Title	Reason for Proposed Changes/Comments	Proposed Changes
Attachment E 6.d.1.b.ii and 6.d.2.b.ii, footnotes 36 and 3837 respectively (Project I Beaches and Creeks Bacteria TMDL)	E-33	Specific Monitoring and Assessment Requirements	To be consistent with Attachment A of Resolution No. R902010-0001,Section (7) (i) 2. Monitoring for TMDL Compliance and Compliance Assessment (p. A54), allow additional wet weather samples collected to be applied to the wet weather period as indicated in the following: "If only one sample is collected for a storm event, the bacteria density for every wet weather day associated with that storm event shall be equal to the results from that one sample. If more than one sample is collected for a storm event, but not on a daily basis, the bacteria density for all the wet weather days not sampled shall be equal to the highest bacteria density result reported from samples collected. The exceedance frequency shall be calculated by dividing the number of wet weather days that exceed the single sample maximum REC-1 WQOs by the total number of wet weather days during the rainy season."	Revise text as follows: Wet weather days are defined by the TMDL as storm events of 0.2 inches or greater and the following 72 hours. The Responsible Copermittees may choose to limit their wet weather sampling requirements to storm events of 0.2 inches or greater, or also include storm events of 0.1 inches or greater as defined by the federal regulations [40CFR122.26(d)(2)(iii)(A)(2)]. <ins>If only one sample is collected for a storm event, the bacteria density for every wet weather day associated with that storm event shall be equal to the results from that one sample. If more than one sample is collected for a storm event, but not on a daily basis, the bacteria density for all the wet weather days not sampled shall be equal to the highest bacteria density result reported from samples collected. The exceedance frequency shall be calculated by dividing the number of wet weather days that exceed the single sample maximum REC-1 WQOs by the total number of wet weather days during the rainy season.</ins>

April 10 and 11, 2013
Item No. 8
Supporting Document No. 5

San Elijo Lagoon CONSERVANCY
25 years of watershed moments

January 08, 2013

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Via e-mail to wchiu@waterboards.ca.gov
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

RE: Comments on Tentative Order Number: R9-2013-0001

Dear Mr. Chiu:

San Elijo Lagoon Conservancy respectfully submits the following comments on the draft San Diego Regional Municipal Separate Storm Sewer System permit.

Urban runoff is the San Diego region's most urgent pollution problem. Arguably, it is the most difficult to solve. In a region known for its beaches and strong tourism economy, polluted runoff makes our beaches and waterways unsafe for swimming, fishing and other recreation for at least 72 hours after a rain event. Even in dry weather, our "urban drool" from residents and businesses overwatering lawns becomes a major pollution source.

The good news is by working together as a community, we can solve this challenging public health problem. The Water Quality Improvement Plans proposed in the draft permit have the potential to become powerful tools to help us improve water quality within our watersheds. However, the Copermittees cannot be tasked with creating these plans alone. Specifically:

- The Permit should require formation of a stakeholder advisory group for each watershed that includes representatives of environmental groups with knowledge of the watershed.
- This stakeholder advisory group should work closely with the Copermittees and a regional board staff member while the Water Quality Improvement Plans are being developed to ensure these plans aggressively pursue water quality gains.
- The stakeholder advisory process should include accountability and measureable milestones to ensure the goals of the Permit are being met.

By taking advantage of the knowledge and resources of diverse stakeholders like municipalities, businesses and residents, our region can be on the cutting-edge of addressing urban runoff and creating healthier communities and watersheds. But this can only be achieved if these diverse voices are impacting the planning process in a meaningful way.

San Elijo Lagoon Conservancy recognizes the challenge urban runoff presents to our region, and we want to do our part to solve the problem. San Elijo Lagoon Conservancy is interested in participating in a Water Quality Improvement Plan development process for Escondido Creek watershed and the Carlsbad Hydraulic Unit.

San Elijo Lagoon Conservancy urges the Regional Board to enhance the stakeholder participation opportunities during Water Quality Improvement Plan development and then approve the permit.

Respectfully submitted,

Doug Gibson
Executive Director / Principal Scientist

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SELC is a non-profit 501 (c) (3) organization, tax ID #33-0358660

April 10 and 11, 2013
Item No. 8
Supporting Document No. 5

From: Carol Crossman
To: Chiu, Wayne@Waterboards
Subject: draft water permit
Date: Wednesday, January 09, 2013 3:02:41 PM

Mr. Wayne Chiu, P.E.
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

Re: Comment—Tentative Order No. R9-2013-001, Regional MS4 Permit, Place ID: 786088Wchiu

Dear Mr. Chiu:

I am writing in regards to the San Diego Regional Water Quality Control Board's Tentative Order R9-2012-0011 ("Permit") dated October 31, 2012. After reviewing the proposed Permit, I am concerned it will impose expensive, onerous, and untested regulations on local governments, businesses, and residents. These new regulations will impact the region's economy without improving its water quality.

Everyone understands the importance of clean, safe water to the region. It is important, however, that we use our limited resources wisely, and ensure that our efforts produce the desired outcome of improving water quality. I applaud the Board's inclusion of Water Quality Improvement Plans (WQIP) as a first step in developing a cost-effective approach to improving our water. Analysis remains a critical component of a successful strategy, and I am glad to see that the Board is committed to finding the best possible solution to water quality improvement.

I am concerned, however, that the costs associated with enforcing and implementing the permit will have a negative impact on my business and San Diego's economy. The four primary areas of concern include: 1) the strict liability for exceeding water quality objectives; 2) the additional and changing requirements for development projects, impacting items such as storm water retention and discharge; 3) the preemption of WQIPs by new and changing regulatory requirements prior to allowing the WQIPs to be developed and implemented; and 4) the lack of reliable funding sources to implement these regulatory changes.

It is necessary to hold individuals, businesses and governments accountable, but it is critical that the accountability measures can be reasonably achieved and are likely to have a significant and positive impact on San Diego's water. Because of these concerns, I respectfully request that the Permit focus on the timely development of effective and enforceable WQIPs, and that each of the WQIPs be developed through a process that ensures public participation. I ask also that the designation of appropriate Best Management Practices in each watershed be determined through the WQIP process rather than the one size fits all strategy currently being proposed in the Permit. I ask further that until the Board adopts a WQIP for a watershed that the provisions of the existing Permit remain in place for that watershed. Finally, in order to avoid unnecessary litigation I request that the Board adopt the WQIPs as Orders implementing the proposed Permit.

I urge you to adopt final permit language that is evidence-based and both environmentally and economically sustainable. Thank you for your consideration.
Sincerely,

Carol T. Crossman
Independent Owner of rental units
Board Member of SDCAA
746 Horton Road Bonita CA 91902
619-479-2482

CITY OF POWAY

January 9, 2013

California Regional Water Quality Control Board, San Diego Region
Attn: Wayne Chiu, P.E.
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

RE: Comment -Tentative Order No. R9-2013-0001
Regional MS4 Permit, Place ID: 786088Wchiu

Dear Wayne,

The Priority Development "cutoff" levels don't appear to have a link to soil types, which greatly impact the amount of runoff. A site with Type A soil ("Site A") retains a large portion of rainwater naturally, and has a small amount of runoff. Adding 5,000 square feet (SF) of impervious surface to "Site A" massively increases the amount of runoff compared to the natural condition because the water that previously soaked into the ground now runs off. Compare this to a site of equal size and slope but with Type D soil ("Site D"). In its natural condition very little water is retained by soaking into the ground due to the tight soil matrix and rock. Adding 5,000 square feet of impervious surface to "Site D" only slightly increases runoff from the site, since the site was nearly impervious in its natural condition. The permit should reflect this basic hydrologic tenant, and have stepped cutoff, such as: 5,000 SF for A soils, 6,000 SF for B, 7,000 for C, and 9,000 SF for D. This would more accurately reflect the increase in runoff from sites with differing soils.

Suggested language:

II.E.b.(2)(a)
New development projects that create ~~10,000 square feet or~~ more ~~of~~ impervious surfaces (collectively over the entire project site) based on the following soil types:

Type A soil = 10,000 square feet or more
Type B soil = 12,000 square feet or more
Type C soil = 14,000 square feet or more
Type D soil = 16,000 square feet or more

This category includes commercial, industrial, residential, mixed-use, and public development projects on public or private land which fall under the planning and building authority of the Copermittee.

II.E.b.(2)(g)
Streets, roads, highways, freeways, and driveways. This category is defined as any paved impervious surface ~~that is 5,000 square feet or more~~ used for the transportation of automobiles, trucks, motorcycles, and other vehicles that meet the following criteria:

Type A soil = 5,000 square feet or more
Type B soil = 6,000 square feet or more
Type C soil = 7,000 square feet or more
Type D soil = 9,000 square feet or more

Compliance

Develop language to clearly link WQIPs to Permit compliance.

TMDLs

Add options for BMP - and load-based compliance with WLAs. Insert language in *Modification of Programs* (Provision H) to reopen Permit to incorporate TMDL revisions and CLRP modifications.

Hydromodification Management Plan

Reaffirm Resolution R9-2010-0066; reference the Resolution in the permit.
Replace "pre-development naturally occurring" with "pre-project".

Should you have questions, you may contact me via email at sstrapac@poway.org or by phone at (858) 668-4653.

Sincerely,

DEVELOPMENT SERVICES DEPARTMENT

Steven E. Strapac

Steven E. Strapac, P.E., P.L.S.
Senior Civil Engineer

c: Steve Crosby, P.E., City Engineer
Roger Morrison, Management Analyst

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County of San Diego

JACK MILLER
Director

DEPARTMENT OF ENVIRONMENTAL HEALTH
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ELIZABETH POZZEBON
Assistant Director

January 9, 2013

Mr. Wayne Chiu
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4353

NPDES PERMIT AND WASTE DISCHARGE REQUIREMENTS FOR DISCHARGES FROM THE MUNICIPAL SEPARATE STORM SEWER SYSTEMS (MS4) DRAINING THE WATERSHEDS WITHIN THE SAN DIEGO REGION (REGIONAL MS4 PERMIT) (ORDER NO. R9-2013-0001)

Dear Mr. Chiu:

The County of San Diego, Department of Environmental Health (DEH) has reviewed the proposed draft Order No. R9-2013-001 (Regional MS4 Permit), and offers the following comments:

The existing San Diego MS4 Storm Water permit includes vector-related language which is intended to raise awareness of the potential unintended public health risk resulting from mosquito production in certain storm water management devices, the proposed draft permit does not. The removal of the vector-related language raises a significant concern, and we request that it be placed back into the proposed draft to protect public health. Please note that the San Diego Regional MS4 permit was the first in the United States to include vector-related language, and ultimately resulted in improved language adopted into storm water permits throughout the State.

The vector-related language included in the existing MS4 permit represents a compromise that allows water quality goals to be met while minimizing the risk to public health. It recognizes that mosquitoes cannot completely be eliminated given the current water quality requirements. It further serves a critical public health purpose of maintaining an awareness of the potential unintended public health threat created by mosquitoes, and emphasizes the importance of proper maintenance of storm water management and treatment structures to minimize the potential for mosquito production and ultimately the spread of mosquito-borne diseases including West Nile Virus (WNV).

WNV continues to be a threat to human health, and has proven to be unpredictable. 2012 was the second worst year for WNV in the United States and California since it was introduced 13 years ago. Approximately 5,400 human illnesses were confirmed nationwide, with 243 deaths as of December 12, 2012. In California there were 464 confirmed cases in 2012 with 18 deaths as of December 24, 2012.

It is critical that the State and the RWQCB continue to include vector-related language in storm water NPDES permits to protect public health. It would be counterproductive and counterintuitive to strive to improve the quality of water for the benefit of public and environmental health only to create environments highly conducive to mosquitoes that have the potential to severely impact human and animal health from mosquito-borne diseases.

The County of San Diego's DEH respectfully requests that the Board restore the vector-related language in the proposed draft MS4 Permit. The following is the existing permit language from Section D - Urban Runoff Management Systems, Subsection 2 - Development Planning:

> f. *If not properly designed or maintained, certain BMPs implemented or required by municipalities for urban runoff management may create a habitat for vectors (e.g. mosquitoes and rodents). However, proper BMP design and maintenance can prevent the creation of vector habitat. Nuisances and public health impacts resulting from vector breeding can be prevented with close collaboration and cooperative effort between municipalities and local vector control agencies and the State Department of Health Services during the development and implementation of urban runoff management programs.*

In addition, the County of San Diego's DEH requests that to facilitate inspection of new BMPs, the San Diego Regional Permit require that a list of new storm water management and treatment units be submitted by the Permittees to their respective vector control agencies. The County requests that the Permit include the following language recently added to the draft Fact Sheet for the Los Angeles MS4 permit:

> *Monitoring studies conducted by the California Department of Public Health (CDPH) have documented that mosquitoes opportunistically breed in structural storm water Best Management Practices (BMPs), particularly those that hold standing water for over 96 hours. Certain Low Impact Development (LID) site design measures that hold standing water such as rainwater capture systems may similarly produce mosquitoes. BMPs and LID design features should incorporate design, construction, and maintenance principles to promote drainage within 96 hours to minimize standing water available to mosquitoes. This Order requires regulated MS4 Permittees to coordinate with other agencies necessary to successfully implement the provisions of this Order. These agencies may include CDPH and local mosquito and vector control agencies on vector-related issues surrounding implementation of post-construction BMPs.*

Thank you for the opportunity to submit comments on the proposed draft language for the MS4 Permit. If you have questions regarding the above comments, please contact Rebecca Lafreniere, Chief, at (858) 694-3595 or by E-mail at Rebecca.Lafreniere@sdcounty.ca.gov.

Sincerely,

JACK MILLER, Director

cc: Richard Crompton, Director, County of San Diego, Department of Public Works
Rebecca Lafreniere, Chief, County of San Diego, Department of Environmental Health, Community Health Division

COUNTY OF RIVERSIDE
TRANSPORTATION AND LAND MANAGEMENT AGENCY
Transportation Department

Juan C. Perez, P.E., T.E.
Director of Transportation

January 9, 2013 *Submitted via email* to WChiu@waterboards.ca.gov

Wayne Chiu, PE
California Regional Water Quality Control Board – San Diego Region
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4353

Subject: Comment – Tentative Order No. R9-2013-0001, Regional MS4 Permit, Place ID: 786088Wchiu

Dear Mr. Chiu:

The Riverside County Transportation Department (Transportation Department) appreciates the opportunity to comment on Tentative Order No. R9-2013-0001, NPDES No. CAS0109266, National Pollutant Discharge Elimination System (NPDES) Permit and Waste Discharge Requirements for Discharges of Urban Runoff from the Municipal Separate Storm Sewer Systems (MS4s) Draining the Watersheds within the San Diego Region (Tentative Order). The Transportation Department requests that the Tentative Order be revised to provide that public works transportation improvement projects are exempt from individual project-specific Standard Stormwater Mitigation Plans (SSMPs) when they are designed and constructed to the Maximum Extent Practicable (MEP) in conformance with the USEPA guidance "Managing Wet Weather with Green Infrastructure: Green Streets."[1]

Background

The Public Works departments of municipalities have an obligation to the traveling public to provide safe, efficient, and reliable street and road systems for travel. Municipalities are not profit driven, but, as public servants, strive to maintain and improve as many roads as possible within each fiscal year budget and within a reasonable (but uncertain) capital improvement program planning horizon. The Riverside County Transportation Department takes advantage of state and federal safety grants as often as we can; however such grants often come with funding limits, matching requirements, and time constraints for project completion.

Public Works transportation projects are different from conventional private development projects

[1] USEPA. 2008. http://water.epa.gov/infrastructure/greeninfrastructure/upload/gi_munichandbook_green_streets.pdf and http://water.epa.gov/infrastructure/greeninfrastructure/gi_policy.cfm#municipalhandbook

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due to the following:

- State and federal funding for Public Works transportation projects have strict timelines.
- Most Public Works transportation projects (1) are constrained by private property and utility easements on either side of the road right-of-way; (2) are linear in nature, and (3) have great difficulty meeting each and every requirement associated with a project-specific SSMP given right-of-way constraints.
- The number of roadway projects delivered to the public is based on annual transportation fund allocations.
- The purpose of the majority of Public Works transportation projects is to improve public safety. Safety projects include intersection improvements, minor shoulder widening, curve realignments, adjustments to vertical grades, and turn pockets.

On July 2, 2012 Riverside County submitted to the Executive Officer of the San Diego Regional Water Quality Control Board the Transportation Project Guidance that was developed in accordance with Order No. R9-2010-0016, NPDES No. CAS0108766, Waste Discharge Requirements for Discharges from the Municipal Separate Storm Sewer Systems (MS4s) Draining the County of Riverside, the Incorporated Cities of Riverside County, and the Riverside County Flood Control and Water Conservation District within the San Diego Region (2010 Riverside County MS4 Permit). The Transportation Project Guidance was prepared in accordance with Directive F.1.d.(2)(g) of the 2010 Riverside County MS4 Permit, which stated:

> *"...To the extent that the Copermittees develop revised standard roadway design and post-construction BMP guidance that comply with the provisions of Section F.1 of the Order, then public works projects that implement the revised standard roadway sections do not have to develop a project specific SSMP. The standard roadway design and post-construction BMP guidance must be submitted with the Copermittee's updated SSMP."*

The Transportation Project Guidance addresses improvements to streets, roads, highways, and freeways, and Class I Bikeway and sidewalk projects undertaken by the MS4 Copermittees and incorporates the principles contained in the USEPA guidance, "Managing Wet Weather with Green Infrastructure: Green Streets" and addresses Hydrologic Conditions of Concern criteria. The Transportation Project Guidance was also submitted to the Santa Ana Regional Water Quality Control Board and was approved by its Executive Officer on October 22, 2012. To date, the Riverside County NPDES MS4 Copermittees have received no comments or questions from staff of the San Diego Regional Water Quality Control Board relative to the Transportation Project Guidance submitted on July 2, 2012.

Transportation Department Project Example

Recently the Riverside County Transportation Department completed the construction of a roundabout on Rancho California Road in the Temecula area. The purpose of the project was to improve an existing intersection deficiency. Several thousand cars travel Rancho California Road each day for touring the many wineries in the Temecula area. Rancho California Road has multiple intersections with several in need of traffic control measures to slow the traffic through the area. The needed traffic control measures would improve safety and provide an opportunity for residents, tourists, and commercial vehicles to cross Rancho California Road or to merge into traffic on the road. A traffic signal light would have been the appropriate solution in a more urban setting. However, in this relatively rural environment, a roundabout was determined to be a more appropriate traffic control measure. This project was built at a cost of $1.6 million with $800,000 (half the total project cost) needed to purchase land and to construct a water quality basin to treat 100% of the runoff from the project site. We believe that a regional approach to water quality would have been much more appropriate, not only due to cost, but also because of the aesthetic sensitivity of the surrounding community. Although the water quality basin performs its function and meets the requirements of a project-specific Standard Stormwater Mitigation Plan (SSMP), it does not aesthetically complement the surrounding environment. This project area consists of rolling hills, a vast landscape of vineyards, beautiful wineries, and now, a nicely landscaped roundabout with an adjacent and unattractive water quality basin. In addition to the less than optimal (aesthetically) water quality basin, the cost of the project meant that other roundabouts planned for Rancho California Road had to be deferred.

Support for Transportation Department's Request

Providing the NPDES MS4 Copermittees the alternative of using the Transportation Project Guidance would provide the most efficient use of limited public resources by:

- Ensuring that *all new roadway projects* would incorporate hydromodification Best Management Practices (BMPs) as described in the Tentative Draft Regional MS4 Permit.
- Ensuring *all roadway improvement projects* would incorporate hydromodification BMPs to the Maximum Extent Practicable (MEP) through the use of templates included in the Transportation Project Guidance
- Allowing time sensitive projects to proceed without delay.
- Ensuring that projects do not get "shelved" due to costly project-specific SSMPs for individual projects.
- Reducing the need to condemn property for the purpose of acquiring enough right-of-way to meet the requirements of SSMPs for individual projects.

The Santa Ana River Region and the Santa Margarita River Region NPDES MS4 Permittees have dedicated substantial time and resources to developing Transportation Project Guidance intended to provide a consistent structure and decision-making procedures during the planning and design of their transportation improvement projects. These NPDES MS4 Permittees are just beginning to implement the Transportation Project Guidance in which they invested to comply with their 2010 NPDES MS4 permits. The planning horizon for most transportation improvement projects is years. The NPDES MS4 Permittees should now be afforded the opportunity to implement the Transportation Project Guidance

The recently adopted 2012 NPDES MS4 Permit for the Coastal Watersheds of Los Angeles County requires street and road construction of 10,000 square feet or more of impervious surface area to (1) follow the USEPA guidance regarding "Managing Wet Weather with Green Infrastructure: Green Streets" to the maximum extent practicable and (2) to address hydromodification control measures. However, projects that are replacement, maintenance or repair of a Permittee's existing flood control facility, storm drain, or transportation network may be exempted from the hydromodification control measures. Further, the Coastal Los Angeles NPDES MS4 permit does not impose post-construction (permanent) BMPs on routine maintenance activities that are conducted to maintain original line and grade, hydraulic capacity, original purpose of facility or emergency redevelopment activity required to protect public health and safety, including impervious surface replacement or repaving, such as the reconstruction of parking lots and roadways which does not disturb additional area and maintains the original grade and alignment.

Request for Revision of Tentative Order

We urge you to reconsider the requirements imposed upon Public Works transportation projects as included in the Tentative Order No. R9-2013-0001. We request that you direct staff include the following exemption language into Provision E.3.(b)(3):

(b) Any impervious surface that is 5,000 square feet or more used for the transportation of automobiles, trucks, motorcycles, and other vehicles that is designed and constructed to the Maximum Extent Practicable in accordance with the USEPA guidance "Managing Wet Weather with Green Infrastructure: Green Streets"[2]. ~~Retrofitting of existing paved alleys, streets or roads that meet the following criteria:~~

~~(i) Must be two lanes or less; AND~~

~~(ii) Must be a retrofitting project implemented as part of an alternative compliance project option under Provision E.3.c.(3)(b)(v) to achieve the performance requirements of Provisions E.3.c.(1) and/or E.3.c.(2) for a Priority Development Project; AND~~

[2] USEPA. 2008. http://water.epa.gov/infrastructure/greeninfrastructure/upload/gi_munichandbook_green_streets.pdf and http://water.epa.gov/infrastructure/greeninfrastructure/gi_policy.cfm#municipalhandbook

~~(iii) Designed and constructed in accordance with the USEPA Green Streets guidance.~~

Conclusion

The Transportation Department appreciates the opportunity to comment on the Tentative Order and your consideration of our comments. The Transportation Department looks forward to participating in the further development of the next version of the Tentative Order in a collaborative process aimed at addressing the issues raised in this letter. If you have any questions regarding our comments, please contact Claudia Steiding at 951.955.1694.

Sincerely,

Patricia Romo

Patricia Romo, PE
Deputy Director
Riverside County Transportation Department

cc: Claudia Steiding
Jason Uhley

From:	Matthew Boomhower
To:	Chiu, Wayne@Waterboards
Subject:	Comment - Tentative Order No.R9-2013-0001, Regional MS4 Permit, Place ID: 786088Wchiu.
Date:	Wednesday, January 09, 2013 4:44:32 PM

Mr. Wayne Chiu, P.E.
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

Re: Comment—Tentative Order No. R9-2013-001, Regional MS4 Permit, Place ID: 786088Wchiu

Dear Mr. Chiu:

I am writing in regards to the San Diego Regional Water Quality Control Board's Tentative Order R9-2012-0011 ("Permit") dated October 31, 2012. After reviewing the proposed Permit, I am concerned it will impose expensive, onerous, and untested regulations on local governments, businesses, and residents. These new regulations will impact the region's economy without improving its water quality.

Everyone understands the importance of clean, safe water to the region. It is important, however, that we use our limited resources wisely, and ensure that our efforts produce the desired outcome of improving water quality. I applaud the Board's inclusion of Water Quality Improvement Plans (WQIP) as a first step in developing a cost-effective approach to improving our water. Analysis remains a critical component of a successful strategy, and I am glad to see that the Board is committed to finding the best possible solution to water quality improvement.

I am concerned, however, that the costs associated with enforcing and implementing the permit will have a negative impact on my business and San Diego's economy. The four primary areas of concern include: 1) the strict liability for exceeding water quality objectives; 2) the additional and changing requirements for development projects, impacting items such as storm water retention and discharge; 3) the preemption of WQIPs by new and changing regulatory requirements prior to allowing the WQIPs to be developed and implemented; and 4) the lack of reliable funding sources to implement these regulatory changes.

It is necessary to hold individuals, businesses and governments accountable, but it is critical that the accountability measures can be reasonably achieved and are likely to have a significant and positive impact on San Diego's water. Because of these concerns, I respectfully request that the Permit focus on the timely development of effective and enforceable WQIPs, and that each of the WQIPs be developed through a process that ensures public participation. I ask also that the designation of appropriate Best Management Practices in each watershed be determined through the WQIP process rather than the one size fits all strategy currently being proposed in the Permit. I ask further that until the Board adopts a WQIP for a watershed that the provisions of the existing Permit remain in place for that watershed. Finally, in order to avoid unnecessary litigation I request that the Board adopt the WQIPs as Orders implementing the proposed Permit.

I urge you to adopt final permit language that is evidence-based and both environmentally and economically sustainable. Thank you for your consideration.

Sincerely,

Matthew C. Boomhower, RA, CSI, CCCA
President
Southern Cross Property Consultants
858-395-8657
www.southerncrosspc.com

CITY OF DANA POINT

DEPARTMENT OF PUBLIC WORKS

January 10, 2013

Wayne Chiu, P.E.
California Regional Water Quality Control Board, San Diego region
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340
(submitted electronically to wchiu@waterboards.ca.gov)

Subject: Comment - Tentative Order No. R9-2013-0001, Regional MS4 Permit, Place ID: 786088Wchiu.

Dear Mr. Chiu:

First, we would like to acknowledge the work that the Board staff has already accomplished through the focused work group efforts during the fall. Significant progress has been made on the Draft Permit from the input of co-permittees and NGO's alike since this process began in April 2012. Thank you.

That said, it was also apparent by the amount of testimony over two days at the following Board workshops that there remain significant concerns, many of which we believe can be easily be rectified to clarify and improve the Permit.

Following the Staff work sessions, we have spent a tremendous amount of additional time trying to explain our concerns at the Board workshops and work with our fellow permitees and co-permittees to develop comments and provide redline recommendations for the Permit language. Please review the comments and recommendations in writing that have been submitted on our behalf by the County of Orange, and which we support in great part.

Although it may first appear voluminous, the County of Orange redline recommendations should make for easy adjustment provided you concur with the justification and support that is presented. We have been working with these Permits now for many years and understand the importance of having carefully crafted language to allow for consistent implementation.

All of the issues that the Orange County letter raises reflect our concerns. However, we will add a few comments here on several selected issues to reinforce those comments from our own City's perspective.

For the hydromodification provision, please include the Engineered Channel Exemption (E3c2dii). While there may be a few locations upstream where reestablishment of a soft walled meandering stream may be technically & economically feasible, those locations are a small minority of the existing hard walled flood control channel system. As a suggestion to allow for that restoration possibility, you may want to reinstate the exemption, "Discharges storm water runoff into conveyance channels that are engineered for the capacity to convey the 10-year ultimate build out condition flow and are regularly maintained to ensure flow capacity all the

33282 Golden Lantern, Dana Point, CA 92629-1805 • (949) 248-3554 • FAX (949) 234-2826 • www.danapoint.org

way from the point of discharge to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean; except where the responsible flood control agency agrees with the likely feasibility of the proposed natural reestablishment and the long range goal is reflected in the approved WQIP." Although charging an in lieu fee to do other water quality improvements is a nice idea, it just won't stand up to legal challenge without a nexus. We feel it is important for the Permit to include justified requirements that are not subject to legal battles so as to not diminish the integrity of the program as a whole.

While we appreciate the intent of requiring roadwork to meet priority development standards, it must be restricted to new development (E.B.2g). In many cases, introducing water into the subgrade of street and gutter projects will be infeasible.

Our single biggest annual capital expenditure is street repair projects. The feasibility and cost to meet the draft imposed requirements could add 10% to 100% additional cost for these projects. This single requirement could exceed all the annual funding the City currently puts toward Water Quality Improvement. White it may be feasible to add these requirements to new development it is not appropriate for redevelopment and repair. Please allow EPA Green Street guidance to suffice as other NPDES permits do.

Please insert the TMDLs as originally written and intended. The municipalities and the SDRWQCB spent years developing the TMDL technical documents and approving them as part of the associated Basin Plan Amendment. As briefed by Nancy Palmer and carefully explained in the Orange County comments this is critical for both the Beaches and Creek TMDL, affecting the entire San Diego Region and Baby Beach TMDL. TMDLs by definition are based upon load, not concentration, and please include the necessary reopener provision(s).

The provisions requiring the development and implementation of a Water Quality Improvement Plan can be better aligned with the Jurisdictional Runoff Management Program requirements so that the programs are complimentary and prioritized instead of additive. We believe this is your intent, but the Draft Permit, as written, is unclear and open to conflicting interpretation at this time.

The City also underwent an audit of three key components of the current NPDES MS4 Permit in June of 2012, specifically covering the over-irrigation prohibition, the IC/ID Detection, and the NAL program elements. Although we have not received any feedback regarding the outcome of the audit beyond the debrief that occurred at the end of the audit (which appeared to be positive), we wanted to mention it to ensure that any potentially helpful information obtained was not overlooked in this process.

Again, I would like to emphasize there are many more critical issues contained in Orange County's response letter (attached via reference). We believe that while well intended, some of the draft provisions exceed the Federal Clean Water Act MS4 regulations. Given the potential for third party lawsuits, these are of great concern to our elected officials representing our constituency. As a beach city we are strongly committed to improving water quality. We can still accomplish that progressively with the modifications the County has recommended.

April 10 and 11, 2013
Item No. 8
Supporting Document No. 5

Again, thank you for your past efforts and for continuing consideration of our remaining concerns. The City would like to request the opportunity to meet with you, other Regional Board staff and the County of Orange to review in detail the changes requested in the County letter. Perhaps including the other Counties in the meeting to resolve language issues would be good as well.

Please direct any questions regarding this letter to myself at (949) 248-3582.

Yours sincerely,

Brad J. Fowler, P.E.
Director of Public Works

Attachment via reference: Comments/Redline submitted by the County of Orange

CC: -Douglas Chotkevys, City Manager
- Richard Montevideo, City Attorney
- Dana Point OWQ Subcommittee Members
- Lisa Zawaski, City of Dana Point
- Mary Ann Skorpanich, County of Orange

City of Mission Viejo

Public Works Department

Frank Ury
Mayor
Rhonda Reardon
Mayor Pro Tem
Trish Kelley
Council Member
Dave Leckness
Council Member
Cathy Schlicht
Council Member

January 10, 2013

Wayne Chiu, P.E.
California Regional Water Quality Control Board, San Diego Region
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

Subject: **Comments on Tentative Order No. R9-2013-0001, Regional MS4 Permit, Place ID: 786088Wchiu.**

Dear Mr. Chiu:

The City of Mission Viejo appreciates the opportunity to provide comments on Tentative Order No. R9-2013-0001, which is intended by the Regional Board to serve as the basis for stormwater regulation in the City upon the expiration of current Order R9-2009-0002. The City has been actively involved in the development of the comprehensive set of comments submitted by the County of Orange and supports those comments and attaches them by reference.

The City appreciates the revisions made by Regional Board staff since the prior Administrative Draft but believes that further changes are necessary, which are included in redline format in the County letter. A number of key issues have been extensively discussed in the focus meetings and Board workshops and, despite some changes, still remain a significant concern to the City. These include:

- The Receiving Water Limitations provisions in the Tentative Order could expose the City to Clean Water Act liabilities for discharges that cause or contribute to an exceedance of a water quality standard. A clear linkage between the compliance provisions and prohibitions, receiving water limitations, and effluent limitations must be established.

- The provisions dealing with land development, Low Impact Development (LID) and hydromodification control are significantly ratcheted up while existing permit programs are only just being implemented and/or pending approval. The City is particularly concerned with the elimination of all exemptions for the hydromodification control requirements, including for discharges to channels that have been engineered to prevent erosion. Exemptions for hydromodification management should include discharges to certain types of receiving waters and certain types of projects.

- The provisions implementing the Beaches and Creeks Total Maximum Daily Load (TMDL) bacteria requirements are inconsistent with the TMDL as it was developed and

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pose additional significant liabilities. Permit provisions must be consistent with the corresponding Basin Plan amendments.

- The provisions requiring the development and implementation of a Water Quality Improvement Plan need to be aligned with the Jurisdictional Runoff Management Program requirements so that the programs are complimentary and prioritized instead of additive.

Thank you for the opportunity to provide comments. The City would like to request the opportunity to meet with you, other Regional Board staff and the County of Orange to review in detail the changes requested in the County letter.

Please direct any questions regarding this letter to Joe Ames, Assistant City Engineer, at 949/470-8419.

Sincerely,

Dennis Wilberg
City Manager

C: Mark Chagnon, Director of Public Works
Rich Schlesinger, City Engineer
Joe Ames, Assistant City Engineer

CITY OF RANCHO SANTA MARGARITA

January 10, 2013

Wayne Chiu, P.E.
California Regional Water Quality Control Board, San Diego Region
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

Subject: Comment – Tentative Order No. R9-2013-0001, Regional MS4 Permit, Place ID: 786088Wchiu.

Dear Mr. Chiu:

The City of Rancho Santa Margarita appreciates the opportunity to provide comments on Tentative Order No. R9-2013-0001, which is intended by the Regional Board to serve as the basis for stormwater regulation in the City upon the expiration of current Order R9-2009-0002. The City has been actively involved in the development of the comprehensive set of comments submitted by the County of Orange and supports those comments and attaches them by reference.

The City appreciates the revisions made by Regional Board staff since the prior Administrative Draft, but believes that further changes are necessary, which are included in redline format in the County letter. A number of key issues have been extensively discussed in the focus meetings and Board workshops and, despite some changes, still remain a significant concern to the City. These include, without limitation:

- The Receiving Water Limitations provisions in the Tentative Order could expose the City to Clean Water Act liabilities for discharges that cause or contribute to an exceedance of a water quality standard. A clear linkage between the compliance provisions and prohibitions, receiving water limitations, and effluent limitations must be established.

- The provisions dealing with land development, Low Impact Development (LID) and hydromodification control are significantly ratcheted up while existing permit programs are only just being implemented and/or pending approval. In addition, many of the land development requirements conflict with applicable federal and/or state constitutional provisions, laws and court decisions and may not be practically enforceable.

- The City is particularly concerned with the elimination of all exemptions for the hydromodification control requirements, including for discharges to channels that have been engineered to prevent erosion. Exemptions for hydromodification management should include discharges to certain types of receiving waters and certain types of projects.

- The provisions implementing the Beaches and Creeks Total Maximum Daily Load (TMDL) bacteria requirements are inconsistent with the TMDL as it was developed and pose additional significant liabilities. Permit provisions must be consistent with the corresponding Basin Plan amendments.

- The provisions requiring the development and implementation of a Water Quality Improvement Plan need to be aligned with the Jurisdictional Runoff Management Program requirements so that the programs are complimentary and prioritized instead of additive.

Thank you for the opportunity to provide comments. The City would like to request the opportunity to meet with you, other Regional Board staff and the County of Orange to review in detail the changes requested in the County letter.

Please direct any questions regarding this letter to myself or Rae Beimer, Environmental Associate, at 949-635-1800 x 6503.

Yours sincerely,

EMaximous

E. (Max) Maximous, P.E.
City Engineer

CC: City Council
Jennifer M. Cervantez, City Manager
Gregory E. Simonian, City Attorney
County of Orange, OC Public Works Department

EM/rb

CITY OF VISTA
CALIFORNIA

January 10, 2013

Wayne Chiu, P.E.
California Regional Water Quality Control Board, San Diego Region
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

Subject: **City of Vista Comments – Tentative Order No. R9-2013-0001, Regional MS4 Permit, Place ID: 786088Wchiu**

Dear Mr. Chiu:

The City of Vista appreciates the efforts that the Regional Water Board staff has undertaken to involve the stakeholders in the development of the new permit. The early release of the administrative draft, subsequent focused meetings, and revisions incorporated into the Tentative Order have resulted in a Tentative Order that is much improved and will allow stormwater programs in the region to make meaningful progress towards improving water quality.

The City of Vista participated in the development of the comments submitted by the County of San Diego on behalf of the 21 Copermittees in San Diego County. We support the comments and look forward to their inclusion in the Final Order. Additionally, a couple of comments are included in the attached table related to the Land Development Provisions for consideration.

We understand the need to balance the collaborative process in the development of the permit with the regulatory oversight incumbent on the Regional Water Quality Control Board. Thank you for the opportunities provided for the Copermittees to add their experience and insights to the process. Please contact Paul Hartman at (760) 726-1340 x1373 or at phartman@cityofvista.com with any questions related to our comments.

Sincerely,

Greg Mayer
City Engineer

Attachment 1 - City of Vista Comments on Tentative Order R9-2013-0001

Permit Section	Tentative Order Page	Section Title	Reason for Prosed Change/Comments	Proposed Changes
E.3.c.(1)(a)	78	Development Planning - Structural BMP Performance Requirements (Stormwater Pollutant Control BMP Requirements)	LID is intended to retain the first flush up to the 85th percentile runoff difference. In San Diego County, the 24 hour - 85^{th} percentile precipitation event (P_{85}) usually generates runoff in natural conditions, as impervious soils (Type D) and poor or fair natural vegetation are predominant in the County. Runoff as a percentage of precipitation is dependent on the conditions of the natural terrain and the size of P85. The removal of this naturally occurring runoff as required in Section E.3.c.(1)(a)(i) may create an environmental problem in downstream wetlands, where critical habitat depends on this runoff for survival.	Modify E.3.c.(1)(a)(i) to read "The volume of storm water produced from a 24-hour 85th percentile storm event in post-development conditions less the volume of storm water produced by the same storm under natural conditions[26]" Modify footnote 26 to read "LID is intended to retain the first flush up to the 85th percentile runoff difference. The 85th percentile runoff in natural conditions will depend on the original natural vegetation and soil type."
E.3.c.(3)(b)(i)[c]	82	Alternative Compliance to Onsite Structural BMP Performance Requirements	The selection of 1.5 does not appear to be scientifically based. It is understood that a number greater than one is needed, but such a number could also be obtained from a concentration load – runoff analysis. The permit should have flexibility for projects where a more accurate scientific justification is provided.	Modify section E.3.c.(3)(b)(i)[c] to read "Biofilter at least 1.5 the design capture volume that is not reliably retained onsite, or biofilter a volume that demonstrates an equivalent load reduction that would occur if a retention LID volume is in place;"

April 10 and 11, 2013
Item No. 8
Supporting Document No. 5

County of San Diego
OFFICE OF COUNTY COUNSEL

COUNTY ADMINISTRATION CENTER
1600 PACIFIC HIGHWAY, ROOM 355
SAN DIEGO, CALIFORNIA 92101-2469
(619) 531-4860 FAX (619) 531-6005

WRITER'S DIRECT NUMBER:
(619) 531-4869
WRITER'S E-MAIL ADDRESS:
James.oday@sdcounty.ca.gov

January 10, 2013

Catherine Hagan, Esq.
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, California 92123-4340

via Fed Ex

Re: Tentative Order R9-2013-0001

Dear Catherine:

On behalf of our client the County of San Diego, I am writing concerning some provisions in Tentative Order R9-2013-0001 that are of particular concern to the County. I respectfully ask that you review our legal position on those provisions as outlined below, and please call me to discuss if you have any questions or need further information to assist your review.

The Bacteria TMDL Resolution

The Tentative Order would incorporate elements and requirements from the Bacteria TMDL Resolution (Resolution R9-2010-0001) into the new MS4 permit for San Diego Region copermittees, including the County of San Diego. We specifically urge the San Diego Regional Board to not incorporate the Bacteria TMDL provisions in this permit renewal cycle. It is our legal position that your Board has the authority to decline the demands of other interested parties that this action be taken.

Reasons Not to Incorporate the Bacteria TMDL Into the Permit

From a recent summary by Regional Board (RB) staff, County of San Diego copermittees spend approximately \$119M per year on programs to improve water quality in the San Diego region. Those programs have improved water quality in general and at beaches in the region. With ever-increasing knowledge gained through trial and error, and with the Watershed Quality Improvement Plan concept expected to permit existing resources to be focused in more efficient and effective ways, San Diego copermittees expect to continue the march toward improved water quality using the current level of resources. The copermittees are continually working on ways to improve water quality and have done so for over two decades. As evident in our annual expenditure and work with experts, we are committed to improving water quality.

By RB staff estimates and as confirmed by San Diego copermittees, the implementation of the Bacteria TMDL in the next permit cycle would add a magnitude of additional costs to copermittee budgets that is unsustainable using existing methods for raising general fund monies and given California's legal constraints on taxation or fees. As your Board has heard, the range of additional cost attributable to the Bacteria TMDL alone is \$144M to \$272M per year, meaning billions of taxpayer dollars over the compliance period.

As presentations in the adoption process have shown, given the unique challenges associated with bacteria as a constituent in stormwater, the cost-benefit analysis dictates that implementing the Bacteria TMDL at this time, as written, would be bad public policy. Studies and experience show that any magnitude of controls for bacteria, up to and including disinfectant efforts, will not consistently achieve the Resolution's numeric standards, even with the expenditure of billions of dollars. So, the sensible, logical next step is to take a hard look at the standards and assumptions of the Bacteria TMDL and devise plans to improve water quality using existing resources and as realistically achievable with today's scientific methods.

<u>Legal Authority to Not Incorporate the Bacteria TMDL Into the Permit</u>

As you know in 1987, Congress declared its intent to chart a different course for improving water quality flowing from MS4 systems by enacting Clean Water Act § 402 (33 U.S.C. § 1342). In establishing the "maximum extent practicable" (MEP) standard of CWA § 402(p)(3)(B), Congress recognized and enacted a different standard than the technology based requirements of CWA § 301. The MEP standard is the legal standard for stormwater compliance.

In *Defenders of Wildlife v. Browner,* 191 F.3d 1159 (1999) the Ninth Circuit held that the MEP standard of CWA § 402(p)(3)(B) *replaces* the requirements of CWA § 301(b)(1)(C) for MS4 dischargers. The *Browner* decision goes on to discuss the discretion vested in permitting authorities to either require strict compliance, or less than strict compliance, with water quality standards.

Our office believes that the November 12, 2010 EPA memorandum concerning the incorporation and use of numeric WQBELs in permits is not dispositive of this issue. As acknowledged in its March 17, 2011 letter, EPA is still considering whether to retain, reissue, or withdraw the 2010 memorandum. And, in the same letter, EPA acknowledges that the 2010 memorandum, "does not impose legally binding requirements on EPA, States, or the regulated community, nor does it confer legal rights or impose legal obligations on any member of the public."

With regard to the unique challenges associated with bacteria control, the science shows that consistent achievement of the Bacteria TMDL numeric standards is not possible, even with any level of expenditure. Therefore, imposing the 2010 Bacteria TMDL provisions as permit conditions would exceed the "maximum extent practicable" standard. Accordingly, we believe your Board is vested with the discretion to elect not to incorporate the Bacteria TMDL provisions at this time.

Your Board would be justified to open a process to revisit and re-examine the Bacteria TMDL assumptions in the context of its basin planning process, instead of taking the irrevocable step of incorporating the TMDL into the permit and potentially wasting valuable taxpayer dollars that could better be spent on achievable water quality improvement goals.

Receiving Water Limitations (RWL) Language

As you know, the copermittees have expressed significant concerns about third-party liability risks resulting from the Ninth Circuit's interpretation of receiving water limitation language in the L.A. Region's stormwater permit. While we appreciate the State Water Resources Control Board's willingness to take comment and review those concerns, it may take several months for the State Board to act. The Tentative Order retains language similar to the problematic language reviewed in the *NRDC* case; this leaves the County and other copermittees immediately exposed to similar litigation from third parties for violations of water quality standards. We know that several various proposals to modify RWL language have been presented at state and local levels.

We suggest a simple solution consistent with Congress' intent in enacting CWA § 402 as discussed above: simply remove the RWL language in Provision A of the Tentative Order. Federal law does not require imposition of the receiving water limitations for MS4 systems. There is precedent for this action; a number of EPA issued stormwater permits throughout the country do not include this language. Your Board has the discretion under CWA § 402 and *Browner* to remove the language. If EPA does not consider the RWL language to be essential to its own MS4 permitting, it seems logical that your Board is not required to include it in the new permit.

State Water Board policy supports the iterative process approach to water quality improvement, and acknowledges that water quality standards for many pollutants from MS4s cannot be met immediately. Therefore it is unrealistic and at odds with the iterative process to enact a standard that puts the third-party lawsuit gun to the head of public entities diligently spending significant time and public money pursuing water quality improvement. The permit would still include its enforceable prescriptive requirements and the WQIP features that all parties believe will focus resources in each watershed in the most productive fashion. Over the past two decades, the region has developed the knowledge and skill set to improve water quality, but understands that only through an iterative process can true progress be made.

Removal of the RWL language would eliminate the inevitable jousting over modified language proposals and the uncertainty created by its retention in light of the *NRDC* ruling. Copermittees would simply be obligated to focus on permit condition compliance, including the tasks identified in approved WQIPs, subject to RB enforcement if appropriate. Removal of the language would not create a "free pass"; to the contrary, it would encourage effective water quality monitoring and reporting that might otherwise be discouraged by the specter of third party lawsuits like those filed in the *NRDC* and other cases.

Land Development Standards/Hydromodification Issues

County Counsel concurs with the legal concerns sent to your attention in the December 19, 2012 letter from the Office of the City Attorney of the City of San Diego. The letter points out potential constitutional issues with hydromodification requirements imposed in the Tentative Order. We urge you to recommend modifying the referenced provisions to avoid the potential consequences for copermittees outlined in the letter.

The County also urges the Regional Board to amend the Tentative Order to incorporate the approved hydromodification management plan (HMP) for San Diego County into the permit, and remove provisions of the Tentative Order that are inconsistent with the HMP. As you know, the HMP was developed at significant cost to copermittees, and has only recently been implemented. Therefore, scrapping key components and changing the baseline standard for redevelopment to the questionable "pre-development" standard without further study of the effectiveness of the HMP as implemented is legally inconsistent with the premise upon which the HMP was required to be developed in the first instance. Our client is submitting a more comprehensive technical comment on the HMP issue for your review.

Other legal concerns with various Tentative Order provisions will be woven into the comprehensive written comments to be submitted by the County and copermittees. Because of the potential impact of the above provisions of the Tentative Order for our client, we urge you to review and revise your recommendations to the Regional Board. Our mutual goal should be a permit that realistically and responsibly advances the march toward improved water quality in the region using available existing resources. As always, thank you for your consideration.

Very truly yours,

THOMAS E. MONTGOMERY, County Counsel

By James R. O'Day

James R. O'Day, Senior Deputy

JRO/tlm
12-00802

April 10 and 11, 2013
Item No. 8
Supporting Document No. 5

DEPARTMENT OF THE NAVY
COMMANDER NAVY REGION SOUTHWEST
937 NO. HARBOR DR.
SAN DIEGO, CALIFORNIA 92132-0058

IN REPLY REFER TO:
5090
Ser N45JWW.ch/013
January 10, 2013

Wayne Chiu, P.E.
California Regional Water Quality Control Board,
San Diego Region
9174 Sky Park Court, Suite 100
San Diego California 92123-4340

Dear Mr. Chiu:

SUBJECT: COMMENT - TENTATIVE ORDER NO. R9-2013-0001, REGIONAL MS4 PERMIT, PLACE ID: 786088WCHIU

On behalf of Navy Region Southwest I respectfully submit these comments on the draft Regional MS4 Permit.

In a conscious policy decision, supported by the CWA, the MS4 permit mandates toxicity monitoring for receiving waters. This policy direction recognizes some very important and unique aspects of storm water discharges namely; they are intermittent, flow is unpredictable, and they are short duration representing a very temporary condition in the receiving water.

Receiving water toxicity testing is consistent with the San Diego Region Basin Plan which states that *"All waters shall be maintained free of toxic substances in concentrations that are toxic, or that produce detrimental physiological responses in human, plant, animal, or aquatic life"*. It is also consistent with the current draft of the State Water Board Policy for Toxicity Assessment and Control as well as the recently adopted Framework for Monitoring and Assessment in the San Diego Region. Together these documents insure that reliable and statistically and scientifically sound information is produced to show permit compliance, and guide decisions about, and the evaluation of, the progress of efforts to protect and restore the quality and beneficial uses of waters in the San Diego Region.

The Navy supports the use of toxicity testing of the receiving water as described in Provision D Monitoring and Assessment Program Requirements. Toxicity testing of the receiving water, as opposed to testing 100% storm water, is protective of water quality and beneficial uses and accurately measures toxicity impacts from storm water discharges.

Lastly, as articulated in the MS4 Fact sheet F-36:

> *"[t]he inclusion of receiving water limitations is also consistent with the Ninth Circuit Court of Appeals' ruling in Defenders of Wildlife v. Browner (191 F.3d 1159, 1166 (1999)) that the permitting authority has discretion regarding the nature and timing of requirements that it includes as MS4 permit conditions to attain water quality standards."*

We support the San Diego Regional Board's use of toxicity testing of the receiving water in all NPDES Stormwater Permits where toxicity limitations or monitoring requirements are determined necessary to insure water quality protection. This position is supported by the CWA, Porter Cologne Act, State Policy, US EPA-approved Regional Basin plans.

The Navy requests that you consider these comments in the upcoming permit adoption. The points of contact for this letter are Mr. Christopher Haynes at christopher.a.haynes@navy.mil or (619)532-2285 and Mr. Brian Gordon at brian.gordon@navy.mil or (619)532-2273.

Sincerely,

Brian S. Gordon

B. S. GORDON
By direction

WARREN D. WILLIAMS
General Manager-Chief Engineer

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RIVERSIDE COUNTY FLOOD CONTROL
AND WATER CONSERVATION DISTRICT

January 10, 2013

Mr. Wayne Chiu, P.E.
California Regional Water Quality
Control Board, San Diego Region
9174 Sky Park Court, Suite 100
San Diego, California 92123-4340

Dear Mr. Chiu:

Re: Tentative Order No. R9-2013-0001
Regional MS4 Permit
Place ID: 786088Wchiu

The Riverside County Flood Control and Water Conservation District (District) is submitting this comment letter on the above listed Tentative Draft Order on behalf of the Riverside County MS4 Copermittees within the San Diego Region (Riverside County Copermittees) which includes the District, the County of Riverside and the Cities of Murrieta, Temecula and Wildomar. Tentative Draft Order R9-2013-0001 (Draft Permit) was drafted by Board staff to cover Phase I municipal separate storm sewer system (MS4) Copermittees in San Diego County, southern Orange County, and the portion of southwestern Riverside County within the Santa Margarita Hydrologic Unit.

The Riverside County Copermittees have previously commented that the San Diego Water Board lacks authority to adopt a regional permit covering Orange and Riverside Counties, in addition to San Diego County; a comment which is discussed in further detail below and in the attached legal comments. Notwithstanding such objection, and subject to it, the Riverside County Copermittees are providing comments on the Draft Permit.

In the workshop on the Administrative Draft Order held on April 22, 2012 San Diego Water Board staff identified the following desired outcomes for the proposed permit:

- Improving the quality of water discharged from the MS4
- Restoring or enhancing Beneficial Uses and Receiving Water quality

It was further identified by Board staff that to be able to meet those goals, the proposed regional MS4 permit needed to be 1) Strategic, 2) Adaptive, and 3) Synergistic.

Notwithstanding the concerns of the Riverside County Copermittees with regard to the legal authority to issue a regional MS4 permit, the Copermittees agree that being able to adapt and direct resources toward specific water quality priorities in a given watershed, rather than all potential problems simultaneously, is more likely to result in actual and meaningful improvements in water quality. However, to be able to achieve those improvements the MS4 Permit must be crafted to provide the Copermittees with the ability to truly and fully adaptively manage their programs to focus resources on those BMP strategies and monitoring efforts that are identified as being most effective, consistent with the MEP standard, at addressing watershed priorities.

Unfortunately, many provisions in the Draft Permit, including but not limited to the Receiving Water limitation provisions in Provision A and others discussed in this letter, still do not fully support the achievement of those outcomes. The Draft Permit does not provide the Copermittees with the flexibility to be fully strategic in managing their resources nor the ability to fully adapt their programs to focus on the highest priority water quality needs of the watershed. This comment letter and the other documents submitted herewith (a redline of the Draft Permit and Legal Comments) identify some suggestions which, if adopted by the San Diego Water Board, will help to address these limitations and facilitate the desired improvements.

This comment letter is organized as follows:

As noted, the Riverside County Copermittees also are submitting a redline of the Draft Permit ("Redline") that proposes alternative language intended at achieving solutions to the various issues raised in this letter, and a Legal Comment document ("Legal Comments") that provides additional legal context for the various issues raised in this letter. The Riverside County Copermittees reserve their right, in the context of filing a Report of Waste Discharge ("ROWD") prior to the expiration of Order R9-2010-0016 (the 2010 MS4 Permit), to again address these issues and others relevant and appropriate to the SMR.

1 BACKGROUND

The Riverside County Copermittees were issued an extensive and prescriptive MS4 Permit in November 2010 which greatly expanded monitoring obligations, required special studies, a jurisdictional runoff management program, and Watershed Workplan requirements that were very different than the requirements set forth in the previous MS4 Permit issued to the Copermittees. Development and implementation of the 2010 MS4 Permit compliance requirements has been very expensive, especially in comparison to the relatively few demonstrated impairments of Beneficial Uses in the region and the Copermittees' resources. These requirements have left other important societal needs unfulfilled by the Riverside County Copermittees during a period of unprecedented and continuing economic distress. Further, the Riverside County Copermittees are still in the process of developing and implementing these 2010 MS4 Permit requirements, which is a serious concern given the very different compliance approach proposed in the Draft Permit. The Copermittees hope that the compliance efforts under the current MS4 Permit are taken into account when they submit their ROWD at the expiration of the 2010 MS4 Permit.

2 General Comments

2.1 Regional Permit

The Riverside County Copermittees respectfully submit that the San Diego Water Board is not authorized under the Clean Water Act or under its implementing regulations to issue a regional permit to Copermittees in San Diego County, South Orange County and the Santa Margarita Region (SMR) of Riverside County. As discussed more fully in the Legal Comments, the only circumstance under which the San Diego Water Board could issue such a permit would be if the Copermittees in these counties agreed to such a permit. Additionally, while the Draft Permit purports to affect the conduct of the Riverside County Copermittees upon expiration of the 2010 MS4 Permit in November 2015, the Riverside County Copermittees have not submitted a ROWD requesting coverage under a regional permit. Because no application has been made for the regional permit, which is a requirement set forth in the CWA regulations, the San Diego Water Board lacks jurisdiction to name the Riverside County Copermittees on the Draft Permit at this time.

Notwithstanding the above, the Riverside County Copermittees are submitting the comments in this letter based on:

- The San Diego Water Board staff's stated intent to enroll the Riverside County Copermittees in this permit upon expiration of the 2010 MS4 Permit.
- Statements made by San Diego Water Board staff that this comment period would serve as the primary opportunity for the Riverside County Copermittees to influence their next term MS4 Permit. The Riverside County Copermittees are entitled, as part of the ROWD process, to again raise relevant issues regarding permit provisions, but have undertaken in these comments to address major current concerns.

2.2 Outcome Focus

As mentioned above, the Copermittees agree that being able to adapt and direct resources toward addressing the specific water quality priorities in a given watershed, rather than all potential problems simultaneously, is more likely to result in actual/meaningful improvements in water quality. However, to be able to achieve those improvements, the MS4 Permit must fully integrate the following principles:

- **The Jurisdictional Program requirements must be fully flexible:** The Permit must be written in a way that allows the Copermittees to truly and adaptively manage their programs to fully focus their existing resources on those BMP strategies and monitoring efforts that are identified within the Water Quality Improvement Plan (WQIP) as being most effective, consistent with the Maximum Extent Practicable (MEP) standard, at addressing the watershed's priorities. We understand this to be the goal of the San Diego Water Board as well. While some elements of the Draft Permit embody this need, others do not and require dedication of resources to specific pre-defined efforts, regardless of the identified need for that effort in the watershed. The specific program areas that need more work to this end are:
    - The approach to addressing Non-stormwater discharges
    - Development Planning
    - Retrofitting
    - Channel Rehabilitation

These issues and proposed new language to address these issues are included throughout this letter and/or in the attached Redline.

- **Basin Plan updates need to be Prioritized by the San Diego Water Board:** For outcome-based permitting to be successful, the desired outcomes must be achievable by and appropriate to the Copermittee. To do that, the outcomes must take into account the background conditions in the watershed, and be appropriate for the attainment of Beneficial Uses in the specific waterbody, based on the specific conditions within and influencing that waterbody. The values in the Basin Plan should be comprehensively re-evaluated to ensure that water quality standards are scientifically justified to protect Beneficial Uses. Without updating the Basin Plan, the outcomes that the Copermittees target in the WQIPs would be arbitrary and not guaranteed to achieve the desired beneficial use improvements. Such an update should be pursued aggressively, led by and adequately funded by the San Diego Water Board, with participation by the MS4 Copermittees and other dischargers and stakeholders in the watershed.

- **Other Dischargers need to be Similarly Regulated by the San Diego Water Board:** The MS4 Copermittees are not the only dischargers of pollutants in the watershed. For example, the SMR of Riverside County includes State Lands (such as Caltrans), Tribal Lands, Agricultural Operators, Industrial Permit dischargers, Construction Permit dischargers, Phase II entities, Water Districts, and 'De Minimus' dischargers issued general permit coverage; all of which:

- Have separate regulatory programs (such as permits or waivers) implemented by the San Diego Water Board;
- May discharge pollutants, including non-stormwater, that can affect the quantity and quality of runoff, both directly within Receiving Waters, and in runoff discharges that may enter into and be discharged from the MS4; and
- Cannot be regulated by the Copermittees for the quantity and quality of their runoff because of their separate permits or waivers granted by the NPDES Program Administrator.

As such, while MS4 Copermittees can implement programs to reduce pollutants in discharges that are within their legal jurisdiction, no amount of effort by the MS4 Copermittees can be expected to fully attain water quality standards in the Receiving Waters. The only way to achieve that outcome will be for the NPDES Program Administrator (the San Diego Water Board in most cases) to directly regulate each of these entities to similar levels and standards as set forth by this Permit.

2.3 Responsibility for meeting goals of CWA

The CWA requires Copermittees subject to any MS4 permit, including the Draft Permit, only to address discharges from their MS4s. 33 U.S.C. § 1342(p)(3)(B). The Copermittees are not required to restore Beneficial Uses in any Receiving Water, or to address sources of pollution to those Receiving Waters that are not being discharged into or from those MS4s. However, in various provisions in the Draft Permit, there is a suggestion that the Copermittees are solely responsible for attaining water quality standards in their respective Receiving Waters. The San Diego Water Board must make clear in the Draft Permit that the responsibilities of the Copermittees are limited to their MS4s and the requirements of the CWA for municipal stormwater dischargers. Redline changes have been proposed in the above referenced portions of the Draft Permit to address this issue.

3 Specific Comments

The following comments represent specific high level concerns that the Riverside County Copermittees have identified at this time. Additional comments on the Draft Permit can be found in the Redline, as well as in the attached Legal Comments.

3.1 Findings

The Riverside County Copermittees have two separate sets of comments on the Findings. The first addresses the need for additional findings, with respect to aspects of California law and the physical setting of the SMR. The second set of comments focuses on existing Findings in the Draft Permit.

3.1.1 Needed Additional Findings

The Findings in the Draft Permit fail to fully address the context and conditions under which the proposed permit requirements are to be applied. A more complete explanation of this background is necessary to ensure that the Provisions ultimately included in the Draft Permit are credible, appropriate and legally required, and that the Permit Provisions (which must stem from the Findings) reflect the context of the broader issues that affect MS4s within the region. The Riverside County Copermittees request that San Diego Water Board staff work with the MS4 Copermittees to expand the Findings, including the addition of findings to address the following:

California Water Law

California law requires that downstream entities must accept runoff from up-gradient properties. Owners and operators of MS4s are not exempt from this legal mandate, even if that runoff contains pollutants. Moreover, flood control districts, including the District, are mandated by the California Legislature (Legislature) to protect the lives and property of residents from floodwaters. The Riverside County Copermittees request that a finding, in the form set forth in the Redlines, be added to the Draft Permit.

Flooding

Many areas that would be under the jurisdiction of the Draft Permit are subject to periodic catastrophic flooding, which results from natural conditions, specifically the presence of mountains and hilly areas in close proximity to development, along with the effect of strong Pacific storms. This flooding would occur even in the absence of development. The Legislature recognized the importance of this issue in the early 20th Century, when it established flood control districts across the state, including in Riverside, Orange and San Diego Counties. Such flooding has, and if not controlled, could result in loss of life and widespread property damage. Further, the flooding can mobilize significant amounts of pollutants from industrial, commercial, residential and agricultural lands, damaging watercourses, habitat, and the Beneficial Uses therein. MS4 systems are designed and constructed to mitigate these impacts. The Riverside County Copermittees request that a finding in the form set forth in the Redline be added to the Draft Permit.

Flood Control District Acts

As noted above, the Legislature established Flood Control Districts in Orange, Riverside, and San Diego Counties through a series of Flood Control Acts. The Legislature determined that protection of life and property from the effects of flooding through the implementation of flood control improvements was a priority, and assigned those Districts with the sole responsibility to design, construct and maintain those improvements necessary to manage and contain floodwaters to prevent such negative impacts, as well as to conserve floodwaters for beneficial use. As noted above, these improvements represent fundamental water quality BMPs inasmuch as they reduce the widespread exposure of runoff to pollutants. The Flood Control Districts, while owners and operators of MS4s, have no authority or powers beyond those granted by the Legislature. The Legislature did not provide the Flood Control Districts, for example, the authority to regulate land uses within the municipal jurisdictions of Riverside County, nor to control the volume or quality of runoff discharged by those land uses. Findings describing the legislative priority for flood control and the limitations on the governing power of the Flood Control Districts should be added to set forth the appropriate role of the Flood Control Districts as MS4 Copermittees. The Riverside County Copermittees request that a finding, in the form set forth in the Redline, be added to the Draft Permit.

Limits on Extent of Permittee Legal Authority

The MS4 Copermittees lack the authority to regulate many significant sources of pollutants that may impact Receiving Waters. For example, the Copermittees cannot regulate pollutants discharged from federal and state lands, facilities, tribal lands, special districts, utilities, agricultural lands, or railroads. Moreover, the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) preclude local regulation of pesticides. The Riverside County Copermittees request that a finding in the form set forth in the Redline be added to the Draft Permit.

3.1.2 Comments on Existing Findings

Findings 3 and 15 (and elsewhere in Draft Permit)

In Findings 3 and 15 (and throughout the Draft Permit), it is stated that the CWA requires controls to reduce the discharge of pollutants "in stormwater" to the MEP. Finding 15, moreover, states that non-stormwater discharges from the MS4 are "not considered stormwater discharges and therefore are not subject to the MEP standard, stating that the MEP standard "is explicitly for 'Municipal . . . Stormwater Discharges" from the MS4s.

These conclusions are directly contrary to the plain language of the CWA, as set forth in the November 16, 1990 preamble accompanying the CWA stormwater regulations. Those authorities provide that the MEP standard applies to *all* pollutants discharged from the MS4, notwithstanding that some may be transported by non-stormwater. Additionally, the Redline reflects deletion of the limitation of the MEP standard to stormwater discharges in multiple locations, reflecting federal law. For a further discussion of this issue, please see the Legal Comments. The Riverside County Copermittees also request deletion of Finding 15.

Finding 11

This Finding states that "[r]ivers, streams and creeks in developed areas used [to convey runoff] . . . are part of the Copermittees' MS4s regardless of whether they are natural, anthropogenic, or partially modified features. In these cases, the rivers, streams and creeks in the developed areas of the Copermittees' jurisdictions are both an MS4 and Receiving Water." This statement is incorrect and must be deleted (as reflected in the Redline). For reasons more fully set forth in the Legal Comments, natural streams cannot be considered MS4; there is no MS4 "outfall" from a channelized river or stream to a natural stream; and, USEPA itself requires a distinction between MS4s and Receiving Waters.

Finding 12

This Finding states that as operators of MS4s, "Copermittees cannot passively receive and discharge pollutants from third parties." By providing free and open access to an MS4 that conveys discharges to Waters of the U.S., the operator essentially accepts responsibility for discharges into the MS4 that it does not prohibit or otherwise control. This statement is incorrect and must be deleted (as set forth in the Redline). As the discussion in the Legal Comments indicates, municipalities must maintain the MS4 to protect the lives and property of their citizens and to prevent nuisance. Flood Control Districts have a statutory obligation to operate and maintain such MS4, an obligation which is not affected by either the CWA or the terms of the Draft Permit. While an MS4 operator has the obligation to effectively prohibit the entry of non-stormwater into the MS4, it does not have legal responsibility for such discharges, which are the responsibility of the discharger itself and subject to the jurisdiction of the San Diego Water Board, pursuant to Water Code section 13260 *et seq.*

Finding 28

This Finding recites that the San Diego Water Board finds that the requirements of the Draft Permit "are not more stringent than the minimum federal requirements." The Riverside County Copermittees disagree with this finding, as it is not supported by the evidence, *i.e.,* the many requirements in the Draft Permit which exceed the federal MEP standard. Moreover, any decision by the San Diego Water Board to adopt "other provisions" going beyond MEP is not a federal requirement, but rather a discretionary decision taken by a state agency under authorization in the CWA. *See Defenders of Wildlife v. Browner,* 191 F.3d 1159, 1164-65 (9th Cir. 1999). Please see discussion in the Legal Comments. The Finding also indicates that the San Diego Water Board has developed an economic analysis of the Draft Permit. As set forth in the Legal Comments, the Riverside County Copermittees challenge the adequacy of that analysis.

Finding 29

This finding purports to find that the Draft Permit does not constitute an unfunded state mandate. The Riverside County Copermittees disagree with the conclusions set forth in this finding. More importantly, the finding is without legal effect because exclusive jurisdiction as to whether a state mandate exists, and whether it is unfunded lies with the Commission on State Mandates. Government Code §§ 17751 and 17552; *Lucia Mar Unified School District v. Honig* (1988) 44 Cal.3d 830, 837; *Hayes v. Commission on State Mandates* (1992) 11 Cal.App.4th 1546, 1596-97. The finding of an agency that has no jurisdiction to make that finding is entitled to no weight and should be deleted, as shown in the Redline. For an additional discussion of these issues, please see the Legal Comments.

Finding 31

The Riverside County Copermittees believe that the Receiving Water Limitation ("RWL") language set forth in the Draft Permit renders compliance with the permit impossible, since exceedances of water quality standards occur routinely through no fault of the MS4 Permittees. Thus, unless the RWL is modified to provide the Copermittees with a means to be in compliance, those Copermittees risk the threat of arbitrary San Diego Water Board enforcement or the bringing of citizen suit lawsuits under the CWA, which could nullify compliance with all other terms set forth in the Draft Permit, as discussed more fully in the Legal Comments. The exposure to third party litigation from the proposed RWL language is one of the most significant threats to an otherwise collaborative approach to achieving long term water quality improvement. This threat was emphasized by the recent bringing of a citizen suit lawsuit against the City of Malibu, the County of Los Angeles and the Los Angeles County Flood Control District based on similar language in the 2001 Los Angeles County MS4 Permit. The Riverside County Copermittees have suggested modifications to Provision A in the Redline and as discussed below and in the Legal Comments that are intended to better support the Iterative Process for compliance authorized by the State Water Resources Control Board in Order No.

2001-15, through the WQIP process. The Copermittees also note that the State Board considered the problems with the RWL language at a recent workshop, which may eventually result in modifications which should, if applicable, be reflected in the Draft Permit. Other requested changes to the Findings are set forth in the Redline.

3.2 Provision A, Prohibitions and Limitations

As noted above, the requirements set forth in Provision A are of great concern to the Riverside County Copermittees. The Copermittees generally support an approach to compliance that utilizes WIQPs as the implementing mechanism for the 'Iterative Process' described in Provision A.4, and that by implementing that iterative process in accordance with A.4, that the Copermittee should be in compliance with Provisions A.1 and A.2. The Redline reflects edits of Provision A to clarify the linkage between the prohibitions and limitations in Provisions A.1. through A.3. and Provision A.4 – which is described as the method for complying with the prohibitions and limitations. It must be noted, however, that the Riverside County Copermittees do not agree with the approach suggested, that any WQIP-based compliance approach be necessarily accompanied by a Reasonable Assurance Analysis. Such analyses can be extremely complex, expensive and time-intensive to develop, and similar analyses are commonly developed within TMDL models; taking a number of years to develop and refine. Given that the Santa Margarita Watershed has no adopted TMDLs; thus, comprehensive pollutant transport and BMP models are not available for the suite of constituents that might be considered for prioritization within a WQIP for the Santa Margarita Watershed. In the context of a TMDL, such models would be developed by the combined resources of the San Diego Water Board and a range of stakeholders and dischargers. Undertaking such an exercise solely with the public resources of the 275,000 residents of the SMR is beyond the financial ability of the Copermittees and would shift the responsibility for development of TMDLs from the San Diego Water Board to the Copermittees. Comments on Provision A can be found below, in the Redline and in the Legal Comments.

3.2.1 Overview of Key Issues

As noted above, an overriding issue for the Riverside County Copermittees is having a permit that, while being appropriately proactive and aggressive at addressing the prioritized water quality conditions with the Receiving Waters, is one that all Copermittees can remain in compliance with while implementing those requirements. As presently drafted (and as made clear by statements in the Fact Sheet), Provision A imposes immediate potential liability on every Copermittee if monitoring in the Receiving Waters reflects exceedances of water quality standards that may have been caused or contributed to by MS4 discharges. San Diego Water Board staff has repeatedly indicated in workshop presentations that they expect that Copermittees will not be able to comply with the Receiving Water Limitations and Discharge Prohibitions for some time. Staff has separately indicated that they are interested in having the Copermittees undertake bold initiatives in trying to address urban runoff pollution, and that the Copermittees have actually been encouraged to "fail early and fail often" as this would reflect such progress in refining these initiatives. The iterative, flexible and priority-setting approach reflected in the WQIP is intended to allow the Copermittees to focus on the most important problems in their watershed. The entire approach is endangered, however, by RWL provisions which would allow either the San Diego Water Board or a citizen plaintiff to sue the Copermittees for any individual exceedance of the

RWLs. Under the current version of Provision A, the unmitigated risk of such actions leads not to bold initiatives but rather to attempts to minimize liability.

As set forth in the Legal Comments, this approach is not mandated by the CWA, State Board orders or the opinion of the Ninth Circuit Court of Appeals in *Natural Resources Defense Council v. County of Los Angeles*, 673 F.3d 880 (9th Cir. 2011), *reversed,* 568 U.S. __ (January 8, 2013). As importantly, the threat of immediate potential noncompliance actually interferes with the ability of the Copermittees, including the Riverside County Copermittees, to comply with the Draft Permit. Instead of being able to focus on pollutants of highest concern in the watershed, as called for in the WQIP, the Copermittees will be forced to try to address every pollutant monitored, since the exceedance of any water quality standard leads to immediate potential liability. Moreover, because citizen plaintiffs are entitled to injunctive relief under Section 505(a) of the CWA, a federal judge could order the Copermittees to undertake steps completely independent of the WQIP or other compliance provisions in the Draft Permit.

The Riverside County Copermittees do not object to compliance provisions that will provide a means to achieve real improvement in water quality. The Copermittees are willing to undertake these Provisions, because the success or failure is in their control. Compliance with the requirements of Provision A, however, is beyond the control of the Copermittees. Based on the statements made during the workshop process, the Riverside County Copermittees believe that the San Diego Water Board is serious about working with the Copermittees on a permit that provides flexibility and problem solving approaches. To ensure that this flexibility is not lost, the Draft Permit must tie in compliance with Provisions A.1 through A.3 to a process set forth in Provision A.4. This approach is shown in the Redline and is discussed further below.

3.2.2 Comments in support of specific changes

Provision A, Introduction

The introduction notes that pollutants "in stormwater discharges" from the MS4 must be controlled to the MEP. As discussed above, the CWA does not differentiate between stormwater and non-stormwater discharges from the MS4; both must be controlled to the MEP standard. The Riverside County Copermittees have requested revised language in the Redline. Additionally, the linkage between compliance with Discharge Prohibitions (Provision A.1), Receiving Water Limitations (Provision A.2) and Effluent Limitations (Provision A.3) should be noted as being defined by Provision A.4. This change is reflected in the Redline.

A.1.a

First, language must be added providing that compliance may be addressed through the process set forth in Provision A.4. This language is provided in the Redline. Second, the Provision prohibiting discharges which are "threatening to cause" a condition of pollution, etc., is unenforceable, because it prohibits an action that, with respect to MS4 operators, is beyond their control. Moreover, there is no authority for such provisions in the Porter-Cologne Act. The Riverside County Copermittees request deletion of this phrase, as shown in the Redline. Additionally, as set forth in the Legal Comments, the Provision improperly expands the Discharge Prohibitions to Waters of the State.

A.1.b

40 CFR § 122.26(d)(2)(iv)(B)(1) clarifies that the requirement for an MS4 Copermittee to "effectively prohibit" the discharge of Non-stormwater/illegal discharges into its MS4s is to be accomplished through "a program, including inspections, to implement and enforce an ordinance, orders or similar means…". The language of this Provision should reflect federal law in this respect. The Redline reflects this change.

A.1.c

First, this Provision requires the Copermittees to comply with the Basin Plan prohibitions listed in Attachment A. This list is over-inclusive, as it contains requirements that are not applicable to some or all of the Copermittees' MS4 discharges, or to the Riverside County Copermittees in particular. The Riverside County Copermittees request that this Provision be amended to read as follows: "Discharges from MS4s are subject to all applicable waste Discharge Prohibitions in the Basin Plan." This change is noted in the Redline. Second, language must be added providing that compliance with this restriction can be obtained through the process set forth in Provision A.4. This language is provided in the Redline.

A.2.a

First, this Provision and Provisions A.1. and A.3 should be linked to the iterative process described in A.4. Please see the Redline.

Second, not all plans, policies, etc. set forth in Provision A.2.a.(1)-(4) may qualify as "water quality standards" or be applicable to all the MS4 Copermittees. These subsections should be deleted, and replaced with a reference to "Water Quality Standards," which is a defined term in the Draft Permit (This change is reflected in the Redline). Otherwise, the MS4 Permit would become over inclusive with respect to what is considered a water quality standard. Such standards must be established in accordance with federal and state law. If this process has not been followed for a particular requirement, it is not a "water quality standard."

A.3.a

As discussed above, this Provision erroneously states that pollutants "in stormwater discharges" from MS4s must be reduced to the MEP. Please see the Redline.

A.3.b

This Provision should also provide that compliance with a TMDL constitutes compliance with Provisions A.1 and A.2, for those pollutants/waterbodies subject to the TMDL.

A.4.a

The Riverside County Copermittees support an approach whereby compliance with Provisions A.1 through A.3 are achieved through a truly iterative approach, one which reflects the intent of the precedential State Water Board Order Nos. 99-05 and 2001-015. As set forth in the Redline, the Riverside County Copermittees believe that they and the other Copermittees under the Draft Permit should be considered in compliance with Provisions A.1, A.2 and A.3, as applicable, through development of the WQIP, unless the San Diego Water Board denies approval of a WQIP or amendment thereof. This ensures that the Iterative Process which is the focus of the WQIP, is utilized to provide a means to be in compliance for the Copermittees.

A.4.c

This Provision should be deleted, as is reflected in the Redline. Again, this Provision defeats the purpose of an iterative approach to compliance with the Provisions A.1 through A.3, because it allows the San Diego Water Board to enforce any provision of the Draft Permit, including those provisions at any time. The San Diego Water Board obviously retains full ability to enforce the provisions of the Draft Permit, including with respect to the failure of the Copermittees to carry out required provisions. To short circuit the WQIP/JRMP process, however, is to defeat the entire intent of the Draft Permit.

3.3 Provision B, Water Quality Improvement Plans

3.3.1 Overview of Key Issues

- The goals and requirements of the WQIP need to be aligned with the requirements of the CWA that were established specifically for MS4 permits, and not impose the restoration of Receiving Waters entirely upon MS4 Copermittees.
- The WQIP should focus on addressing sources of pollutants within the jurisdiction of the respective Copermittees.
- The BMP strategies identified in the WQIP should fully inform the selection and design of programs identified in the JRMP. Some minor edits were proposed in Provision B, with additional edits as warranted in Provisions D and E.

3.3.2 Comments in support of specific changes

Introductory paragraph

The introductory language implies that the WQIP should be designed to unilaterally protect, preserve, enhance, and restore water quality and Beneficial Uses in waters of the state. As noted in Section 2.3 above, MS4 Copermittees are responsible only for discharges from their MS4s, not the unilateral protection of Beneficial Uses within their watersheds.

Redline edits were provided to:

- Tie the goals of the WQIP to the requirements of the CWA applicable to MS4 Permits.
- Replace 'waters of the state' with 'Receiving Waters' to be consistent with federal law.
- Clarify the linkage between Provision A and Provision B.

Additionally, Redline edits were provided to clarify that the strategies identified in the WQIP are intended to guide the specific actions that will be implemented by the Copermittees pursuant to Provision E.

B.1

The Riverside Copermittees support the redlines of the San Diego County Copermittees with regard to setting forth that the WQIP for the Santa Margarita Watershed Management Area (WMA) would commence upon enrollment of the Riverside County Copermittees into the Order.

B.2.e.

Two changes have been proposed, as shown in the Redline:

- The introductory paragraph includes language that clarifies that the Numeric Goals are not enforceable compliance standards, effluent limitations, or Receiving Water limitations. This clarification is consistent with San Diego Water Board staffs' verbally stated intent.
- Provision B.2.e.(1) as written requires that the final Numeric Goals be "capable of demonstrating the achievement of the restoration and/or protection of water quality standards in Receiving Waters". As discussed in Provision 2.3 above, meeting WQS in Receiving Waters is a goal of the overall NPDES regulatory programs under the CWA and not as a requirement to be accomplished alone by MS4 Copermittees. Redline edits have been provided to clarify that such goals are only required to be for MS4 discharges.

B.3.

In the Redline, edits were made to the introductory paragraph to ensure that the requirements are consistent with federal law. The CWA requires the 'effective prohibition' of non-stormwater discharges, not 'preventing' or 'eliminating' them.

Edits were also made to Provision B.3.a. to link the strategies more clearly to the Numeric Goals developed pursuant to Provision B.2.e, as well as to link them to the JRMP programs in Provision E.

B.5

In the Redline, edits were made to the introductory paragraph to clarify that the WQIP (and by extension the JRMP and Monitoring programs) are intended to meet the requirements of Provisions A.1, A.2, and A.3. The Tentative Order particularly excluded Provision A.1.b. (dealing with non-stormwater discharges). However, as discussed in the attached Legal Comments, the CWA requires that illegal discharges must be addressed via a program (as included in Provision E.2), and it is appropriate that the program be guided by the priorities and strategies included in the WQIP.

Other edits were made to clearly link Provision B.5 to the applicable requirements of Provision F.

3.4 Provision C, Action Levels

3.4.1 Overview of Key Issues

- The Action Levels (non-stormwater, and stormwater) applicable within each watershed should only be those that are associated with the priority water quality conditions in that watershed, or that are 303(d) listed for that watershed. For example, if Zinc is not a priority pollutant for a watershed, and is not 303(d) listed, there should not be a Zinc action level. This change is needed because Provision D requires analysis for all 'action level' parameters. Analysis for pollutants that are not a priority for a watershed is a waste of Copermittee resources.
- The Copermittees should be able to establish alternative action levels that are appropriate to the WMA within their WQIP. Such alternative action levels would be subject to Executive Officer approval as part of the WQIP approval process.
- Footnote 8 and 10 need to clarify that the NALs and SALs are not enforceable limitations.
- Various references to 'waters of the state' need to be changed to Receiving Waters for consistency with the Draft Order and the CWA.

Please see the Redline for further detailed comments and language changes.

3.5 Provision D, Monitoring and Assessment

The Riverside County Copermittees appreciate the changes in the monitoring program reflected in the Draft Permit, as compared to the Administrative Draft. However, elements of the revised requirements are still infeasible for the Riverside County Copermittees. The comments below identify modifications of areas of the monitoring requirement's which can significantly improve the Copermittees' ability to implement and comply with the requirements, while still maintaining appropriate jurisdictional accountability and assessment requirements to guide the implementation of the WQIPs and JRMP programs. The Redline provides further detailed comments and language changes.

3.5.1 Overview of Key Issues

- Dry Weather MS4 Outfall Monitoring
  - The level of effort dedicated to monitoring and addressing outfalls with non-stormwater discharges should be commensurate with the potential impact that discharge has on a Receiving Water. If a discharge, whether persistent or transient, has no or little potential for impacting a flowing Receiving Water, (e.g. due to infiltration, evaporation, or treatment of the flows), the outfall should be de-emphasized relative to other outfalls that have discharges that have connectivity to a flowing Receiving Water.
  - Outfall Dry Weather Field Screening – As currently drafted, the number of required visual inspections of outfalls during dry weather required per Provision D.2.a.(2)(a) and Provision D.2.b.(1) is both excessive and disproportionate. This will particularly impact smaller jurisdictions, which may be required to do more visual inspections of MS4 outfalls than would larger jurisdictions with more outfalls and more resources.
  - Similarly, as written, the Persistent Flow Outfall Monitoring requirements of Provision D.2.b.(2)(b) are excessive and also will disproportionately impact smaller jurisdictions.

Jurisdictions with several hundred outfalls will likely have significantly more resources to perform the required monitoring than smaller jurisdictions with fewer outfalls, yet both are required to implement the same level of persistent flow monitoring.

- Assessment Requirements
  - The assessment requirements require modeled extrapolation of monitored outfall data to non-monitored outfalls for the purposes of calculating loads from each outfall in each jurisdiction. Such extrapolations though modeling or other calculations will not accurately reflect actual jurisdictional loads, and have no benefit that directly analyzing the monitored data cannot more accurately provide.

3.5.2 Other Global Issues

- As currently drafted, MS4s operated by a flood control district within a city or county would be effectively double-counted for identification of outfalls in each jurisdiction and for performance of the load calculations from each jurisdiction. Additionally, Flood Control Districts have no land use or enforcement authorities outside of the MS4 and rely on the local Copermittee to address pollutant sources and discharges to their MS4. Redline edits have been included to clarify the relationship between districts and the municipal jurisdictions they serve for the purposes of outfall monitoring and the assessment requirements.
- Timelines for monitoring and assessments were clarified throughout and linked to specific reporting requirements of Provision F in the Redline.

3.5.3 Comments in support of specific changes

D.1.a.(3) and D.1.e.

The Redline clarifies that the Receiving Water monitoring described in these sections must be conducted as applicable to the WMA and the Copermittees' MS4 discharges, because some of the monitoring requirements only apply to MS4 discharges to certain waterbodies. Not all Copermittees within a WMA will have discharges to that waterbody.

D.1.b.

The Redline proposes language to allow for alternative long-term monitoring stations to be identified. Using the SMR as an example, the Copermittees might wish to utilize a location other than the existing stations due to the influence of groundwater during dry weather and/or the general lack of MS4 contributions in dry weather to those locations.

Table D-1 and D-6

The Redline proposes an addition to the list of field observations, an assessment for flow connectivity of any MS4 discharges to the sampled Receiving Water. It is important to know whether the sampled Receiving Water included a contribution of flows from MS4 discharges, or whether the data reflect conditions in the absence of an apparent MS4 discharge contribution.

D.2.a.(2)

The Redline clarifies that the identification of annual outfall monitoring requirements is based on municipal Copermittee boundaries, inclusive of Flood Control District MS4 outfalls within their jurisdiction.

The Redline clarifies that the field screening requirements apply to those outfalls in the Copermittee's inventory that are 'accessible'. If an outfall is inaccessible for safety reasons or due to habitat restrictions, it would not need to be field screened.

The Redline simplifies the 'tiers' in Provision D.2.a.(2)(a) by removing the lower tier (i), and expanding the second tier (ii) to cover all Copermittees with 500 or less outfalls. This resolves the disproportionality that occurs for Copermittees with a number of outfalls near the current 125 outfall threshold. For example, as currently drafted, a city with 150 outfalls would be required to do 150 visual inspections per year, but a smaller city with 120 outfalls would be required to do 192 visual inspections per year. The Redline also maintains the 80% requirement from the first tier to help smaller Copermittees manage their workload for meeting the field screening requirements while also conducting the additional source identifications that are required under the Draft Permit.

The Redline includes edits to Footnote 19 to clarify that persistent flow should effectively be a discharge that is hydraulically connected to a flowing Receiving Water. Any other discharges that are not affecting a flowing Receiving Water (such as pooled or ponded water) would be addressed as a Transient Discharge, with source IDs any time an obvious illegal discharge (i.e. color or odor) is identified.

D.2.a.(3)

The Redline incorporates edits proposed by the San Diego County Copermittees to require 10% of the samples in each WMA to be from a first storm event. As described in the comments of the San Diego County Copermittees, this will help avoid overly skewing of the data to 'first flush' data, while still incorporating such data into the data and analyses.

D.2.b.(1)

The Redline removes the requirement that the number of visual inspections performed be equivalent to the number of inspections required under Provision D.2.a.(2)(a).

As areas within a jurisdiction are confirmed not to have non-stormwater discharges, inspections of other outfalls would have to be perpetually (and unnecessarily) increased to maintain compliance with this requirement. For example, if a Copermittee had 150 outfalls, but after the transitional period it confirmed that 100 of those outfalls had no evidence of non-stormwater discharges to flowing Receiving Waters, it would have to visit the remaining 50 outfalls for up to three times a year to meet the requirement in this Provision. As the Copermittee got closer to eliminating non-stormwater flows at more outfalls, inspections at the remaining outfalls would quickly become excessive and unreasonable. Removing this requirement will better incentivize the elimination of non-stormwater flows, as a Copermittee can look forward to reducing its workload in areas confirmed to not have non-stormwater flows.

D.2.b.(2)(b)

While the Riverside County Copermittees support the San Diego County Copermittees' proposal to reduce the number of required outfalls from 10 to 5 persistently flowing outfalls per WMA, the Riverside County Copermittees believe that applying the same minimum bar to all Copermittees is inappropriate and disproportionately affects smaller Copermittees that have commensurately less staff and resources.

The Riverside County Copermittees propose requiring monitoring of the top 10% of the prioritized persistent flow outfalls, with a lower and upper limit of 1 and 5 respectively, as shown in the redlines. With this change, the level of effort required of any individual Copermittee would scale consistent with the number of persistent flow outfalls within each Copermittees' jurisdiction.

Additionally, the Riverside County Copermittees request changing the requirement of Provision D.2.b.(2)(b)(ii) to require annual monitoring rather than semi-annual monitoring. With this change, a Copermittee could focus more of their annual budget on conduction Source ID efforts – which can result in eliminating problematic non-stormwater flows, rather than on a second monitoring event. Copermittees would still have the option to conduct a second monitoring event if they have more resources available and want to remove the outfall from their monitoring list sooner in accordance with Sub-Provisions [a] through [d].

D.2.b.(2)(e)

The Riverside County Copermittees support the San Diego County Copermittees' comments regarding allowing for a tailored list of constituents to be developed for each WMA. The Redline incorporates those edits.

D.3.

The Riverside County Copermittees support the changes recommended by the San Diego County Copermittees to this section, and these changes are reflected in the Redline.

D.4.a.(2)

This Provision as drafted would require the MS4 Copermittees to make comprehensive evaluations of Beneficial Uses that are beyond their expertise or the scope of an MS4 permit. Such evaluations and determinations would require advanced studies and cannot be answered with the monitoring data collected through this permit. This Provision should either be deleted or, alternatively the Riverside County Copermittees request that the assessments be focused on determining the status and progress toward addressing any Numeric Goals established for those Receiving Waters in the WQIP. Please see the Redline.

D.4.b.(1)

The Redline clarifies that outfall assessments are to be done for the area covered by each Municipal Copermittee (consistent with the proposed definition), and that the data to be used by each Municipal Copermittee would include the data collected from any Flood Control District Copermittee operated MS4s within its jurisdiction. This ensures that jurisdictional data is not double reported for Flood Control District MS4s within a city or county.

For Sub-Provision D.4.b.(1)(c)(iv) three key changes are requested in the Redline:

1) Annual volumes and pollutant loads should only be calculated from the monitored outfalls with persistent discharge to a flowing Receiving Water. This is directly applicable to the purpose of the Draft Permit and an important change, because volume and pollutant data extrapolated to non-monitored MS4 outfalls would be inaccurate and potentially misused if taken out of context. It is understood that San Diego Water Board staff want to ensure that jurisdictional accountability is maintained. However, since MS4 outfall monitoring will be conducted within each jurisdiction, inter-jurisdiction comparisons and accountability can be accomplished using the monitoring data directly without such extrapolations.
2) Added language to require a Copermittee to include in its jurisdictional load calculations any discharge that was demonstrated to have entered another Copermittees' MS4 before being discharged into the flowing Receiving Waters. This is important to ensure that each Copermittee maintains accountability for pollutants discharged to flowing Receiving Waters from within its jurisdiction.
3) The Redline proposes that the calculations of pollutant loads be only for the priority water quality constituents identified in the WQIP.

D.4.b.(2)(b)

Two key changes are recommended in the Redline:

1) Annual volumes and pollutant loads should only be calculated from the monitored outfalls for the monitored storm events. This is an important change because volume and pollutant data extrapolated to non-monitored events would be inaccurate and potentially misused if taken out of context. It is understood that San Diego Water Board staff want to ensure that jurisdictional accountability is maintained, so the Redline proposes that data from the monitored outfalls be extrapolated to identify loads for each jurisdiction during each monitored event. With this information, inter-jurisdiction comparisons and the desired 'accountability' can be accomplished using the monitoring data directly without such extrapolations to non-monitored events.
2) The Redline requests that calculations of pollutant loads be performed only for the priority water quality constituents identified in the WQIP.

D.4.b.(2)(c)

The Redline edits are consistent with those proposed by the San Diego County Copermittees, with minor modifications for clarity.

D.4.d.(2)(c)

It would be difficult to proactively determine the pollutant load reductions that *would* be necessary to demonstrate that discharges *are not* causing or contributing to exceedances of Receiving Water Limitations. Instead it would make more sense to calculate the necessary pollutant load reductions where the discharge has been demonstrated to be causing or contributing to such exceedances. In such circumstances, the necessary parameters would be known to calculate the needed load reduction. These changes are set forth in the Redline.

3.6 Provision E.1, Legal Authority

3.6.1 Overview of Key Issues

The Riverside County Copermittees note that Provision E.1, relating to the establishment of adequately legal authority, exceeds the requirements of federal CWA regulations in several respects. The federal regulations at 40 CFR 122.26(d)(2)(i)(A)-(F), provide explicit guidance for the Copermittees in developing the necessary legal authority to control MS4 discharges within its jurisdiction. However, several of the subsections of Provision E.1 go beyond these federal requirements, with respect to areas not within the responsibility of MS4 dischargers, such as negotiating with non-Copermittee entities. The Riverside County Copermittees have provided requested changes in the Redline, which are explained briefly below.

3.6.2 Comments in support of specific changes

E.1.a(1)

Changes in the Redline to accurately reflect the language of 40 CFR 122.26(d)(2)(i)(B).

E.1.a(2)

Changes in the Redline to accurately reflect the language of 40 CFR 122.26(d)(2)(i)(A). In addition, the Provision as written improperly requires the Copermittees to control the quality of runoff from sites covered by the state general permits for industrial activity and construction. These general permits are enforced by the State Board and the regional boards, and it is a state responsibility which cannot be handed off to the Municipal Copermittees.

E.1.a(3)

Changes in the Redline to accurately reflect the language of 40 CFR 122.26(d)(2)(i)(C).

E.1.a(5)

The Redline requests deletion of this Provision, which is not a requirement for municipal stormwater dischargers set forth in the CWA regulations. The Provision also improperly requests the Municipal Copermittees to attempt to negotiate with third parties the contribution of pollutants to the Copermittees' MS4. The Copermittees have no jurisdiction over such parties. The San Diego Water

Board has such jurisdiction, and should take responsibility for addressing non-MS4 sources of pollutants that may ultimately enter the MS4.

E.1.a(6)

Changes in the Redline to reflect accurately the language of 40 CFR 122.26(d)(2)(i)(E).

E.1.a(7)

The Redline requests deletion of this Provision, which is not a requirement for municipal stormwater dischargers set forth in the CWA regulations.

E.1.a(8)

The Redline requests deletion of this Provision, which is not a requirement for municipal stormwater dischargers set forth in the CWA regulations.

E.1.a(9)

The Redline requests deletion of this Provision, which is not a requirement for municipal stormwater dischargers set forth in the CWA regulations.

E.1.a(10)

The Redline requests both correction of the language in this Provision to comport with the federal regulations in 40 CFR 122.26(d)(2)(i)(F) and deletion of the second clause of this Provision, which is not found in 40 CFR 122.26(d)(2)(i)(F). Moreover, the requirement to inspect and monitor in the first clause of this Provision covers the issues set forth in the second clause. It is therefore unnecessary.

3.7 Provision E.2, IDDE

3.7.1 Overview of Key Issues

- The Draft Permit requires the Copermittees to address all non-stormwater discharges from the MS4 as illegal discharges, and then describes certain sources that need not be prohibited. This is effectively a 'guilty until proven innocent' provision, where a Copermittee will be required to expend potentially significant resources conducting source identification efforts any time non-stormwater is observed discharging from the MS4. In addition to the issues discussed in the Legal Comments, the Provision raises two practical and logistical problems:
    - This requirement is entirely independent of the determination that there are in fact any significant pollutants in such a discharge. A Copermittee could be spending substantial sums tracking (and then potentially enforcing upon) the source of a discharge that is not negatively impacting Receiving Waters. This not only is a waste of public resources, but would undermine the credibility of stormwater programs.
    - The San Diego Water Board and the State Water Board do not treat non-stormwater flows in the same manner across all of their regulatory mechanisms. For example, Order

No. R9-2008-0002 allows non-stormwater discharges to occur, POTWs are issued permits for their discharges and agricultural operators can discharge irrigation water. The Copermittees should not be forced to conduct an expensive source investigation, only to find that the discharge complies with a permit or a waiver granted by the Water Board. The Copermittee would have no ability to address such a discharge as an 'illegal discharge', and further would have no ability to recuperate their costs for the source identification.

The best way to address these issues, is to require the Copermittee to have and enforce an effective prohibition of illegal discharges of *pollutants* (through statutes, ordinances, permits, contracts, orders or similar means), and then allow the Copermittee full discretion to determine which non-stormwater discharges have the potential to negatively impact Receiving Waters, consistent with the WQIP priorities – and address those as illegal discharges.

- Several categories of non-stormwater discharge that were previously conditionally exempt consistent with the CWA, are required by the Draft Permit to be treated as illegal discharges, unless they have coverage under another order issued by the San Diego Water Board. In addition to the problems identified above for conducting enforcement in the absence of a pollutant discharge, the San Diego Water Board, not the Copermittees, is responsible for evaluating coverage, need for coverage, and compliance with other orders issued by the Water Board. The Copermittees have neither authority nor jurisdiction. Please see the Redline.
- Several categories of non-stormwater discharge that were previously conditionally exempt consistent with the CWA, are required by the draft permit to be 'controlled' or otherwise prohibited by the Copermittees. The Fact Sheet further describes that such controls are warranted because they could potentially contain pollutants. However, the CWA only requires controls where the discharges are determined to be a significant source of pollutants. Please see Legal Comments for a further discussion of this issue as well as the Redline.
- The Draft Permit eliminates the conditional exemptions for Landscape Irrigation, Irrigation Water, and Lawn Watering (collectively 'irrigation runoff'). The San Diego Water Board has provided no data demonstrating that these discharge categories have contributed a significant pollutant load to Receiving Waters within Riverside County. Information discussed in the Fact Ssheet focuses on data from other counties. The only data from Riverside County is public educational material referring to irrigation runoff; this material, however, was adapted from public education material from other counties. That public educational material was intended to help prevent such discharges from becoming a significant source of impact on the Receiving Waters, and did not constitute a determination that such discharges are in fact, actually a significant source that needs to be subject to a prohibition. See the discussion in the Legal Comments as well as the Redline.
- The Draft Permit, in Provision E.2.a.(7) requires efforts to minimize or eliminate all non-stormwater flows, including those that are natural, conditionally exempt, or otherwise permitted by the San Diego Water Board, regardless of whether or not such discharges are not contributing pollutants to the MS4. Such a requirement conflicts with the prior Provisions E.2.a.(1) through

(5), which state conditions where such discharges need not be prohibited. The requirement should therefore be removed, as set forth in the Redline.

3.7.2 Comments in support of specific changes

E.2.a.(1) and (3)

The Riverside County Copermittees request that this Provision be deleted (as shown in the Redline) and the categories of non-stormwater discharges be re-incorporated into Provision E.2.a.(3). The apparent premise of Provision E.2.a(1) as drafted is that since the San Diego Water Board requires those discharges to have coverage under a separate order, they are illegal if they lack such coverage. The MS4 Copermittees, however, are not responsible for enforcing discharge coverage under separate San Diego Water Board orders; that is the responsibility of the San Diego Water Board itself. Requiring the Copermittees to enforce such entities for their lack of coverage under a separate San Diego Order shifts that responsibility from the Board to Copermittees. This is not authorized by the CWA or the Porter-Cologne Water Quality Act. The Copermittees are, under the CWA, only required to address such discharges as illegal discharges if the discharge is found to be contributing a significant pollutant load to the MS4. By moving those categories to Provision E.2.a.(3), as shown in the Redline, the Copermittees will still be required to treat such discharges as illegal discharges if and when they are found to be contributing significant pollutants to the MS4. This proposed approach is consistent with other MS4 permits in the state, including prior San Diego Water Board orders, and is further consistent with the approach taken for the WQIP, which is intended to allow the Copermittees to focus resources on addressing the specific impacts that MS4 discharges are having on Receiving Water quality.

E.2.a.(2)

This Provision requires the Copermittees to treat water line breaks as illegal discharges, which in turn requires the Copermittee to conduct enforcement measures. Water main breaks are accidental occurrences, or may be the result of acts of nature. It is no more appropriate to treat accidents as illegal and subject to enforcement than it would be for a city to declare vehicular accidents as illegal, and conduct enforcement against those involved. This language needs to be removed as shown in the Redline. Additionally, as discussed in the Legal Comments, a recent case from the federal district court in Virginia suggests that the regulation of mere flow may exceed the authority of the CWA.

E.2.a.(4)

The Redline clarifies that if the 'statues, ordinances, permits, contracts, orders or similar means' are enacted/adopted by a Copermittee, the categories of non-stormwater discharges listed do not need to be treated as illegal discharges. Otherwise, the language could be read to imply that, for example, if it was infeasible for a particular resident to direct wash water to landscaped areas, that the Copermittee would be required to treat that residents' discharge as illegal and enforce upon them.

E.2.a.(5)

Contrary to the provisions of the CWA regulations, prior MS4 permits issued by the San Diego Water Board and other permits in the state, the Draft Permit requires implementation of BMPs, where feasible, during emergency firefighting activities. During such emergencies, all focus of public resources must appropriately be dedicated to protecting life and property. Any diversions from that mission would only serve to diminish and potentially compromise that mission. The Redline proposes language consistent with that adopted by the San Diego Water Board in 2010 for the Riverside County MS4 Permit (Order R9-2010-0016).

E.2.a.(7)

Provisions E.2.a.(1) through E.2.a.(6) describe circumstances where non-stormwater discharges need not be prohibited. This Provision then requires the Copermittees to minimize such 'conditionally allowed' flows anyway. This requirement exceeds the scope of the CWA and its implementing regulations and makes no sense. The Redline requests deletion of these Provisions.

E.2.b.(1)(d)

This Provision requires the MS4 Copermittees to map all known private outfalls to Receiving Waters. Such a requirement is beyond the scope of an MS4 permit and should be removed, as shown in the Redline. The Draft Permit does not require a Copermittee to address private outfalls to Receiving Waters; this is the responsibility of the San Diego Water Board, which governs all waste dischargers under the authority of the CWA or the Porter-Cologne Act.

E.2.b.(4)

This Provision requires the Copermittees, in conjunction with a spill, to 'prevent contamination of surface water, groundwater, and soil.'This requirement is clearly beyond the scope of an MS4 permit issued under the CWA (which regulates only discharges of water containing pollutants *from* the MS4 to Receiving Waters) and must be removed, as shown in the Redline. The Draft Permit could more appropriately require the Copermittees to 'coordinate, to the extent possible, with spill response teams to prevent entry of spills into the MS4.'

E.2.d.(2)(e)

The Redline requests edits to clarify that the intent of this Provision is to document and attempt to quantify any obvious sources of non-stormwater illegal discharges in response to the outfall monitoring, and that it is not necessary to conduct a full source identification any time there is evidence of water near an outfall.

New Provisions E.2.d.(3)(e)-(f)

The Redline adds two new provisions to this section to address a gap in potential outcomes from a source identification effort. These Provisions address scenarios where a Copermittee identifies A) the illegal discharge is coming from another upstream Copermittees' MS4, or B) that the discharge has been authorized by the San Diego Water Board, either through an order or waiver of WDRs. In the first scenario, the responsibility to continue the source identification, and conduct enforcement, would be transferred to the upstream Copermittee. In the second scenario, the responsibility for follow-up would fall on the San Diego Water Board, after receiving relevant information from the Copermittee. This Provision also provides for reimbursement to the Copermittee for the cost of the source identification, since the San Diego Water Board required the Copermittee to conduct the investigation, while not commensurately prohibiting all non-storm water discharges from all other sources regulated by the Water Boards.

3.8 Provision E.3, Development Planning

3.8.1 Overview of Key Issues

- Priority Development Projects - The Tentative Order identifies categories of projects that are to be defined as 'Priority Development Projects' (PDPs), which in turn will be required to comply with specific water quality and Hydromodification mitigation and quantitative requirements. The criteria for PDPs is quite broad and would include the majority of development projects, from small convenience stores and residences, to mega malls and specific plan developments. The Fact Sheet describes that while some smaller project types may not have significant pollutant loads, they may have a hydrologic impact upon Receiving Waters. However, it is important to recognize that pursuant to Provision E.3.a., All projects are required to implement a variety of LID principles such as disconnecting impervious surfaces, draining impervious surfaces to landscaped areas, and minimization of soil compaction in landscaped areas. Since such LID principles will be implemented wherever feasible consistent with the MEP standard, these smaller development projects are unlikely to create a pollutant or hydrologic impact. Additionally, the Fact Sheet advocates incentivizing LID design concepts and green infrastructure and building principles. Accordingly, the Redline requests changes to Provision E.3.b.(3) as described in Provision 3.8.2 below. The Legal Comments further note the potential impact of the Virginia case (*Virginia Dept. of Transp. v. U.S. Environmental Protection* Agency) holding that the CWA does not regulate stormwater as a pollutant.
- Design Capture Volume – There are two problems with how the Draft Permit defines the Design Capture Volume:
    - The Draft Permit changes the 'design capture volume' from previous permits by eliminating the term 'runoff'. Prior permits described that the design capture volume is the volume of stormwater runoff from the 24-hour 85th percentile storm event. This permit changes that to be the volume of stormwater produced from a 24-hour 85th percentile storm event. The elimination of the term 'runoff' means that BMPs would need to be sized potentially much larger than previously. For example, if the 85th percentile storm is 1" and a BMP is designed to treat 1 acre of residential land with a coefficient of runoff of 0.6, then under the current permits the BMP must be sized to hold 2,178 cubic feet of water. However, under the language of the Draft Permit, the BMP treating the same area would be required to hold 3,630 cubic feet of water, a 70% increase in BMP size. Accordingly, the Redline restores the term 'runoff'.
    - Additionally, the Draft Permit defines the Design Capture Volume alternatively as: *"the volume of storm water that would be retained onsite if the site was fully undeveloped and naturally vegetated, as determined using continuous simulation modeling techniques based on site-specific soil conditions and typical native vegetative cover."* In addition, to the problem identified above regarding the volume of storm water runoff, this language does not provide a temporal standard for determining which volume to

calculate from a continuous simulation model. Additionally, such models are not commonly used among general practitioners in the civil engineering community. The Redlines propose an alternative and simpler approach for this second definition: "The volume of stormwater runoff produced from a 24-hour 85th percentile storm event, that would be retained onsite in the pre-project condition." This definition is advantageous for several reasons: 1) it is simple for any civil engineer to understand, calculate, and comply with and is based on the same storm and hydrologic calculations as the first option, 2) it respects natural hydrology for the site, which may have had runoff in the pre-project condition, and as such, is more compatible with the intent of LID to mimic natural hydrology, and 3) as a result it is less likely to result in potential degradation of Beneficial Uses downstream, from reductions in flows beyond the pre-project condition.

- Pre-Project vs Pre-Development – Both the Storm Water Pollutant Control BMP requirements and the Hydromodification Management BMP requirements in the Draft Permit specify a 'pre-development' condition as the mitigation standard for all PDPs. In addition to the legal problems with such a standard as set forth in the Legal Comments, there are practical problems with the standard.
    - The presumption made in the discussions in the Fact Sheet are that all Receiving Waters can, and will, be restored to a fully natural condition - effectively to a natural floodplain. This presumption does not address reality, which is that development has occurred in those floodplains over many generations. The San Diego Water Board obviously lacks the authority to force homeowners and businesses to vacate such floodplains to effectuate restored natural conditions. Such an action would represent an unconstitutional taking. Moreover, the Legislature, in the Flood Control Acts covering all three counties proposed to be covered by the Draft Permit, has specifically authorized Flood Control Districts to construct flood control structures required to protect the lives and properties of the citizens.
    - Mitigation to a pre-development condition also may not be necessary to protect Receiving Waters from the effects of Hydromodification. If, for example a Receiving Water with existing development tributary to it, has not experienced increased erosion due to that existing development, there is no reason to require Hydromodification mitigation to anything more than the existing condition. In the counter-example, if under the existing condition the Receiving Water has experienced increased erosion due to that existing development, then, legal issues aside, there would be technical benefit to mitigating to that pre-development condition.

  The Redline proposes alternative language that requires mitigation to a pre-development standard only where it is legal and technically justified based on the conditions of the Receiving Water.

- Alternative Compliance – The alternative compliance project options as set forth in the Draft Permit pose two key problems:

- Several statements are conflicting and thus confusing as to what the required standard is for the various alternative compliance projects. For example, throughout Provision E.3.c. it is stated that 'a PDP may be allowed to comply with Provision E.3.c.(1)(a) and/or Provision E.3.c.(2) if they …'. This language can be mis-read to imply that the project must comply both with Provisions E.3.c.(1)(a) and E.3.c.(2) *and* implement the alternative compliance project (thus negating the benefit of alternative compliance). The Redline clarifies this language.
- The Biofiltration option set forth in the Draft Permit arbitrarily, and without technical basis or justification, **doubles** the sizing standard for biofiltration BMPs from 0.75 times the design capture volume (as set forth in the 2010 MS4 Permit and the 2009 Orange County Permit) to 1.5 times the design capture volume. The existing 0.75 standard was set due to the fact that 1) the 85^{th} percentile 24-hour storm occurs over a period of time, and 2) such BMPs have outflows and will regain some capacity during the storm event, and as such, do not need to instantaneously hold the entire 'Design Capture Volume' to have fully treated that volume. In fact, studies have shown that in addition to yielding excellent pollutant concentration reductions, LID Biofiltration BMPs are excellent at reducing the volume of runoff similar to retention BMPs. According to the ASCE International BMP database 60% or more of the long-term volume of runoff from a site can be retained within a Bioretention BMP (Bioretention BMPs are the primary 'biofiltration' BMP now allowed in Riverside County). In comparison, a Retention BMP sized to hold the runoff from the 85^{th} percentile storm event (the Design Capture Volume) will end up retaining approximately 80% of the long-term volume of runoff. Thus, by simple proportions, a Bioretention BMP sized to 'hold' 100% of the Design Capture Volume may also be able to retain 80% of the long-term volume of runoff. $\left(\frac{0.75 \times DCV}{60\%\ retained} = \frac{1.0 \times DCV}{80\%\ retained}\right)$. This is being validated through Bioretention BMPs that have been constructed and are being monitored for such volume reductions at the Riverside County Flood Control District's headquarters in Riverside. Further, Biofiltration BMPs have the added benefit of providing better overall treatment of back to back storms. Where a Retention BMP would be full after the first storm, fully bypassing the second storm without treatment, a Biofiltration BMP will have restored some capacity after the first storm, providing for treatment of some or all of the second of the back to back storms. Thus, the attached redlines propose changing the sizing factor for Biofiltration BMPs to 1.0 times the Design Capture Volume. The Redline proposes changes consistent with these comments.

3.8.2 Comments in support of specific changes

Introduction

Provision E.3.g (Strategies to address the highest priority water quality conditions) was moved to the beginning to support and better integrate the development planning programs in the JRMP with the strategies developed in the WQIP.

E.3.a.(3)

The Redline changes the title of this section (and other appropriate references to this Provision) to refer to LID Principles, as identified in the CASQA LID Manual for Southern California (https://www.casqa.org/LIDDemo/LowImpactDevelopmentManual/tabid/242/Default.aspx)

E.3.b.(1)(c) (New Provision)

This Provision was added to clarify the requirements if a project that was already subjected to SSMP requirements redevelops a portion of the site.

E.3.b.(2)

The Redline edits shown for this Provision are primarily to simplify this Provision, by grouping various categories by their applicable square footage threshold and including some of the specifics in the definitions (Attachment C). Other changes (beyond reorganization) include:

- Removing the addition of 'driveways' from subsection (g) as described in Provision 3.8.1 of this letter.
- Adding a footnote for parking lots, to clarify that the trigger would not include parking lots that are not exposed to runoff, such as subterranean or covered parking lots. It is beneficial to not have parking lots exposed to runoff; excluding such parking lots from being defined as a PDP is a good way to encourage such practices.
- Hillside development projects were not included as it is not believed to be necessary anymore with the relatively low threshold (10,000 square feet) identified for other categories included in this and other recent MS4 permits.
- The definition for "Environmentally Sensitive Areas" from existing MS4 permits was restored to include the language referring to discharges that are not commingled with flows from adjacent or other upstream lands (note that the change is shown in the definitions per the re-organization suggested above).

E.3.b.(3)

- The PDP exemption for sidewalks, bicycle lanes, or trails, [E.3.b.(3)(a)] has been expanded to as shown in the Redline to include driveways and parking lots. If those projects implement criteria already described in that section, they are also unlikely to create an impact to Receiving Waters. Further, including those project types in that exemption will further incentivize developers to utilize those LID Principles.
- The exemption described in Provision E.3.b(3)(b), was modified as shown in the Redline, and as discussed in the comment letter submitted by the Riverside County Transportation Department. Please see that letter for a justification for the requested changes.
- As shown in the Redline, the exemptions for new and redeveloped single family residences [E.3.b.(3)(c) and (d)] were consolidated into a new provision [E.3.b.(3)(c)], covering all single family residential projects (both new and redeveloped). The key difference is that such projects would be considered exempt if they are both 1) not part of a larger common plan of development or planned subdivision, and 2) successfully incorporate each of the applicable source control and LID Principles identified in Provision E.2.a.(2)-(3) to the MEP.

- A new Provision-E.3.b.(3)(d), titled 'Watershed Protection Projects' was added in the Redline. The project types described therein are all projects that are undertaken to rehabilitate or prevent environmental, social, and economic damage within the watershed, including Receiving Waters. These projects, while they may in some cases require some level of impervious surfaces to be constructed, are 1) not designed for human use or activity that would generate pollutants, or are designed specifically to mitigate such pollutants; and 2) will implement each of the applicable source control and LID Principles identified in Provision E.2.a.(2)-(3) to the MEP.

E.3.c.(1)

In addition to the edits discussed in Provision 3.8.1 of this letter, the Redline removed subprovision E.3.c.(1)(c) , for two reasons:

- The requirements that must be met to when implementing an alternative compliance project are more fully described in Provision E.3.c.(3).
- The language, as drafted, appeared to require double-mitigation. It requires that: 1) conventional treatment is required to treat the entire volume not retained onsite, and 2) the pollutant load discharged must also be mitigated with an alternative compliance project. Such a scenario would be requiring double-mitigation. The Redline provides a clearer and more simple mitigation standard.

E.3.c.(2)

The Riverside County Copermittees have two concerns with this Provision:

- The first concern is the universal requirement to mitigate to the 'pre-development' standard, as discussed above in section 3.8.1 of this letter. The Copermittees in the Redline propose that this language be changed to the 'pre-project' condition. For new development projects, the 'pre-project' condition will be equivalent to the 'pre-development' condition. For redevelopment projects, the standard would be the conditions that exist onsite prior to the construction of the project. This is appropriate, because in many areas, particularly in areas of existing development that would be subject to 'redevelopment', Receiving Waters are engineered and maintained to 1) provide flood protection for the public, 2) ensure that floodwaters don't comingle with pollutants on adjacent private properties and 3) to ensure that the existing development draining to that system does not cause erosion. In cases where the Receiving Waters are not engineered and maintained, and erosion problems caused by existing development are observed, language has been added to the Redline to provide for additional standards to be developed in the WQIP, based on the WQIP priorities.
- Additionally, the Redline proposes an additional exemption from HMP requirements for projects that discharge into conveyance channels that are engineered and maintained for the build-out condition all the way from the project to a waterbody that is sufficiently resistant to Hydromodification. This language is consistent with the above discussions, and ensures the PDPs are not required to mitigate for non-existent impacts. Please see the specific language in the Redline. The engineered channel exemption can be found in other recent MS4 permits, including the recently adopted Los Angeles County MS4 Permit.

E.3.c.(3)(a) and (b)

These two Provisions were re-written in the Redline to be simpler and clearer on what BMPs, criteria, sizing standards are required for what type of project. This alternative language still meets the intent of the Draft Permit, while being easier to understand and comply with. Aside from simplifying the language, the following other changes were made in the Redline:

- The alternative compliance options must be determined to provide an equal or greater overall water quality benefit for the WMA.
- Additional options were provided for who can design the alternative compliance projects
- All alternative compliance projects are required to be consistent with the strategies in the WQIP. While the specific alternative compliance project would not be required to be identified in the WQIP, the goal of this language is to ensure that allowing the alternative compliance project would not in any way be detrimental to or contrary to the strategies in the WQIP.
- Requirements E.3.c.(3)(a)(iv) and (v) were removed entirely, as they conflict with E.3.c.(3)(a)(iii) which allowed the projects to be in the same WMA (preferably the same HSA)
- Changed the sizing factor for Biofiltration BMPs to 1.0 as discussed in section 3.8.1 of this letter, and deleted the option [d] which required triple mitigation by requiring Biofiltration + Conventional Treatment + Alternative Compliance projects.
- Added Conventional Treatment Control BMPs as an alternative compliance option, only where it has been shown to be technically infeasible to meet E.3.c.(1) and technically infeasible to implement LID Biofiltration Treatment Control BMPs.

E.3.c.(3)(c)

Redline edits in this section are primarily to simplify and consolidate the requirements. Sub-Provision [C] was removed, as it was duplicative of the mitigation standards for the alternative compliance project are specified in E.3.c.(3)(b) and E.3.c.(3)(c)(i)[a].

3.9 Provision E.4, Construction

3.9.1 Overview of Key Issues

This Riverside County Copermittees' comments and edits are set forth in the Redline.

- One key issue for the Copermittees is the edit shown in the Redline to Provision E.4.c, which clarifies that the Copermittees are responsible for *requiring* BMPs at private construction sites, and *implementing* BMPs at Copermittee construction sites.

3.9.2 Comments in support of specific changes

The Redline edits include comments supporting the requested edits.

3.10 Provision E.5., Existing Development

3.10.1 Overview of Key Issues

The Draft Permit includes requirements for advanced programs to identify opportunities and implement programs to facilitate the construction of Retrofit and Stream/Channel/Habitat Rehabilitation projects on private properties. Such requirements are clearly beyond the requirements of the CWA for a management plan to be implemented by an MS4 Copermittee. The Riverside County Copermittees request deletion of these requirements.

Alternatively, the Riverside County Copermittees have the following comments:

While these retrofitting and rehabilitation approaches can be helpful and/or needed in some circumstances, they are not required in all circumstances, nor are required to address all pollutants that may be identified in a WQIP as the highest priority water quality conditions. For example, some pollutants are best addressed with regulatory source controls at the state or federal level, such as the removal of copper from brake pads, and controls on pesticides, while other pollutants can be adequately addressed through inspections and enforcement. There are several problems with requiring Copermittee resources to be invested in such Retrofit and/or Rehabilitation strategies (collectively referred to as 'retrofit'):

- Land Ownership: The land that could potentially be identified for retrofit would likely not be owned by a Copermittee. The Copermittee therefore has no ability to force the property owner to retrofit their property. Although the Copermittee could potentially implement programs to "facilitate" implementation, such a program would still be limited by the rights of the individual property owner. Even if a Copermittee were to attempt to purchase a privately owned existing development for the purposes of retrofit (a step going far beyond any requirements in the CWA or the Porter-Cologne Act), such a process can take many years, and if the owner is unwilling to sell, the retrofit project could never be realized. In any scenario, the process to facilitate such "retrofits" is extremely costly and lengthy, with no guarantee of a benefit to water quality. Retrofits should only be undertaken where the Copermittee identifies it as a necessary step to addressing the MS4 contributions to Receiving Water problems to the MEP. Otherwise, it forces the Copermittee to utilize resources very ineffectively, which is contrary to the goals of the WQIP and may actually be detrimental to water quality.
- Permitting: Aside from the limitations discussed above, stream/channel/habitat restorations have the additional complexities of requiring other regulatory permits that are not the discretion of the San Diego Water Board nor the Copermittees to issue. Such projects can take many decades to implement, and thus, are not expected to be highly effective at addressing the goals of the WQIP, except in rare circumstances.

Redline edits have been provided to clarify that these strategies and programs should only be used when, and to the extent directed by the strategies developed in the WQIP.

3.10.2 Comments in support of specific changes

E.5.b.(1)(b) and (d)

BMP implementation requirements of Provision E.5.b.(1)(b) and (d) have been clarified in the Redline to require the Copermittee to implement BMPs on their existing development, and require implementation of BMPs on private existing development.

E.5.c.(1)(a)(iv)

The Riverside County Copermittees request deletion of this Provision. The Copermittees should be provided the flexibility to schedule inspections as they see fit, provided that the schedules they establish pursuant to E.5.c.(1)(a), and the minimum frequency in E.5.c.(1)(a)(i) are met. Requiring 20% every year will be difficult to track as businesses may be opened or closed throughout the year and throughout the permit term.

Additionally, the Riverside Copermittees understand that other Copermittees may be recommending that E.5.c.(1)(a)(i) be changed to 'once per permit term'. The Riverside Copermittees believe that the current language of 'once every five years' is more appropriate for two reasons: 1) not all Copermittees (i.e. OC and Riverside) will be enrolled into the permit at the beginning of the 'permit term', and 2) not all businesses will be in existence at the beginning of the permit term. Accordingly it is more appropriate to simply require the minimum to be once every five years, that way a program manager can simply look at the last time a facility was inspected, and use that date to schedule the next inspection.

3.11 Provision E.6, Enforcement Response Plans

3.11.1 Overview of Key Issues

The Riverside County Copermittees' edits and comments are shown in the Redline and discussed below.

3.11.2 Comments in support of specific changes

E.6.d.

The terminology in this Provision was changed in the Redline from 'escalated' enforcement to 'progressive' enforcement. The proposed language better reflects the nature of enforcement actions, which are not simply 'escalated' or 'not escalated', as implied by Provision E.6.d.(2), but are progressive as needed in response to the severity of the violation. Since every violation comes with a unique set of circumstances, it is not reasonable to presume that a single set of 'triggers' will universally result in the same level of enforcement.

3.12 Provision E.7, Public Education

3.12.1 Overview of Key Issues

The Riverside County Copermittees' edits and comments are shown in the Redline.

3.13 Provision, E.8 Fiscal Analysis

3.13.1 Overview of Key Issues

The requirement that the Copermittees "must secure all the resources necessary to comply with this Order" exceeds the requirements of the CWA and illegally intrudes on the home rule authority of municipalities to govern themselves. This must be deleted. Please also see Legal Comments.

With regard to other provisions, the Riverside County Copermittees' edits and comments are shown in the Redline.

3.14 Provision F

3.14.1 Overview of Key Issues

- F.1 – WQIP Submittal
  - Based on the schedule for the initial submittal of the Priority Water Quality Conditions and Numeric Goals, and the subsequent 60-day public review, only one month would be left for the Copermittees to finalize strategies based on those conditions and goals and the public input received. This is an insufficient amount of time. The Redline requests modifications to the schedule that would provide for the submittal of the final WQIP within 24 months (instead of 18), to provide additional time for the development of strategies.
- F.1 and F.2.
  - The schedules for submittals should be linked to the receipt of comments on prior submittals, or the approval of prior submittals, rather than the permit adoption date. If it is tied to the permit adoption date, the submittal dates could become out of sync with the comment periods or San Diego Water Board approvals if any unexpected delays occur (for example if the San Diego Water Board is delayed in approving a document, or posting a document online for public comment). The Redline requests appropriate modifications.
  - Implementation dates for the plans are unclear / undefined. The Redline clarifies this issue.
- F.3. Progress Reports
  - The reporting requirements across the transitional period were unclear. Redlines are provided to clarify and consolidate.
  - The Regional Monitoring and Assessment Report language was revised to be consistent with the requirements of the Integrated Assessment of the Water Quality Improvement Plan, rather than an additional, slightly different report, due at the same time.

3.15 Attachments B and C

Comments and edits to Attachments B and C are shown in the Redline.

Very truly yours,

for JASON E. UHLEY
Chief of Watershed Protection Division

CP:cw
P8/

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

TENTATIVE
ORDER NO. R9-2013-0001
NPDES NO. CAS0109266

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT AND WASTE DISCHARGE REQUIREMENTS FOR DISCHARGES FROM THE MUNICIPAL SEPARATE STORM SEWER SYSTEMS (MS4s) DRAINING THE WATERSHEDS WITHIN THE SAN DIEGO REGION

The San Diego County Copermittees in Table 1a are subject to waste discharge requirements set forth in this Order.

Table 1a. San Diego County Copermittees

Municipal Copermittees	
City of Carlsbad	City of Oceanside
City of Chula Vista	City of Poway
City of Coronado	City of San Diego
City of Del Mar	City of San Marcos
City of El Cajon	City of Santee
City of Encinitas	City of Solana Beach
City of Escondido	City of Vista
City of Imperial Beach	County of San Diego
City of La Mesa	San Diego County Regional Airport Authority
City of Lemon Grove	San Diego Unified Port District
City of National City	

After the San Diego Water Board receives and considers the Orange County Copermittees' Report of Waste Discharge and makes any necessary changes to the Order, the Orange County Copermittees in Table 1b will become subject to waste discharge requirements set forth in this Order after expiration of Order No. R9-2009-0002, NPDES No. CAS0108740 on or after December 16, 2014.

Table 1b. Orange County Copermittees

Municipal Copermittees	
City of Aliso Viejo	City of Rancho Santa Margarita
City of Dana Point	City of San Clemente
City of Laguna Beach	City of San Juan Capistrano
City of Laguna Hills	City of Laguna Woods
City of Laguna Niguel	County of Orange
City of Lake Forest	~~Orange County Flood Control District~~

City of Mission Viejo	
Special District Copermittee	
Orange County Flood Control District	

After the San Diego Water Board receives and considers the Riverside County Copermittees' Report of Waste Discharge and makes any necessary changes to this Order, the Riverside County Copermittees in Table 1c will become subject to waste discharge requirements set forth in this Order after expiration of Order No. R9-2010-0016, NPDES No. CAS0108766 on or after November 10, 2015.

Table 1c. Riverside County Copermittees

Municipal Copermittee	
City of Murrieta	County of Riverside
City of Temecula	~~Riverside County Flood Control and Water Conservation District~~
City of Wildomar	
Special District Copermittee	
Riverside County Flood Control and Water Conservation District	

The Orange County Copermittees and Riverside County Copermittees may become subject to the requirements of this Order at a date earlier than the expiration date of their current Orders subject to the conditions described in Provision F.6 of this Order if the Copermittees in the respective county receive a notification of coverage from the San Diego Water Board.

The term Copermittee in this Order refers to any San Diego County, Orange County, or Riverside County Copermittee covered under this Order, unless specified otherwise.

This Order provides permit coverage for the Copermittee discharges described in Table 2.

Table 2. Discharge Locations and Receiving Waters

Discharge Points	Locations throughout San Diego Region
Discharge Description	Municipal Separate Storm Sewer System (MS4) Discharges
Receiving Waters	Inland Surface Waters, Enclosed Bays and Estuaries, and Coastal Ocean Waters of the San Diego Region

Table 3. Administrative Information

This Order was adopted by the San Diego Water Board on:	**Month Day, 2013**
This Order will become effective on:	**Month Day, 2013**
This Order will expire on:	**Month Day, 2018**
The Copermittees must file a Report of Waste Discharge in accordance with Title 23, California Code of Regulations, as application for issuance of new waste discharge requirements no later than 180 days in advance of the Order expiration date.	

I, David W. Gibson, Executive Officer, do hereby certify that this Order with all attachments is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Diego Region, on Month Day, 2013.

TENTATIVE

David W. Gibson
Executive Officer

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II. PROVISIONS (Cont'd)

ATTACHMENTS

I. FINDINGS

Comment [A1]: See discussions in section 3.1 of the comment letter

The California Regional Water Quality Control Board, San Diego Region (San Diego Water Board), finds that:

JURISDICTION

1. **MS4 Ownership or Operation.** Each of the Copermittees owns or operates an MS4, through which it discharges storm water and non-storm water into waters of the U.S. within the San Diego Region. These MS4s fall into one or more of the following categories: (1) a medium or large MS4 that services a population of greater than 100,000 or 250,000 respectively; or (2) a small MS4 that is "interrelated" to a medium or large MS4; or (3) an MS4 which contributes to a violation of a water quality standard; or (4) an MS4 which is a significant contributor of pollutants to waters of the U.S.

Many geographical areas subject to this Order are subject to the threat of periodic catastrophic flooding resulting from natural conditions, specifically the presence of mountains and hilly areas in close proximity to urban development and the effect of period strong Pacific Ocean storms. Such flooding would occur in the absence of development. The Legislature recognized the importance of this issue when it established flood control districts across the state, including in Orange, Riverside and San Diego Counties. Such flooding has in the past, and if not controlled, could in the future result in loss of life and property damage. Such flooding can also mobilize significant Pollutants from industrial, commercial, residential and agricultural lands, damaging watercourses and the beneficial uses thereof, including habitat. MS4s are designed and constructed to mitigate such impacts.

2. Riverside County Flood Control and Water Conservation District.

Comment [A2]: See discussion in section 3.1.1 of the comment letter.

In 1945, the California Legislature enacted the Riverside County Flood Control and Water Conservation District Act, establishing the Riverside County Flood Control and Water Conservation District (District). The objects and purposes of the Act are to provide for the control and conservation of flood and storm waters and for the protection of watercourses, watersheds, public highways, life and property within the District from damage or destruction from flood waters. Among its other powers, the District also has the power to conserve, reclaim and save such waters for beneficial use. However the Act does not provide the District with the power to control the volume or quality of discharges that runs off of private property, which may end up in the District's flood control system. The District is governed by the District's Board of Supervisors as a separate legal entity from the County of Riverside.

Many of the flood management systems that the District operates are defined by the Clean Water Act as an MS4, and include many of the larger MS4s within the Santa Margarita watershed region of Riverside County (SMR). District does not however own or operate streets, catch basins or storm drains smaller than 36 inches that collect runoff from the incorporated and unincorporated jurisdictions within the SMR, and commonly connect into the District's flood management system. Such systems are typically owned and operated by either the County of Riverside or the incorporated Cities within the SMR.

The waters and pollutants that may enter the regional receiving waters and/or the District's flood management systems come from various sources. These sources can include storm water and non-storm water from the Municipal Copermittees under this permit as well as from other NPDES and non-NPDES permittees, including industrial waste water dischargers, waste water treatment facilities, industrial and construction stormwater dischargers, water suppliers, tribal lands, other state and federal government entities, and Caltrans. Sources can also include discharges from Phase II entities such as school districts and discharges from entities that have been granted waste discharge requirements or waivers of waste discharge requirements, including agricultural operations.

The District does not own or operate any municipal sanitary sewer systems, public streets, roads, or highways. The District has no planning, zoning, development permitting or other land use authority, thus, it has no permitting or governing authority over industrial or commercial facilities, residents, new developments or re-development projects, and development construction sites located in any incorporated or unincorporated areas within its service area, including the SMR. The Copermittees that have such authority are responsible for implementing a storm water management program to address pollutants discharged from such industrial and commercial facilities, residential areas, new development and re-development projects, and development construction sites within their jurisdictional boundaries. Nonetheless, as an owner and operator of an MS4, the District is required to control pollutant discharges into and from its MS4, such as through interagency agreements among Copermittees and other owners of a MS4, the contribution of pollutants from one portion of the MS4 to another portion of the MS4 within their jurisdiction.

2. **Legal and Regulatory Authority.** This Order is issued pursuant to section 402 of the federal Clean Water Act (CWA) and implementing regulations (Code of Federal Regulations [CFR] Title 40, Part 122 [40 CFR 122]) adopted by the United States Environmental Protection Agency (USEPA), and chapter 5.5, division 7 of the California Water Code (CWC) (commencing with section 13370). This Order serves as an NPDES permit for discharges from MS4s to surface waters. This Order also serves as waste discharge requirements (WDRs) pursuant to article 4, chapter 4, division 7 of the CWC (commencing with section 13260).

   The San Diego Water Board has the legal authority to issue a regional MS4 permit pursuant to its authority under CWA section 402(p)(3)(B) and 40 CFR 122.26(a)(1)(v). The USEPA also made it clear that the permitting authority, in this case the San Diego Water Board, has the flexibility to establish system- or region-wide permits (55 Federal Register [FR] 47990, 48039-48042). The regional nature of this Order will ensure consistency of regulation within watersheds and is expected to result in overall cost savings for the Copermittees and San Diego Water Board.

The federal regulations make it clear that the Copermittees need only comply with permit conditions relating to discharges from the MS4s for which they are operators (40 CFR 122.26(a)(3)(vi)). This Order does not require the Copermittees to manage storm water outside of their jurisdictional boundaries, but rather to work collectively to improve storm water management within watersheds.

3. **CWA NPDES Permit Conditions.** Pursuant to CWA section 402(p)(3)(B), NPDES permits for storm water discharges from MS4s must include requirements to effectively prohibit non-storm water discharges into MS4s, and require controls to reduce the discharge of pollutants from the MS4s ~~in storm water~~ to the maximum extent practicable (MEP), and to require other provisions as the San Diego Water Board determines are appropriate to control such pollutants. This Order prescribes conditions to assure compliance with the CWA requirements for owners and operators of MS4s to effectively prohibit non-storm water discharges in to the MS4s, and require controls to reduce the discharge of pollutants ~~in storm water~~ from the MS4s to the MEP.

Comment [A3]: See discussion in section 3.1.2 of the comment letter.

4. **CWA and CWC Monitoring Requirements.** CWA section 308(a) and 40 CFR 122.41(h),(j)-(l) and 122.48 require that NPDES permits must specify monitoring and reporting requirements. Federal regulations applicable to large and medium MS4s also specify additional monitoring and reporting requirements in 40 CFR 122.26(d)(1)(iv)(D), 122.26(d)(1)(v)(B), 122.26(d)(2)(i)(F), 122.26(d)(2)(iii)(D), 122.26(d)(2)(iv)(B)(2) and 122.42(c). CWC section 13383 authorizes the San Diego Water Board to establish monitoring, inspection, entry, reporting and recordkeeping requirements. This Order establishes monitoring and reporting requirements to implement federal and State requirements.

5. **Total Maximum Daily Loads.** CWA section 303(d)(1)(A) requires that "[e]ach state shall identify those waters within its boundaries for which the effluent limitations…are not stringent enough to implement any water quality standard applicable to such waters." The CWA also requires states to establish a priority ranking of impaired water bodies known as Water Quality Limited Segments and to establish Total Maximum Daily Loads (TMDLs) for such waters. This priority list of impaired water bodies is called the Clean Water Act Section 303(d) List of Water Quality Limited Segments, commonly referred to as the 303(d) List. The CWA requires the 303(d) List to be updated every two years.

TMDLs are numerical calculations of the maximum amount of a pollutant that a water body can assimilate and still meet water quality standards. A TMDL is the sum of the allowable loads of a single pollutant from all contributing point sources (waste load allocations or WLAs) and non-point sources (load allocations or LAs), background contribution, plus a margin of safety. Discharges from MS4s are point source discharges. The federal regulations (40 CFR 122.44(d)(1)(vii)(B)) require that NPDES permits to incorporate water quality based effluent limitations (WQBELs) developed to protect a narrative water quality criterion, a numeric water quality criterion, or both, consistent with the assumptions and requirements of any available WLA for the discharge. Requirements of this Order implement the TMDLs adopted by the San Diego Water Board and approved by USEPA.

6. **Non-Storm Water Discharges.** Pursuant to CWA section 402(p)(3)(B)(ii), this Order requires each Copermittee to effectively prohibit discharges of non-storm water into its MS4. Nevertheless, non-storm water discharges into and from the MS4s continue to be reported to the San Diego Water Board by the Copermittees and other persons. Monitoring conducted by the Copermittees, as well as the 303(d) List, have identified dry weather, non-storm water discharges from the MS4s as a source of pollutants causing or contributing to receiving water quality impairments in the San Diego Region. The federal regulations (40 CFR 122.26(d)(2)(iv)(B)(1)) require the Copermittees to have a program to prevent illicit discharges to the MS4. The federal regulations, however, allow for specific categories of non-storm water discharges or flows to be addressed as illicit discharges only where such discharges are identified as sources of pollutants to waters of the U.S.

7. **In-Stream Treatment Systems.** Pursuant to federal regulations (40 CFR 131.10(a)), in no case shall a state adopt waste transport or waste assimilation as a designated use for any waters of the U.S. Authorizing the construction of a runoff treatment facility within a water of the U.S., or using the water body itself as a treatment system or for conveyance to a treatment system, would be tantamount to accepting waste assimilation as an appropriate use for that water body. Runoff treatment must occur prior to the discharge of runoff into receiving waters. Treatment control best management practices (BMPs) must not be constructed in waters of the U.S. Construction, operation, and maintenance of a pollution control facility in a water body can negatively impact the physical, chemical, and biological integrity, as well as the beneficial uses, of the water body.

DISCHARGE CHARACTERISTICS AND RUNOFF MANAGEMENT

8. **Point Source Discharges of Pollutants.** Discharges from the MS4s may contain waste, as defined in the CWC, and pollutants that adversely affect the quality of the waters of the state. A discharge from an MS4 is a "discharge of pollutants from a point source" into waters of the U.S. as defined in the CWA. Storm water and non-storm water discharges from the MS4s may contain pollutants that cause or threaten to cause a violation of surface water quality standards, as outlined in the Water Quality Control Plan for the San Diego Basin (Basin Plan). ~~Storm water and non-storm water discharges from the MS4s are subject to the conditions and requirements established in the Basin Plan for point source discharges.~~

9. **Potential Beneficial Use Impairment.** The discharge of pollutants and/or increased flows from MS4s may cause or threaten to cause the concentration of pollutants to exceed applicable receiving water quality objectives and impair or threaten to impair designated beneficial uses or which may result~~ing~~ in a condition of pollution, contamination, or nuisance. In addition, the reduction of flows below the

existing condition may impact negatively impact beneficial uses.

10. **Pollutants Generated by Land Development.** Land development has created and continues to create new sources of non-storm water discharges and pollutants in storm water discharges as human population density increases. This brings higher levels of car emissions, car maintenance wastes, municipal sewage, pesticides, household hazardous wastes, pet wastes, and trash. Pollutants from these sources are dumped or washed off the surface by non-storm water or storm water flows into and from the MS4s. When development converts natural vegetated pervious ground cover to impervious surfaces such as paved highways, streets, rooftops, and parking lots, the natural absorption and infiltration abilities of the land are lost. Therefore, runoff leaving a developed area without BMPs that can maintain pre-development conditions will contain greater pollutant loads and have significantly greater runoff volume, velocity, and peak flow rate than pre-development runoff from the same area.

11. **Runoff Discharges to Receiving Waters.** The MS4s discharge runoff into lakes, drinking water reservoirs, rivers, streams, creeks, bays, estuaries, coastal lagoons, the Pacific Ocean, and tributaries thereto within the eleven hydrologic units comprising the San Diego Region. ~~Historic and current development makes use of natural drainage patterns and features as conveyances for runoff. Rivers, streams and creeks in developed areas used in this manner are part of the Copermittees' MS4s regardless of whether they are natural, anthropogenic, or partially modified features. In these cases, the rivers, streams and creeks in the developed areas of the Copermittees' jurisdictions are both an MS4 and receiving water.~~ Numerous receiving water bodies and water body segments have been designated as impaired by the San Diego Water Board pursuant to CWA section 303(d).

Pollutants in Runoff. The most common pollutants in runoff discharged from the MS4s include total suspended solids, sediment, pathogens (e.g., bacteria, viruses, protozoa), heavy metals (e.g., cadmium, copper, lead, and zinc), petroleum products and polynuclear aromatic hydrocarbons, synthetic organics (e.g., pesticides, herbicides, and PCBs), nutrients (e.g., nitrogen and phosphorus), oxygen-demanding substances (e.g., decaying vegetation, animal waste), detergents, and trash. ~~As operators of the MS4s, the Copermittees cannot passively receive and discharge pollutants from third parties. By providing free and open access to an MS4 that conveys discharges to waters of the U.S., the operator essentially accepts responsibility for discharges into the MS4 that it does not effectively prohibit or otherwise control.~~ These discharges may cause or contribute to a condition of pollution or a violation of water quality standards. California law requires downstream landowners, including owners and operators of MS4, to accept upstream flows, even if that flow contains Pollutants. Failure to do can create conditions.

Limitation on Powers of Copermittees. This Order regulates the discharge of non-stormwater into and Pollutants from non-agricultural Anthropogenic sources from the MS4s owned and/or operated by the Copermittees. The Copermittees lack legal

Comment [A4]: See discussion in section 3.1.2 of the comment letter.

Comment [A5]: See discussion in section 3.1.2 of the comment letter.

Comment [A6]: This finding is based on Findings I.B and I.C in Order R8-2010-33, applicable to portions of Riverside County within the Santa Ana region.

jurisdiction over discharges into their MS4 from agricultural activities, State and federal facilities, public schools and hospitals, utilities, railroads, special districts, Native American tribal lands, wastewater management agencies and other point and non-point source discharges otherwise permitted by the Water Board. The Water Board recognizes that the Copermittees should not be held responsible for discharges from such facilities or Pollutants in those discharges. Also, certain activities and sources that generate pollutants present in urban runoff may be beyond the ability of the Copermittees to prevent or eliminate. Examples of these activities and sources include, but are not limited to: emissions from internal combustion engines, brake pad wear and tear, atmospheric deposition, non-Anthropogenic sources of bacteria (including wildlife and feral cats and dogs), the regulation of pesticides and leaching of naturally occurring nutrients and minerals from local soils. This Order is not intended to address background or naturally occurring Pollutants or flows.

12.

13. **Human Health and Aquatic Life Impairment.** Pollutants in runoff discharged from the MS4s can threaten and adversely affect human health and aquatic organisms. Adverse responses of organisms to chemicals or physical agents in runoff range from physiological responses such as impaired reproduction or growth anomalies to mortality. Increased volume, velocity, rate, and duration of storm water runoff greatly accelerate the erosion of downstream natural channels. This alters stream channels and habitats and can adversely affect aquatic and terrestrial organisms.

14. **Water Quality Effects.** The Copermittees' water quality monitoring data submitted to date documents various persistent exceedances of Basin Plan water quality objectives for runoff-related pollutants at various watershed monitoring stations. Persistent toxicity has also been observed at several watershed monitoring stations. In addition, bioassessment data indicate that the majority of the monitored receiving waters have Poor to Very Poor Index of Biological Integrity (IBI) ratings. ~~These findings indicate that runoff discharges are causing or contributing to water quality impairments, and are a leading cause of such impairments in the San Diego Region. Non-storm water discharges from the MS4s have been shown to contribute significant levels of pollutants and flow in arid, developed Southern California watersheds, and contribute significantly to exceedances of applicable receiving water quality objectives.~~

Comment [A7]: These statements are completely unsubstantiated.

15. ~~**Non-Storm Water and Storm Water Discharges.** Non-storm water discharges from the MS4s are not considered storm water discharges and therefore are not subject to the MEP standard of CWA section 402(p)(3)(B)(iii), which is explicitly for "Municipal … *Stormwater Discharges* (emphasis added)" from the MS4s. Pursuant to CWA 402(p)(3)(B)(ii), non-storm water discharges into the MS4s must be effectively prohibited.~~

Comment [A8]: See discussion in section 3.1.2 of the comment letter.

16. **Best Management Practices.** Waste and pollutants which are deposited and accumulate in MS4 drainage structures may~~will~~ be discharged from these structures

to waters of the U.S. unless they are removed. These discharges may cause or contribute to, or threaten to cause or contribute to, a condition of pollution in receiving waters. For this reason, pollutants in storm water discharges from the MS4s can be and must be effectively reduced in runoff by the application of a combination of pollution prevention, source control, and treatment control BMPs. Pollution prevention is the reduction or elimination of pollutant generation at its source and is the best "first line of defense". Source control BMPs (both structural and non-structural) minimize the contact between pollutants and runoff, therefore keeping pollutants onsite and out of receiving waters. Treatment control BMPs remove pollutants that have been mobilized by storm water or non-storm water flows.

17. **BMP Implementation.** Runoff needs to be addressed during the three major phases of development (planning, construction, and use) in order to reduce the discharge of storm water pollutants to the MEP, effectively prohibit non-storm water discharges, and protect receiving waters. Development which is not guided by water quality planning policies and principles can result in increased pollutant load discharges, flow rates, and flow durations which can negatively affect receiving water beneficial uses. Construction sites without adequate BMP implementation result in sediment runoff rates which greatly exceed natural erosion rates of undisturbed lands, causing siltation and impairment of receiving waters. Existing development can generate substantial pollutant loads which are discharged in runoff to receiving waters. Retrofitting areas of existing development with storm water pollutant control and hydromodification management BMPs may in many cases be ~~is~~ necessary to address storm water discharges from existing development that may cause or contribute to a condition of pollution or a violation of water quality standards.

Comment [A9]: It is not necessary in all cases.

18. **Long Term Planning and Implementation.** Federal regulations require municipal storm water permits to expire 5 years from adoption, after which the permit must be renewed and reissued. The San Diego Water Board recognizes that the degradation of water quality and impacts to beneficial uses of the waters in the San Diego Region occurred over several decades. The San Diego Water Board further recognizes that a decade or more may be necessary to realize demonstrable improvement to the quality of waters in the Region. This Order includes a long term planning and implementation approach that will require more than a single permit term to complete.

WATER QUALITY STANDARDS

19. **Basin Plan.** The San Diego Water Board adopted the Water Quality Control Plan for the San Diego Basin (Basin Plan) on September 8, 1994 that designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for receiving waters addressed through the plan. The Basin Plan was subsequently approved by the State Water

Resources Control Board (State Water Board) on December 13, 1994. Subsequent revisions to the Basin Plan have also been adopted by the San Diego Water Board and approved by the State Water Board. Requirements of this Order implement the Basin Plan.

The Basin Plan identifies the following existing and potential beneficial uses for inland surface waters in the San Diego Region: Municipal and Domestic Supply (MUN), Agricultural Supply (AGR), Industrial Process Supply (PROC), Industrial Service Supply (IND), Ground Water Recharge (GWR), Contact Water Recreation (REC1), Non-contact Water Recreation (REC2), Warm Freshwater Habitat (WARM), Cold Freshwater Habitat (COLD), Wildlife Habitat (WILD), Rare, Threatened, or Endangered Species (RARE), Freshwater Replenishment (FRSH), Hydropower Generation (POW), and Preservation of Biological Habitats of Special Significance (BIOL). The following additional existing and potential beneficial uses are identified for coastal waters of the San Diego Region: Navigation (NAV), Commercial and Sport Fishing (COMM), Estuarine Habitat (EST), Marine Habitat (MAR), Aquaculture (AQUA), Migration of Aquatic Organisms (MIGR), Spawning, Reproduction, and/or Early Development (SPWN), and Shellfish Harvesting (SHELL).

20. **Ocean Plan.** The State Water Board adopted the Water Quality Control Plan for Ocean Waters of California, California Ocean Plan (Ocean Plan) in 1972 and amended it in 1978, 1983, 1988, 1990, 1997, 2000, and 2005. The State Water Board adopted the latest amendment on April 21, 2005 and it became effective on February 14, 2006. The Ocean Plan is applicable, in its entirety, to point source discharges to the ocean. Requirements of this Order implement the Ocean Plan.

    The Ocean Plan identifies the following beneficial uses of ocean waters of the state to be protected: Industrial water supply; water contact and non-contact recreation, including aesthetic enjoyment; navigation; commercial and sport fishing; mariculture; preservation and enhancement of designated Areas of Special Biological Significance; rare and endangered species; marine habitat; fish spawning and shellfish harvesting

21. **Sediment Quality Control Plan**. On September 16, 2008, the State Water Board adopted the Water Quality Control Plan for Enclosed Bays and Estuaries – Part 1 Sediment Quality (Sediment Quality Control Plan). The Sediment Quality Control Plan became effective on August 25, 2009. The Sediment Quality Control Plan establishes: 1) narrative sediment quality objectives for benthic community protection from exposure to contaminants in sediment and to protect human health, and 2) a program of implementation using a multiple lines of evidence approach to interpret the narrative sediment quality objectives. Requirements of this Order implement the Sediment Quality Control Plan.

22. **National Toxics Rule and California Toxics Rule.** USEPA adopted the National Toxics Rule (NTR) on December 22, 1992, and later amended it on May 4, 1995 and November 9, 1999. About forty criteria in the NTR applied in California. On May 18, 2000, USEPA adopted the California Toxics Rule (CTR). The CTR promulgated

new toxics criteria for California and, in addition, incorporated the previously adopted NTR criteria that were applicable in the state. The CTR was amended on February 13, 2001. These rules contain water quality criteria for priority pollutants.

23. **Antidegradation Policy.** This Order is in conformance with the federal Antidegradation Policy described in 40 CFR 131.12, and State Water Board Resolution No. 68-16, *Statement of Policy with Respect to Maintaining High Quality Waters in California*. Federal regulations at 40 CFR 131.12 require that the State water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy in State Water Board Resolution No. 68-16. State Water Board Resolution No. 68-16 incorporates the federal antidegradation policy where the federal policy applies under federal law. State Water Board Resolution No. 68-16 requires that existing quality of waters be maintained unless degradation is justified based on specific findings. The Basin Plan implements, and incorporates by reference, both the State and federal antidegradation policies.

CONSIDERATIONS UNDER FEDERAL AND STATE LAW

24. **Coastal Zone Act Reauthorization Amendments.** Section 6217(g) of the Coastal Zone Act Reauthorization Amendments of 1990 (CZARA) requires coastal states with approved coastal zone management programs to address non-point source pollution impacting or threatening coastal water quality. CZARA addresses five sources of non-point source pollution: agriculture, silviculture, urban, marinas, and hydromodification. This Order addresses the management measures required for the urban category, with the exception of septic systems. The runoff management programs developed pursuant to this Order fulfills the need for coastal cities to develop a runoff non-point source plan identified in the Non-Point Source Program Strategy and Implementation Plan. The San Diego Water Board addresses septic systems through the administration of other programs.

25. **Endangered Species Act.** This Order does not authorize any act that results in the taking of a threatened or endangered species or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code sections 2050 to 2097) or the Federal Endangered Species Act (16 USC sections 1531 to 1544). This Order requires compliance with receiving water limits, and other requirements to protect the beneficial uses of waters of the State. The Copermittees are responsible for meeting all requirements of the applicable Endangered Species Act.

26. **Report of Waste Discharge Process.** The waste discharge requirements set forth in this Order are based upon the Report of Waste Discharge submitted by the San Diego County Copermittees prior to the expiration of Order No. R9-2007-0001 (NPDES No. CAS0109266). The Orange County and Riverside County Copermittees are not immediately covered by the waste discharge requirements in this Order. The San Diego Water Board understands that each municipality is

unique although the Counties share watersheds and geographical boundaries. The Order will continue to use the Report of Waste Discharge process prior to initially making Orange County or Riverside County Copermittees subject to the requirements of this Order.

The federal regulations (40 CFR 122.21(d)(2)) and CWC section 13376 impose a duty on the Copermittees to reapply for continued coverage through submittal of a Report of Waste Discharge no later than 180 days prior to expiration of a currently effective permit. This requirement is set forth in the Orange County Copermittees' and Riverside County Copermittees' currently effective permits at Provisions K.2.b and K.2.c, respectively. The Orange County Permit, Order No. R9-2009-0002 (NPDES No. CAS0108740) expires on December 16, 2014 and the Riverside County MS4 Permit, Order No. R9-2010-0016 (NPDES No. CAS0108766) expires on November 10, 2015.

Unless the Orange County or Riverside County Copermittees apply for and receive early coverage under this Order, the Orange County Copermittees' and the Riverside County Copermittees' respective permits will be superseded by this Order upon expiration of their respective permits, subject to any necessary revisions to the requirements of this Order made after the San Diego Water Board considers their respective Reports of Waste Discharge through the public process provided in 40 CFR 124.

Comment [A10]: Please see Comment Letter and Legal Comments regarding regional permit authority,

27. **Integrated Report and Clean Water Act Section 303(d) List.** The San Diego Water Board and State Water Board submit an Integrated Report to USEPA to comply with the reporting requirements of CWA sections 303(d), 305(b) and 314, which lists the attainment status of water quality standards for water bodies in the San Diego Region. USEPA issued its *Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act* on July 29, 2005, which advocates the use of a five category approach for classifying the attainment status of water quality standards for water bodies in the Integrated Report. Water bodies included in Category 5 in the Integrated Report indicate at least one beneficial use is not being supported or is threatened, and a TMDL is required. Water bodies included in Category 5 in the Integrated Report are placed on the 303(d) List.

Water bodies with available data and/or information that indicate at least one beneficial use is not being supported or is threatened, but a TMDL is not required, are included in Category 4 in the Integrated Report. Impaired surface water bodies may be included in Category 4 if a TMDL has been adopted and approved (Category 4a); if other pollution control requirements required by a local, state or federal authority are stringent enough to implement applicable water quality standards within a reasonable period of time (Category 4b); or, if the failure to meet an applicable water quality standard is not caused by a pollutant, but caused by other types of pollution (Category 4c).

Implementation of the requirements of this Order may allow the San Diego Water Board to include surface waters impaired by discharges from the Copermittees'

MS4s in Category 4 in the Integrated Report for consideration during the next 303(d) List submittal by the State to USEPA.

28. **Economic Considerations.** The California Supreme Court has ruled that although CWC section 13263 requires the State and Regional Water Boards (collectively Water Boards) to consider factors set forth in CWC section 13241 when issuing an NPDES permit, the Water Board may not consider the factors to justify imposing pollutant restrictions that are less stringent than the applicable federal regulations require. (*City of Burbank v. State Water Resources Control Bd.* (2005) 35 Cal.4th 613, 618, 626-627.) However, when pollutant restrictions in an NPDES permit are more stringent than federal law requires, CWC section 13263 requires that the Water Boards consider the factors described in CWC section 13241 as they apply to those specific restrictions.

As noted in the following finding, the San Diego Water Board finds that the requirements in this permit are not more stringent than the minimum federal requirements. Therefore, a CWC section 13241 analysis is not required for permit requirements that implement the effective prohibition on the discharge of non-storm water into the MS4 or for controls to reduce the discharge of pollutants ~~in storm water~~ to the MEP, or other provisions that the San Diego Water Board has determined appropriate to control such pollutants, as those requirements are mandated by federal law. Notwithstanding the above, the San Diego Water Board has developed an economic analysis of the requirements in this Order. The economic analysis is provided in the Fact Sheet.

Comment [A11]: See discussion in section 3.1.2 of the Comment Letter and also Legal Comments..

29. ~~**Unfunded Mandates.** This Order does not constitute an unfunded local government mandate subject to subvention under Article XIIIB, Section (6) of the California Constitution for several reasons, including, but not limited to, the following:~~

Comment [A12]: See discussion in section 3.1.2 of the comment letter and in the Legal Comments.

~~a. This Order implements federally mandated requirements under CWA section 402 (33 USC section 1342(p)(3)(B)).~~

~~b. The local agency Copermittees' obligations under this Order are similar to, and in many respects less stringent than, the obligations of non-governmental and new dischargers who are issued NPDES permits for storm water and non-storm water discharges.~~

~~c. The local agency Copermittees have the authority to levy service charges, fees, or assessments sufficient to pay for compliance with this Order.~~

~~d. The Copermittees have requested permit coverage in lieu of compliance with the complete effective prohibition against the discharge of pollutants contained in CWA section 301(a) (33 USC section 1311(a)) and in lieu of numeric restrictions on their MS4 discharges (i.e. effluent limitations).~~

~~e. The local agencies' responsibility for preventing discharges of waste that can create conditions of pollution or nuisance from conveyances that are within their ownership or control under State law predates the enactment of Article XIIIB, Section (6) of the California Constitution.~~

~~f. The provisions of this Order to implement TMDLs are federal mandates. The CWA requires TMDLs to be developed for water bodies that do not meet federal water quality standards (33 USC section 1313(d)). Once the USEPA or a state develops a TMDL, federal law requires that permits must contain water quality based effluent limitations consistent with the assumptions and requirements of any applicable wasteload allocation (40 CFR 122.44(d)(1)(vii)(B)).~~

~~See the Fact Sheet for further discussion of unfunded mandates.~~

30. **California Environmental Quality Act.** The issuance of waste discharge requirements and an NPDES permit for the discharge of runoff from MS4s to waters of the U.S. is exempt from the requirement for preparation of environmental documents under the California Environmental Quality Act (CEQA) (Public Resources Code, Division 13, Chapter 3, section 21000 et seq.) in accordance with CWC section 13389.

STATE WATER BOARD DECISIONS

31. **Compliance with Prohibitions and Limitations.** The receiving water limitation language specified in this Order is consistent with language recommended by the USEPA and established in State Water Board Order WQ 99-05, *Own Motion Review of the Petition of Environmental Health Coalition to Review Waste Discharge Requirements Order No. 96-03, NPDES Permit No. CAS0108740*, adopted by the State Water Board on June 17, 1999. The receiving water limitation language in this Order requires storm water discharges from MS4s to not cause or contribute to a violation of water quality standards, which is to be achieved through an iterative approach requiring the implementation of improved and better-tailored BMPs over time. Implementation of the iterative approach to comply with receiving water limitations based on applicable water quality standards is necessary to ensure that Pollutant ~~storm water~~ discharges from the MS4 will not ultimately cause or contribute to violations of water quality standards and will not create conditions of pollution, contamination, or nuisance.

32. **Special Conditions for Areas of Special Biological Significance.** On March 20, 2012, the State Water Board approved Resolution No. 2012-0012 approving an exception to the Ocean Plan effective prohibition against discharges to Areas of Special Biological Significance (ASBS) for certain nonpoint source discharges and NPDES permitted municipal storm water discharges. State Water Board Resolution No. 2012-0012 requires monitoring and testing of marine aquatic life and water quality in several ASBS to protect California's coastline during storms when rain water overflows into coastal waters. Specific terms, effective prohibitions, and special conditions were adopted to provide special protections for marine aquatic life and natural water quality in ASBS. The City of San Diego's municipal storm water discharges to the San Diego Marine Life Refuge in La Jolla, and the City of Laguna Beach's municipal storm water discharges to the Heisler Park ASBS are subject terms and conditions of State Water Board Resolution No. 2012-0012. The Special

Comment [A13]: See discussion in section 3.1.2 of the comment letter.

Comment [A14]: Please see discussion in section 3.1.2 of the Comment Letter and Legal Comments.

Protections contained in Attachment B to Resolution No. 2012-0012, applicable to these discharges, are hereby incorporated into this Order as if fully set forth herein.

ADMINISTRATIVE FINDINGS

33. **Executive Officer Delegation of Authority.** The San Diego Water Board by prior resolution has delegated all matters that may legally be delegated to its Executive Officer to act on its behalf pursuant to CWC section 13223. Therefore, the Executive Officer is authorized to act on the San Diego Water Board's behalf on any matter within this Order unless such delegation is unlawful under CWC section 13223 or this Order explicitly states otherwise.

34. **Standard Provisions.** Standard Provisions, which apply to all NPDES permits in accordance with 40 CFR 122.41, and additional conditions applicable to specified categories of permits in accordance with 40 CFR 122.42, are provided in Attachment B to this Order.

35. **Fact Sheet.** The Fact Sheet for this Order contains background information, regulatory and legal citations, references and additional explanatory information and data in support of the requirements of this Order. The Fact Sheet is hereby incorporated into this Order and constitutes part of the Findings of this Order.

36. **Public Notice.** In accordance with State and federal laws and regulations, the San Diego Water Board notified the Copermittees, and interested agencies and persons of its intent to prescribe waste discharge requirements for the control of discharges into and from the MS4s to waters of the U.S. and has provided them with an opportunity to submit their written comments and recommendations. Details of notification are provided in the Fact Sheet.

37. **Public Hearing.** The San Diego Water Board held a public hearing on Month Day, 2013 and heard and considered all comments pertaining to the terms and conditions of this Order. Details of the public hearing are provided in the Fact Sheet.

38. **Effective Date.** This Order serves as an NPDES permit pursuant to CWA section 401 or amendments thereto, and becomes effective fifty (50) days after the date of its adoption, provided that the Regional Administrator, USEPA, Region IX, does not object to this Order.

39. **Review by the State Water Board.** Any person aggrieved by this action of the San Diego Water Board may petition the State Water Board to review the action in accordance with CWC section 13320 and California Code of Regulations, title 23, sections 2050, et seq. The State Water Board must receive the petition by 5:00 p.m., 30 days after the San Diego Water Board action, except that if the thirtieth day following the action falls on a Saturday, Sunday or State holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the

Internet at: http://www.waterboards.ca.gov/public_notices/petitions/water_quality or will be provided upon request.

THEREFORE, IT IS HEREBY ORDERED that the Copermittees, in order to meet the provisions contained in division 7 of the CWC and regulations adopted thereunder, and the provisions of the CWA and regulations adopted thereunder, must each comply with the following:

II. PROVISIONS

A. PROHIBITIONS AND LIMITATIONS

Comment [A15]: See discussion in section 3.2 of the comment letter.

The purpose of this provision is to describe the conditions under which storm water and non-storm water discharges into and from MS4s are to be effectively prohibited or limited. The goal of the prohibitions and limitations is to protect the water quality and designated beneficial uses of waters of the state from adverse impacts caused or contributed to by MS4 discharges. This goal will be accomplished through the implementation of water quality improvement strategies and runoff management programs that effectively prohibit non-storm water discharges into the Copermittees' MS4s, and reduce pollutants in ~~storm water~~ discharges from the Copermittees' MS4s to the MEP. The process for determination of compliance with the Discharge Prohibitions (A.1), Receiving Water Limitations (A.2), and Effluent Limitations (A.3) is defined in Provisions A.3.b and A.4.

1. Discharge Prohibitions

a. Discharges from MS4s in a manner causing, or threatening to cause, a condition of pollution, contamination, or nuisance in receiving waters ~~of the state~~ are to be ~~prohibited.~~ effectively prohibited, unless the Regional Board determines such discharges are addressed by the Copermittee through A.3.b or A.4, including any modifications.~~prohibited.~~

Comment [A16]: See discussion in section 3.2.2 of the comment letter.

b. Non-storm water discharges into MS4s are to be effectively prohibited through a program consistent with the requirements of provision E.2. of this order, including inspections, to implement and enforce an ordinance, orders or similar means to prevent illicit discharges to the MS4, unless such discharges are either authorized by a separate NPDES permit, or the discharge is a category of non-storm water discharges or flows that must be addressed pursuant to Provisions E.2.a.(1)-(5) of this Order.

Comment [A17]: See discussion in section 3.2.2 of the comment letter.

c. Discharges from MS4s are subject to all applicable waste discharge prohibitions in the Basin Plan, included in Attachment A to this Order, unless the Regional Board determines such discharges are addressed by the Copermittee through A.3.b or A.4, including any modifications.

Comment [A18]: See discussion in section 3.2.2 of the comment letter.

d. Storm water discharges from the City of San Diego's MS4 to the San Diego Marine Life Refuge in La Jolla, and the City of Laguna Beach's MS4 to the Heisler Park ASBS are authorized under this Order subject to the Special Protections contained in Attachment B to State Water Board Resolution No.

2012-0012 applicable to these discharges, included in Attachment A to this Order. All other discharges from the Copermittees' MS4s to ASBS are ~~to be effectively~~ prohibited.

2. Receiving Water Limitations

Comment [A19]: See discussion in section 3.2.2 of the comment letter.

a. Discharges from MS4s must not cause or contribute to the violation of water quality standards in any receiving waters, including but not limited to all applicable provisions ~~contained in:~~below, unless the Regional Board determines such discharges are addressed by the Copermittee through A.3.b or A.4::~~contained in:~~

(1) The San Diego Water Board's Basin Plan, including beneficial uses, water quality objectives, and implementation plans;

(2) State Water Board plans for water quality control including the following:

(a) Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries (Thermal Plan), and

(b) The Ocean Plan, including beneficial uses, water quality objectives, and implementation plans;

(3) State Water Board policies for water and sediment quality control including the following:

(a) Water Quality Control Policy for the Enclosed Bays and Estuaries of California,

(b) Sediment Quality Control Plan which includes the following narrative objectives for bays and estuaries:

(i) Pollutants in sediments shall not be present in quantities that, alone or in combination, are toxic to benthic communities, and

(ii) Pollutants shall not be present in sediments at levels that will bioaccumulate in aquatic life to levels that are harmful to human health,

(c) The Statement of Policy with Respect to Maintaining High Quality of Waters in California;[1]

(4) Priority pollutant criteria promulgated by the USEPA through the following:

[1] State Water Board Resolution No. 68-16

(a) National Toxics Rule (NTR)[2] (promulgated on December 22, 1992 and amended on May 4, 1995), and

(b) California Toxics Rule (CTR).[3,4]

b. Discharges from MS4s composed of storm water runoff must not alter natural ocean water quality in an ASBS.

[2] 40 CFR 131.36
[3] 65 Federal Register 31682-31719 (May 18, 2000), adding Section 131.38 to 40 CFR
[4] If a water quality objective and a CTR criterion are in effect for the same priority pollutant, the more stringent of the two applies.

3. Effluent Limitations

a. TECHNOLOGY BASED EFFLUENT LIMITATIONS

Comment [A20]: See discussion in section 3.2.2 of the comment letter.

Pollutants in ~~storm water~~ discharges from MS4s must be reduced to the MEP.[5]

b. WATER QUALITY BASED EFFLUENT LIMITATIONS

This Order establishes water quality based effluent limitations (WQBELs) consistent with the assumptions and requirements of all available TMDL waste load allocations (WLAs) assigned to discharges from the Copermittees' MS4s. Each Copermittee must comply with applicable WQBELs established for the TMDLs in Attachment E to this Order, pursuant to the applicable TMDL compliance schedules.

4. Compliance with Discharge Prohibitions and Receiving Water Limitations

Comment [A21]: See discussion in section 3.2.2 of the comment letter.

Each Copermittee must achieve compliance with Provisions A.1.a~~,~~ through A.1.c and A.2.a of this Order through timely implementation of control measures and other actions as specified in Provisions B and E of this Order, including any modifications. The Water Quality Improvement Plans required under Provision B must be designed and adapted to ultimately achieve compliance with Provisions A.1.a~~,~~ through A.1.c and A.2.a~~.~~, as described in Provision B.2.~~.~~

a. If exceedance(s) of water quality standards persist in receiving waters notwithstanding implementation of this Order, the Copermittees must comply with the following procedures:

(1) For exceedance(s) of a water quality standard in the process of being addressed by the Water Quality Improvement Plan, the Copermittee(s) must implement the Water Quality Improvement Plan as accepted by the San Diego Water Board, and update the Water Quality Improvement Plan, as necessary, pursuant to Provision F.2.c;

(2) Upon a determination by either the Copermittees or the San Diego Water Board that discharges from the MS4 are causing or contributing to a new exceedance of an applicable water quality standard not addressed by the Water Quality Improvement Plan, the Copermittees must submit the following updates to the Water Quality Improvement Plan pursuant to Provision F.2.c or as part of the Annual Report required under Provision F.3.b, unless the San

[5] This does not apply to MS4 discharges which receive subsequent treatment to reduce pollutants in storm water discharges to the MEP prior to entering receiving waters (e.g., low flow diversions to the sanitary sewer). Runoff treatment must occur prior to the discharge of runoff into receiving waters per Finding 7.

Diego Water Board directs an earlier submittal:

(a) The water quality improvement strategies being implemented that are effective and will continue to be implemented,

(b) Water quality improvement strategies (i.e. BMPs, retrofitting projects, stream and/or habitat rehabilitation or restoration projects, adjustments to jurisdictional runoff management programs, etc.) that will be implemented to reduce or eliminate any pollutants or conditions that are causing or contributing to the exceedance of water quality standards,

(c) Updates to the schedule for implementation of the existing and additional water quality improvement strategies, and

(d) Updates to the monitoring and assessment program to track progress toward achieving compliance with Provisions A.1.a, A.1.c and A.2.a of this Order;

(3) The San Diego Water Board may require the incorporation of additional modifications to the Water Quality Improvement Plan required under Provision B. The applicable Copermittees must submit any modifications to the update to the Water Quality Improvement Plan within 90 days of notification that additional modifications are required by the San Diego Water Board, or as otherwise directed;

(4) Within 90 days of the San Diego Water Board determination that the update to the Water Quality Improvement Plan meets the requirements of this Order, the applicable Copermittees must revise the jurisdictional runoff management program documents to incorporate the updated water quality improvement strategies that have been and will be implemented, the implementation schedule, and any additional monitoring required; and

(5) Each Copermittee must implement the updated Water Quality Improvement Plan.

b. The procedure set forth above to achieve compliance with Provisions A.1.a, A.1.c and A.2.a of this Order do not have to be repeated for continuing or recurring exceedances of the same water quality standard(s) following implementation of scheduled actions unless directed to do otherwise by the San Diego Water Board.

c. Nothing in Provisions A.4.a and A.4.b prevents the San Diego Water Board from enforcing any of provisions B through I of this Order while the applicable Copermittees prepare and implement the above update to the Water Quality Improvement Plan and jurisdictional runoff management programs.

April 10 and 11, 2013
Item No. 8
Supporting Document No. 5

B. WATER QUALITY IMPROVEMENT PLANS

Comment [A22]: See section 3.3 of the comment letter for discussions of the changes requested herein.

The purpose of this provision is to develop Water Quality Improvement Plans (WQIPs) that guide the Copermittees' jurisdictional runoff management programs towards achieving the outcome of improved water quality in MS4 discharges and receiving waters. The goal of the Water Quality Improvement Plans is to ~~protect, preserve, enhance, and restorerestore the~~address the impacts of MS4 discharges so that such discharges do not impair water quality and designated beneficial uses of receiving waters. ~~of the state.~~ Therefore, implementation of the WQIPs also provides the basis for complying with Provisions II.A.1, II.A.2, and II.A.3, as described in Provision II.A.4. This goal will be accomplished through an adaptive planning and management process that identifies the highest priority water quality conditions within a watershed and implements strategies through the jurisdictional runoff management programs to achieve improvements in the quality of discharges from the MS4s ~~and~~ to receiving waters. As such, the requirements outlined in Provision E may be modified for consistency with the WQIP priorities for the applicable Watershed Management Area, if appropriate justification is provided approved within the WQIP.

Comment [A23]: See discussion in section 3.3.2 of the comment letter.

1. Watershed Management Areas

Comment [A24]: See discussion in section 3.3.2 of the comment letter.

The Copermittees must develop a Water Quality Improvement Plan for each of the Watershed Management Areas in Table B-1. A total of ten Water Quality Improvement Plans must be developed for the San Diego Region.

Development of the Water Quality Improvement Plan for the Santa Margarita River Watershed Management Area shall commence upon notification of coverage of the Riverside County Copermittees under this Order. Until this time, the County of San Diego shall use the water quality priorities in the Santa Margarita River Watershed Urban Runoff Management Plan, developed pursuant to Order No. R9-2007-0001, to guide implementation of Provisions D and E within its jurisdiction

Table B-1. Watershed Management Areas

Hydrologic Unit(s)	Watershed Management Area	Major Surface Water Bodies	Responsible Copermittees
San Juan (901.00)	South Orange County	- Aliso Creek - San Juan Creek - San Mateo Creek - Pacific Ocean - Heisler Park ASBS	- City of Aliso Viejo[1] - City of Dana Point[1] - City of Laguna Beach[1] - City of Laguna Hills[1] - City of Laguna Niguel[1] - City of Laguna Woods[1] - City of Lake Forest[1] - City of Mission Viejo[1] - City of Rancho Santa Margarita[1] - City of San Clemente[1] - City of San Juan Capistrano[1] - County of Orange[1] - Orange County Flood Control District[1]

Table B-1. Watershed Management Areas

Hydrologic Unit(s)	Watershed Management Area	Major Surface Water Bodies	Responsible Copermittees
Santa Margarita (902.00)	Santa Margarita River	- Murrieta Creek - Temecula Creek - Santa Margarita River - Santa Margarita Lagoon - Pacific Ocean	- City of Murrieta[2] - City of Temecula[2] - City of Wildomar[2] - County of Riverside[2] - County of San Diego[3] - Riverside County Flood Control and Water Conservation District[2]
San Luis Rey (903.00)	San Luis Rey River	- San Luis Rey River - San Luis Rey Estuary - Pacific Ocean	- City of Oceanside - City of Vista - County of San Diego
Carlsbad (904.00)	Carlsbad	- Loma Alta Slough - Buena Vista Lagoon - Agua Hedionda Lagoon - Batiquitos Lagoon - San Elijo Lagoon - Pacific Ocean	- City of Carlsbad - City of Encinitas - City of Escondido - City of Oceanside - City of San Marcos - City of Solana Beach - City of Vista - County of San Diego
San Dieguito (905.00)	San Dieguito River	- San Dieguito River - San Dieguito Lagoon - Pacific Ocean	- City of Del Mar - City of Escondido - City of Poway - City of San Diego - City of Solana Beach - County of San Diego
Penasquitos (906.00)	Penasquitos	- Los Penasquitos Lagoon - Pacific Ocean	- City of Del Mar - City of Poway - City of San Diego - County of San Diego
	Mission Bay	- Mission Bay - Pacific Ocean - San Diego Marine Life Refuge ASBS	- City of San Diego
San Diego (907.00)	San Diego River	- San Diego River - Pacific Ocean	- City of El Cajon - City of La Mesa - City of San Diego - City of Santee - County of San Diego
Pueblo San Diego (908.00) Sweetwater (909.00) Otay (910.00)	San Diego Bay	- Sweetwater River - Otay River - San Diego Bay - Pacific Ocean	- City of Chula Vista - City of Coronado - City of Imperial Beach - City of La Mesa - City of Lemon Grove - City of National City - City of San Diego - County of San Diego - San Diego County Regional Airport Authority - San Diego Unified Port District
Tijuana (911.00)	Tijuana River	- Tijuana River - Tijuana Estuary - Pacific Ocean	- City of Imperial Beach - City of San Diego - County of San Diego

Notes:
1. The Orange County Copermittees will be covered under this Order after expiration of Order No. R9-2009-0002, or earlier if the Orange County Copermittees meet the conditions in Provision F.6.
2. The Riverside County Copermittees will be covered under this Order after expiration of Order No. R9-2010-0016, or earlier if the Riverside County Copermittees meet the conditions in Provision F.6.
3. The County of San Diego is required to implement the requirements of Provision B for its jurisdiction within the Santa

Margarita River Watershed Management Area until the Riverside County Copermittees have been notified of coverage under this Order.

2. Priority Water Quality Conditions

The Copermittees must identify the water quality priorities within each Watershed Management Area that will be addressed by the Water Quality Improvement Plan. Where appropriate, Watershed Management Areas may be separated into subwatersheds to focus water quality prioritization and jurisdictional runoff management program implementation efforts by receiving water.

a. Assessment of Receiving Water Conditions

The Copermittees must consider the following, at a minimum, to identify water quality priorities based on impacts of MS4 discharges on receiving water beneficial uses:

(1) Receiving waters listed as impaired on the CWA Section 303(d) List of Water Quality Limited Segments (303(d) List);

(2) TMDLs adopted and under development by the San Diego Water Board;

(3) Receiving waters recognized as sensitive or highly valued by the Copermittees, including estuaries designated under the National Estuary Program under CWA section 320, wetlands defined by the State or U.S. Fish and Wildlife Service's National Wetlands Inventory as wetlands, and receiving waters identified as ASBS subject to the provisions of Attachment B to State Water Board Resolution No. 2012-0012 (Attachment A);

(4) The receiving water limitations of Provision A.2;

(5) Known historical versus current physical, chemical, and biological water quality conditions;

(6) Available, relevant, and appropriately collected and analyzed physical, chemical, and biological receiving water monitoring data, including, but not limited to, data describing:

(a) Chemical constituents,

(b) Water quality parameters (i.e. pH, temperature, conductivity, etc.),

(c) Toxicity Identification Evaluations for both receiving water column and sediment,

(d) Trash impacts,

(e) Bioassessments, and

(f) Physical habitat;

(7) Available evidence of erosional impacts in receiving waters due to accelerated flows (i.e. hydromodification);

(8) Available evidence of adverse impacts to the chemical, physical, and biological integrity of receiving waters; and

(9) The potential improvements in the overall condition of the Watershed Management Area that can be achieved.

b. ASSESSMENT OF IMPACTS FROM MS4 DISCHARGES

The Copermittees must consider the following, at a minimum, to identify the potential impacts to receiving waters that may be caused or contributed to by discharges from the Copermittees' MS4s:

(1) The discharge prohibitions of Provision A.1 and effluent limitations of Provision A.3; and

(2) Available, relevant, and appropriately collected and analyzed storm water and non-storm water monitoring data from the Copermittees' MS4 outfalls;

(3) Locations of each Copermittee's MS4 outfalls that discharge to receiving waters;

(4) Locations of MS4 outfalls that are known to persistently discharge non-storm water to receiving waters likely causing or contributing to impacts on receiving water beneficial uses;

(5) Locations of MS4 outfalls that are known to discharge pollutants in storm water causing or contributing to impacts on receiving water beneficial uses; and

(6) The potential improvements in the quality of discharges from the MS4 that can be achieved.

c. IDENTIFICATION OF PRIORITY WATER QUALITY CONDITIONS

(1) The Copermittees must use the information gathered for Provisions B.2.a and B.2.b to develop a list of priority water quality conditions as pollutants, stressors and/or receiving water conditions that are the highest threat to receiving water quality or that most adversely affect the physical, chemical, and biological integrity of receiving waters. The list must include the following information for each priority water quality condition:

(a) The beneficial use(s) associated with the priority water quality condition;

(b) The geographic extent of the priority water quality condition within the Watershed Management Area, if known;

(c) The temporal extent of the priority water quality condition (e.g., dry weather and/or wet weather);

(d) The Copermittees with MS4s discharges that may cause or contribute to the priority water quality condition; and

(e) An assessment of the adequacy of and data gaps in the monitoring data to characterize the conditions causing or contributing to the priority water quality condition, including a consideration of spatial and temporal variation.

(2) The Copermittees must identify the highest priority water quality conditions to be addressed by the Water Quality Improvement Plan, and provide a rationale for selecting a subset of the water quality conditions identified pursuant to Provision B.2.c.(1) as the highest priorities.

d. IDENTIFICATION OF MS4 SOURCES OF POLLUTANTS AND/OR STRESSORS

The Copermittees must identify and prioritize known and suspected sources of storm water and non-storm water pollutants and/or other stressors within their jurisdiction, associated with MS4 discharges that cause or contribute to the highest priority water quality conditions identified under Provision B.2.c. ~~The identification of known and suspected sources of pollutants and/or stressors that cause or contribute to the highest priority water quality conditions as identified for Provision B.2.c must~~ considering the following:

(1) Pollutant generating facilities, areas, and/or activities within the Watershed Management Area, including:

(a) Each Copermittee's inventory of construction sites, commercial facilities or areas, industrial facilities, municipal facilities, and residential areas,

(b) Publicly owned parks and/or recreational areas,

(c) Open space areas,

(d) All currently operating or closed municipal landfills or other treatment, storage or disposal facilities for municipal waste,,, and

(e) Areas not within the Copermittees' jurisdictions (e.g., Phase II MS4s, tribal lands, state lands, federal lands) that are known or suspected to be discharging to the Copermittees' MS4s;

(2) Locations of the Copermittees' MS4s, including the following:

(a) All major MS4 outfalls [per 40CFR 122.26 (b)(5)] that discharge to receiving waters, and

(b) Locations of major structural controls for storm water and non-storm water (e.g., retention basins, detention basins, major infiltration devices, etc.);

(3) Other known and suspected sources of non-storm water or pollutants in storm water discharges to receiving waters within the Watershed Management Area, including the following:

(a) Other MS4 outfalls (e.g., Phase II Municipal and Caltrans),

(b) Other NPDES permitted discharges,

(c) Any other discharges that may be considered point sources (e.g., private outfalls), and

(d) Any other discharges that may be considered non-point sources (e.g., agriculture, wildlife or other natural sources);

(4) Review of available data, including but not limited to:

(a) Findings from the Copermittees' illicit discharge detection and elimination programs,

(b) Findings from the Copermittees' MS4 outfall discharge monitoring,

(c) Findings from the Copermittees' receiving water monitoring,

(d) Findings from the Copermittees' MS4 outfall discharge and receiving water assessments, and

(e) Other available, relevant, and appropriately collected data, information, or studies related to pollutant sources and/or stressors that contribute to the highest priority water quality conditions as identified for Provision B.2.c.

(5) The adequacy of the available data to identify and prioritize sources and/or stressors associated with MS4 discharges that cause or contribute to the highest priority water quality conditions identified under Provision B.2.c.

e. NUMERIC GOALS AND SCHEDULES

Comment [A25]: See discussion in section 3.3.2 of the comment letter.

The Copermittees must develop and incorporate action levels, interim and final numeric goals[6] and schedules into the Water Quality Improvement Plan. Numeric goals must be used to support Water Quality Improvement Plan implementation and measure progress towards addressing the highest priority water quality conditions identified under Provision B.2.c. . Action Levels, Numeric goals are not enforceable compliance standards, effluent limitations, or receiving water limitations. When establishing numeric goals and corresponding schedules, the Copermittees must consider the following:

(1) Final numeric goals must be based on measureable criteria or indicators, to be achieved in ~~the receiving waters and/or~~ MS4 discharges for the highest priority water quality conditions which will ~~be capable of demonstrating the achievement of the restoration and/or protection~~ comply with the Receiving Water Limitations (A.2) of this Order; ~~water quality standards in receiving waters;~~

(2) Interim numeric goals must be based on measureable criteria or indicators capable of demonstrating incremental progress toward achieving the final numeric goals in the receiving waters and/or MS4 discharges; and

(3) Schedules must be adequate for measuring progress toward achieving the interim and final numeric goals required for Provisions B.2.e.(1) and B.2.e.(2). Schedules must incorporate the following:

(a) Interim dates for achieving the interim numeric goals,

(b) Compliance schedules for any applicable TMDLs in Attachment E to this Order,

(c) Compliance schedules for any ASBS subject to the provisions of Attachment B to State Water Board Resolution No. 2012-0012 (see Attachment A),

(d) Achievement of the final numeric goals in the receiving waters and/or MS4 discharges for the highest water quality priorities must be as soon as possible, and

[6] Interim and final numeric goals may take a variety of forms such as TMDL established WQBELs, action levels, pollutant concentration, load reductions, number of impaired water bodies delisted from the List of Water Quality Impaired Segments, Index of Biotic Integrity (IBI) scores, or other appropriate metrics. Interim and final numeric goals are not necessarily limited to one criterion or indicator, but may include multiple criteria and/or indicators. Except for TMDL established WQBELs, interim and final numeric goals and corresponding schedules may be revised through the adaptive management process under Provision B.5.

(e) Final dates for achieving the final numeric goals must not initially extend more than 10 years beyond the effective date of this Order, unless a longer period of time is authorized by the San Diego Water Board Executive Officer through an approved WQIP or the schedule includes an applicable TMDL in Attachment E to this Order[7].

Comment [A26]: Clarify that a longer period can be granted through the WQIP process.

[7] Achievement of final numeric goals within 10 years represents progress towards attainment of water quality standards, but is not a requirement to fully attain all applicable water quality standards or all priority receiving water conditions within 10 years.

3. Water Quality Improvement Strategies and Schedules

Comment [A27]: See discussion in section 3.3.2 of the comment letter.

The Copermittees must develop specific water quality improvement strategies to address the highest priority water quality conditions identified within a Watershed Management Area. The water quality improvement strategies must address the highest priority water quality conditions by ensuring the effective prohibition of~~preventing or eliminating~~ non-storm water discharges to and from the MS4, reducing pollutants in ~~storm water~~ discharges from the MS4 to the MEP, as applicable to the priority water quality conditions established per provision B.2. ~~and restoring and/or protecting the water quality standards of receiving waters~~.

a. Water Quality Improvement Strategies

The Copermittees must identify and prioritize water quality improvement strategies based on their likely effectiveness and efficiency, and design the JRMP programs to focus resources on those strategies to~~implement strategies to effectively prohibit non-storm water discharges to the MS4, reduce pollutants in storm water discharges from the MS4 to the MEP, improve the physical, chemical, and biological receiving water conditions, and~~ achieve the interim and final numeric goals in accordance with the schedules required for Provision B.2.e.(3). The following water quality improvement strategies must be included and described in the Water Quality Improvement Plan:

(1) Specific strategies and/or activities that may be implemented by one or more Copermittees within their jurisdictions through the jurisdictional runoff management programs that will address the highest priority water quality conditions within the Watershed Management Area, in accordance with the following requirements:

(a) Strategies and/or activities must, at a minimum, be described for each jurisdictional runoff management program component where strategies to address the highest priority water quality conditions are required under Provision E;

(b) The Water Quality Improvement Plan must describe the circumstances or conditions when and where the strategies or/activities should be or will be implemented, but specific details about how each Copermittee will implement the strategies and/or activities within its jurisdiction are not required; and

(c) Descriptions of strategies and/or activities must include any monitoring, information collection, special studies, and/or data analysis that is necessary to assess the effectiveness of the strategy and/or activity toward addressing the highest priority water quality conditions.

(2) Additional strategies and/or activities that may be implemented within the Watershed Management Area on a jurisdictional, sub-watershed, or watershed scale by one or more Copermittees, not specifically required under

Provision E, which are designed to achieve the interim and final numeric goals identified in Provisions B.2.e.(1) and B.2.e.(2);

b. IMPLEMENTATION SCHEDULES

(1) The Copermittees must develop schedules for implementing the water quality improvement strategies identified under Provision B.3.a to achieve the interim and final numeric goals identified under Provision B.2.e.(1) and B.2.e.(2). Schedules must be developed for both the water quality improvement strategies implemented by each Copermittee within its jurisdiction and for strategies that the Copermittees choose to implement on a collaborative basis.

(2) The Copermittees must incorporate the implementation compliance schedules for any ASBS subject to the provisions of Attachment B to State Water Board Resolution No. 2012-0012 (see Attachment A).

4. Water Quality Improvement Monitoring and Assessment Program

a. The Copermittees in each Watershed Management Area must develop and incorporate an integrated monitoring and assessment program into the Water Quality Improvement Plan that assesses: 1) the progress toward achieving the numeric goals and schedules, 2) the progress toward addressing the highest priority water quality conditions for each Watershed Management Area, and 3) each Copermittee's overall efforts to implement the Water Quality Improvement Plan.

b. The monitoring and assessment program must incorporate the monitoring and assessment requirements of Provision D, which may allow the Copermittees to modify the program to be consistent with and focus on the highest priority water quality conditions for each Watershed Management Area.

c. For Watershed Management Areas with applicable TMDLs, the monitoring and assessment program must incorporate the specific monitoring and assessment requirements of Attachment E.

d. For Watershed Management Areas with any ASBS, the water quality monitoring and assessment program must incorporate the monitoring requirements of Attachment B to State Water Board Resolution No. 2012-0012 (see Attachment A).

5. Iterative Approach and Adaptive Management Process

Comment [A28]: See discussion in section 3.3.2 of the comment letter.

The Copermittees in each Watershed Management Area must implement the iterative approach pursuant to Provision A.4 to adapt the Water Quality Improvement Plan, monitoring and assessment program, and jurisdictional runoff management programs to become more effective toward achieving compliance with Provisions A.1, A.2, and A.3.~~A.1.a, A.1.c and A.2.a~~, and must include the following:

a. RE-EVALUATION OF PRIORITY WATER QUALITY CONDITIONS

The priority receiving water quality conditions, and numeric goals and corresponding schedules, included in the Water Quality Improvement Plan pursuant to Provisions B.2.c and B.2.e, may be re-evaluated by the Copermittees as needed during the term of this Order as part of the Annual Report. Re-evaluation and recommendations for modifications to the priority water quality conditions, and numeric goals and corresponding schedules must be provided in the Regional Monitoring and Assessment Report pursuant to F.3.c~~Report of Waste Discharge~~, and must consider the following:

(1) Achieving the outcome of improved water quality in MS4 discharges and receiving waters through implementation of the water quality improvement strategies identified in the Water Quality Improvement Plan;

(2) Progress toward achieving interim and final numeric goals in receiving waters and/or MS4 discharges for the highest priority water quality conditions in the Watershed Management Area,

(3) Progress toward achieving outcomes according to established schedules;

(4) New information developed when the requirements of Provisions B.2.a-c have been re-evaluated;

(5) New policies or regulations that may affect identified numeric goals;

(6) Spatial and temporal accuracy of monitoring data collected to inform prioritization of water quality conditions and implementation strategies to address the highest priority water quality conditions;

(7) Availability of new information and data from sources other than the jurisdictional runoff management programs within the Watershed Management Area that informs the effectiveness of the actions implemented by the Copermittees;

(8) San Diego Water Board recommendations; and

(9) Recommendations for modifications solicited through a public participation process.

b. ADAPTATION OF STRATEGIES AND SCHEDULES

The water quality improvement strategies and schedules, included in the Water Quality Improvement Plan pursuant to Provisions B.3, must be re-evaluated and adapted as new information becomes available to result in more effective and efficient measures to achieve the numeric goals established pursuant to

Provision B.2.e. Re-evaluation of and modifications to the water quality improvement strategies, if determined to be necessary, must be provided in the applicable Annual Report per F.3.b.(3)., and must consider the following:

(1) Modifications to the priority water quality conditions, and numeric goals and corresponding schedules based on Provision B.5.a;

(2) Measurable or demonstrable reductions of non-storm water discharges to and from each Copermittee's MS4;

(3) Measurable or demonstrable reductions of pollutants in ~~storm water~~ discharges from each Copermittee's MS4 to the MEP;

(4) New information developed when the requirements of Provisions B.2.b and B.2.d have been re-evaluated;

(5) Efficiency in implementing the Water Quality Improvement Plan;

(6) San Diego Water Board recommendations; and

(7) Recommendations for modifications solicited through a public participation process.

c. ADAPTATION OF MONITORING AND ASSESSMENT PROGRAM

The water quality improvement monitoring and assessment program, included in the Water Quality Improvement Plan pursuant to Provisions B.4, must be re-evaluated and adapted when new information becomes available. Re-evaluation and recommendations for modifications to the monitoring and assessment program, pursuant to the requirements of Provision D, may be provided in the Annual Report, but must be provided in the Report of Waste Discharge.

6. Water Quality Improvement Plan Submittal, Updates, and Implementation

a. The Copermittees must submit the Water Quality Improvement Plans in accordance with the requirements of Provision F.1.

b. The Copermittees must submit proposed updates to the Water Quality Improvement Plan for acceptance by the San Diego Water Board Executive Officer in accordance with the requirements of Provision F.2.c.

c. The Copermittees must commence with implementation of the Water Quality Improvement Plans ~~immediately after acceptance by the San Diego Water Board, in accordance with the schedules, or subsequently updated schedules, within the Water Quality Improvement Plan.~~in accordance with Provision F.1.b.(5).

April 10 and 11, 2013
Item No. 8
Supporting Document No. 5

C. ACTION LEVELS

Comment [A29]: See comment letter section 3.4 for a discussion of the redlines shown herein.

The purpose of this provision is for the Copermittees to incorporate numeric non-stormwater action levels (NALs) and stormwater action levels (SALs) in the Water Quality Improvement Plans (Provision B), and numeric non-stormwater action levels (NALs) in the Illicit Discharge Detection and Elimination (IDDE) program (Provision E.2.).

- For the purposes of the WQIPs, ~~T~~the goal of the action levels is to guide ~~Water Quality Improvement Plan~~ the implementation efforts and measure progress towards the protection of the identified high priority water quality conditions and associated designated beneficial uses of waters of the state from adverse impacts caused or contributed to by MS4 discharges. This goal will be accomplished through monitoring and assessing the quality of the MS4 discharges during the implementation of the Water Quality Improvement Plans.

- For the purposes of the IDDE program, the goal of the non-stormwater action levels is to assist in determining whether a persistent non-stormwater discharge into or from the MS4 contains pollutants at levels that have the potential to negatively affect the identified high priority water quality conditions.

Action levels will be developed and incorporated into the WQIP (Provision B) and the IDDE Program (Provision E). Depending upon the goals/objectives for the use of the action levels and the priority receiving water conditions, the constituents and values at which they are set may differ between watersheds. Copermittees may develop Watershed Management Area specific numeric action levels for non-stormwater and stormwater MS4 discharges using an approach approved by the Regional Board or use the default non-stormwater and stormwater action levels prescribed in C.1 and C.2 below.

The Copermittees will submit the action levels as a part of the WQIP and JRMP submittals. The action levels currently established will serve as the interim action levels until revised action levels are completed and approved. Exceedances of the action levels are not subject to enforcement or non-compliance actions under this Order.

1. Default Non-Storm Water Action Levels[8]

~~The Copermittees must develop and incorporate numeric non-storm water action levels (NALs) into the Water Quality Improvement Plan to: 1) support the development and prioritization of water quality improvement strategies for addressing non-storm water discharges to and from the MS4s, 2) assess the effectiveness of the water quality improvement strategies toward addressing MS4~~

Comment [A30]: As discussed in section 2.4 of the Riverside comment letter.

[8] NALs are not ~~considered by the San Diego Water Board to be~~ enforceable limitations under this Order.

~~non-storm water discharges, required pursuant to Provision D.4.b.(1), and 3) support the detection and elimination of non-storm water and illicit discharges to and from the MS4, required pursuant to Provision E.2.~~[9]

a. The following NALs must be incorporated as applicable to the WMA and the Copermittees' MS4 discharges.~~:~~ if the Copermittees do not establish numeric action levels within the WQIP based on watershed priorities:

(1) Non-Storm Water Discharges from MS4s to Ocean Surf Zone

Table C-1. Non-Storm Water Action Levels for Discharges from MS4s to Ocean Surf Zone

Parameter	Units	AMAL	MDAL	Instantaneous Maximum	Basis
Total Coliform	MPN/100 ml	1,000	-	10,000/1,000[1]	OP
Fecal Coliform	MPN/100 ml	200[2]	-	400	OP
Enterococci	MPN/100 ml	35	-	104[3]	OP

Abbreviations/Acronyms
AMAL – average monthly action level
MDAL – maximum daily action level
OP – Ocean Plan water quality objective
MPN/100 ml – most probable number per 100 milliliters

Notes:
1. Total coliform density NAL is 1,000 MPN/100 ml when the fecal/total coliform ratio exceeds 0.1.
2. Fecal coliform density NAL is 200 MPN per 100 ml during any 30 day period.
3. This value has been set to the Basin Plan water quality objective for saltwater "designated beach areas."

~~[9] The Copermittees may utilize NALs or other benchmarks currently established by the Copermittees as interim NALs until the Water Quality Improvement Plans are accepted by the San Diego Water Board Executive Officer.~~

(2) Non-Storm Water Discharges from MS4s to Bays, Harbors, and Lagoons/Estuaries

Table C-2. Non-Storm Water Action Levels for Discharges from MS4s to Bays, Harbors, and Lagoons/Estuaries

Parameter	Units	AMAL	MDAL	Instantaneous Maximum	Basis
Turbidity	NTU	75	-	225	OP
pH	Units	Within limit of 6.0 to 9.0 at all times			OP
Fecal Coliform	MPN/100 ml	200[1]	-	400[2]	BP
Enterococci	MPN/100 ml	35	-	104[3]	BP
Priority Pollutants	ug/L	See Table C-3			

Abbreviations/Acronyms:
AMAL – average monthly action level
MDAL – maximum daily action level
OP – Ocean Plan water quality objective
BP – Basin Plan water quality objective
NTU – Nephelometric Turbidity Units
MPN/100 ml – most probable number per 100 milliliters
ug/L – micrograms per liter

Notes:
1. Based on a minimum of not less than five samples for any 30-day period.
2. The NAL is reached if more than 10 percent of total samples exceed 400 MPN per 100 ml during any 30 day period.
3. This value has been set to the Basin Plan water quality objective for saltwater "designated beach areas" and is not applicable to waterbodies that are not designated with the water contact recreation (REC-1) beneficial use.

Table C-3. Non-Storm Water Action Levels for Priority Pollutants

Parameter	Units	Freshwater (CTR)		Saltwater (CTR)	
		MDAL	AMAL	MDAL	AMAL
Cadmium	ug/L	**	**	16	8
Copper	ug/L	*	*	5.8	2.9
Chromium III	ug/L	**	**	-	-
Chromium VI	ug/L	16	8.1	83	41
Lead	ug/L	*	*	14	2.9
Nickel	ug/L	**	**	14	6.8
Silver	ug/L	*	*	2.2	1.1
Zinc	ug/L	*	*	95	47

Abbreviations/Acronyms:
CTR – California Toxic Rule
ug/L – micrograms per liter
AMAL – average monthly action level
MDAL – maximum daily action level

Notes:
* Action levels developed on a case-by-case basis (see below)
** Action levels developed on a case-by-case basis (see below), but calculated criteria are not to exceed Maximum Contaminant Levels (MCLs) under the California Code of Regulations, Title 22, Division 4, Chapter 15, Article 4, Section 64431

The Cadmium, Copper, Chromium (III), Lead, Nickel, Silver and Zinc NALs for MS4 discharges to freshwater receiving waters will be developed on a case-by-case basis because the freshwater criteria are based on site-specific water quality data (receiving water hardness). For these priority pollutants, refer to ~~the following equations (~~40 CFR 131.38.b.2 for details~~) will be required~~:

~~Cadmium (Total Recoverable) = exp(0.7852[ln(hardness)] - 2.715)~~
~~Chromium III (Total Recoverable) = exp(0.8190[ln(hardness)] + 0.6848)~~
~~Copper (Total Recoverable) = exp(0.8545[ln(hardness)] - 1.702)~~
~~Lead (Total Recoverable) = exp(1.273[ln(hardness)] - 4.705)~~
~~Nickel (Total Recoverable) = exp(.8460[ln(hardness)] + 0.0584)~~
~~Silver (Total Recoverable) = exp(1.72[ln(hardness)] - 6.52)~~
~~Zinc (Total Recoverable) = exp(0.8473[ln(hardness)] + 0.884)~~

Comment [A31]: Consistent with SD Permittee recommendations.

(3) Non-Storm Water Discharges from MS4s to Inland Surface Waters

Table C-4. Non-Storm Water Action Levels for Discharges from MS4s to Inland Surface Waters

Parameter	Units	AMAL	MDAL	Instantaneous Maximum	Basis
Dissolved Oxygen	mg/L	Not less than 5.0 in WARM waters and not less than 6.0 in COLD waters			BP
Turbidity	NTU	-	20	See MDAL	BP
pH	Units	Within limit of 6.5 to 8.5 at all times			BP
Fecal Coliform	MPN/100 ml	200[1]	-	400[2]	BP
Enterococci	MPN/100 ml	33	-	61[3]	BP
Total Nitrogen	mg/L	-	1.0	See MDAL	BP
Total Phosphorus	mg/L	-	0.1	See MDAL	BP
MBAS	mg/L	-	0.5	See MDAL	BP
Iron	mg/L	-	0.3	See MDAL	BP
Manganese	mg/L	-	0.05	See MDAL	BP
Priority Pollutants	ug/L	See Table C-3			

Abbreviations/Acronyms:
AMAL – average monthly action level
BP – Basin Plan water quality objective
COLD – cold freshwater habitat beneficial use
NTU – Nephelometric Turbidity Units
mg/L – milligrams per liter
MDAL – maximum daily action level
WARM – warm freshwater habitat beneficial use
MBAS – Methylene Blue Active Substances
MPN/100 ml – most probable number per 100 milliliters
ug/L – micrograms per liter

Notes:
1. Based on a minimum of not less than five samples for any 30-day period.
2. The NAL is reached if more than 10 percent of total samples exceed 400 MPN per 100 ml during any 30 day period.
3. This value has been set to the Basin Plan water quality objective for freshwater "designated beach areas" and is not applicable to waterbodies that are not designated with the water contact recreation (REC-1) beneficial use.

b. NALs must be identified, developed and incorporated in the Water Quality Improvement Plan for any pollutants or waste constituents that cause or contribute, or are threatening to cause or contribute to a condition of pollution or nuisance in Receiving waters ~~of the state~~ associated with the highest priority water quality conditions related to non-storm water discharges from the MS4s. NALs must be based on:

(1) Applicable water quality standards which may be dependent upon site-specific or receiving water-specific conditions or assumptions to be identified by the Copermittees; or

(2) Applicable numeric WQBELs required to meet the WLAs established for the TMDLs in Attachment E to this Order.

c. ~~For the NALs incorporated into the Water Quality Improvement Plan, the Copermittees may develop and incorporate secondary NALs specific to the Watershed Management Area at levels greater than the NALs required by Provisions C.1.a and C.1.b which can be utilized to further refine the prioritization and assessment of water quality improvement strategies for addressing non-~~

~~storm water discharges to and from the MS4s, as well as the detection and elimination of non-storm water and illicit discharges to and from the MS4. The secondary NALs may be developed using an approach acceptable to the San Diego Water Board.~~

d. Dry weather monitoring data from MS4 outfalls collected in accordance with Provision D.2.b may be utilized to develop or revise NALs based on watershed-specific data, subject to San Diego Water Board Executive Officer approval.

2. Default Storm Water Action Levels[10]

The Copermittees must develop and incorporate numeric storm water action levels (SALs) in the Water Quality Improvement Plans to: 1) support the development and prioritization of water quality improvement strategies for reducing pollutants in storm water discharges from the MS4s, and 2) assess the effectiveness of the water quality improvement strategies toward reducing pollutants in storm water discharges, required pursuant to Provision D.4.b.(2).[11]

a. The following SALs for discharges of storm water from the MS4 must be incorporated~~:~~ if the Copermittees do not establish stormwater action levels within the WQIP based on watershed priorities::~~:~~

Table C-5. Storm Water Action Levels for Discharges from MS4s to Receiving Waters

Parameter	Units	Action Level
Turbidity	NTU	126
Nitrate & Nitrite (Total)	mg/L	2.6
Phosphorus (Total P)	mg/L	1.46
Cadmium (Total Cd)*	µg/L	3.0
Copper (Total Cu)*	µg/L	127
Lead (Total Pb)*	µg/L	250
Zinc (Total Zn)*	µg/L	976

Abbreviations/Acronyms:
NTU – Nephelometric Turbidity Units
mg/L – milligrams per liter
ug/L – micrograms per liter

Notes:
* The sampling must include a measure of receiving water hardness at each MS4 outfall. If a total metal concentration exceeds the corresponding metals SAL in Table C-5, that concentration must be compared to the California Toxics Rule criteria and the USEPA 1-hour maximum concentration for the detected level of receiving water hardness associated with that sample. If it is determined that the sample's total metal concentration for that specific metal exceeds that SAL, but does not exceed the applicable USEPA 1-hour maximum concentration criterion for the measured level of hardness, then the sample result will not be considered above the SAL for that measurement.

[10] SALs are not ~~considered by the San Diego Water Board to be~~ enforceable limitations under this Order.
[11] The Copermittees may utilize SALs or other benchmarks currently established by the Copermittees as interim SALs until the Water Quality Improvement Plans are accepted by the San Diego Water Board Executive Officer.

b. SALs must be identified, developed and incorporated in the Water Quality Improvement Plan for pollutants or waste constituents that cause or contribute, or are threatening to cause or contribute to a condition of pollution or nuisance in Receiving waters ~~of the state~~ associated with the highest water quality priorities related to storm water discharges from the MS4s. SALs must be based on:

(1) Federal and State water quality guidance and/or water quality standards; and

(2) Site-specific or receiving water-specific conditions; or

(3) Applicable numeric WQBELs required to meet the WLAs established for the TMDLs in Attachment E to this Order.

c. ~~For the SALs incorporated into the Water Quality Improvement Plan, the Copermittees may develop and incorporate secondary SALs specific to the Watershed Management Area at levels greater than the SALs required by Provisions C.2.a and C.2.b which can be utilized to further refine the prioritization and assessment of water quality improvement strategies for reducing pollutants in storm water discharges from the MS4s. The secondary SALs may be developed based on the approaches recommended by the State Water Board's Storm Water Panel[12] or using an approach acceptable to the San Diego Water Board.~~

d. Wet weather monitoring data from MS4 outfalls collected in accordance with Provision D.2.c may be used to develop or revise SALs based upon watershed-specific data, subject to San Diego Water Board Executive Officer approval.

~~[12] Storm Water Panel Recommendations to the California State Water Resources Control Board: The Feasibility of Numeric Effluent Limits Applicable to Discharges of Storm Water Associated with Municipal, Industrial and Construction Activities (June 2006)~~

D. MONITORING AND ASSESSMENT PROGRAM REQUIREMENTS

Comment [A32]: See discussion in section 3.5 of the comment letter.

The purpose of this provision is for the Copermittees to monitor and assess the impact on the chemical, physical, and biological conditions of receiving waters caused by discharges from the Copermittees' MS4s under wet weather and dry weather conditions. The goal of the monitoring and assessment program is to inform the Copermittees about the nexus between the health of receiving waters and the water quality condition of the discharges from their MS4s to those receiving waters.~~.~~ This goal will be accomplished through monitoring and assessing the conditions of the receiving waters, discharges from the MS4s to those receiving waters, pollutant sources and/or stressors, and effectiveness of the water quality improvement strategies implemented as part of the Water Quality Improvement Plans.

1. Receiving Water Monitoring Requirements

The Copermittees must develop and conduct a program to monitor the condition of the receiving waters in each Watershed Management Area during dry weather and wet weather. Following acceptance of the Water Quality Improvement Plans for each Watershed Management Area, the Copermittees must conduct long-term receiving water monitoring during implementation of the Water Quality Improvement Plan to assess the long term trends and determine if water quality conditions in receiving waters are improving. Any available monitoring data not collected specifically for this Order that meet the quality assurance criteria of the Copermittees and the monitoring requirements of this Order may be utilized by the Copermittees. The Copermittees must conduct the following receiving water monitoring procedures:

a. TRANSITIONAL RECEIVING WATER MONITORING

Beginning October 1st or May 1st (whichever is sooner) following enrollment under this order and until~~Until~~ the monitoring requirements of Provisions D.1.b-e are incorporated into a Water Quality Improvement Plan that is accepted by the San Diego Water Board pursuant to Provision F.1, the Copermittees must conduct the following receiving water monitoring in the Watershed Management Area:

(1) Continue the receiving water monitoring programs required in Order Nos. R9-2007-0001~~,~~ (Attachment A, Section II. A. 1-5),~~,~~ R9-2009-0002, and R9-2010-0016;

(2) Continue the monitoring in the Hydromodification Management Plans approved by the San Diego Water Board;

(3) Participate in the following regional receiving water monitoring programs, as applicable to the Watershed Management Area and each Copermittees' MS4 discharges:

Comment [A33]: See discussion in section 3.5.3 of the comment letter.

(a) Storm Water Monitoring Coalition Regional Monitoring,

(b) Southern California Bight Regional Monitoring, and

(c) Sediment Quality Monitoring;

(4) Implement the monitoring programs developed as part of any implementation plans or load reduction plans (e.g. Bacteria Load Reduction Plans, Comprehensive Load Reduction Plans) for the TMDLs in Attachment E to this Order; and

(5) For Watershed Management Areas with ASBS, implement the monitoring requirements of Attachment B to State Water Board Resolution No. 2012-0012, included in Attachment A to this Order.

b. LONG-TERM RECEIVING WATER MONITORING STATIONS

The Copermittees must select at least one long-term receiving water monitoring station from among the existing mass loading stations, temporary watershed assessment stations, bioassessment stations, and stream assessment stations previously established by the Copermittees to be representative of the receiving water quality in the Watershed Management Area. Additional or alternative long-term receiving water monitoring stations may~~must~~ be selected where necessary to support the implementation and adaptation of the Water Quality Improvement Plan.

Comment [A34]: See discussion in section 3.5.3 of the comment letter.

c. DRY WEATHER RECEIVING WATER MONITORING

During the term of the Order, the Copermittees must perform monitoring during at least three dry weather monitoring events at each of the long-term receiving water monitoring stations. At least one monitoring event must be conducted during the dry season (May 1 – September 30) and at least one monitoring event must be conducted during a dry weather period during the wet season (October 1 – April 30), after the first wet weather event of the season, with an antecedent dry period of at least 72 hours following a storm event producing measureable rainfall of greater than 0.1 inch.

(1) Dry Weather Receiving Water Field Observations

For each dry weather monitoring event, the Copermittees must record field observations consistent with Table D-1 at each long-term receiving water monitoring station.

Table D-1. Field Observations for Receiving Water Monitoring Stations

Field Observations
• Station identification and location • Presence of flow, or pooled or ponded water • If flow is present: - Flow estimation (i.e. width of water surface, approximate depth of water, approximate flow velocity, flow rate) - Flow characteristics (i.e. presence of floatables, surface scum, sheens, odor, color) • If pooled or ponded water is present: - Characteristics of pooled or ponded water (i.e. presence of floatables, surface scum, sheens, odor, color) • Assessment of any observed connectivity of MS4 discharges to a flowing receiving water. • Station description (i.e. deposits or stains, vegetation condition, structural condition, and observable biology) • Presence and assessment of trash in and around station

Comment [A35]: See discussion in section 3.5.3 of the comment letter.

(2) Dry Weather Receiving Water Field Monitoring

For each dry weather monitoring event, if conditions allow the collection of the data, the Copermittees must monitor and record the parameters in Table D-2 at each long-term receiving water monitoring station.

Table D-2. Field Monitoring Parameters for Receiving Water Monitoring Stations

Parameters
• pH • Temperature • Specific conductivity • Dissolved oxygen • Turbidity

(3) Dry Weather Receiving Water Analytical Monitoring

For each dry weather monitoring event, the Copermittees must collect and analyze samples from each long-term receiving water monitoring station as follows:

(a) Analytes that are field measured are not required to be analyzed by a laboratory;

(b) The Copermittees must implement consistent sample collection methods for regional comparability of data, unless site-specific conditions indicate the need for alternate methods;

(c) Grab samples may be collected for pH, temperature, specific conductivity, dissolved oxygen, turbidity, hardness, and indicator bacteria Grab samples may also be collected for the analyses described in (f) where MS4 discharge runoff constitutes less than ten percent of the flow;

Comment [A36]: The receiving water stations in Riverside County either do not receive runoff from MS4 discharges or receive deminimus flows during dry weather conditions. The flow at these stations during dry weather consists virtually entirely of rising groundwater. Background receiving water quality conditions In such cases composite samples of receiving waters not affected by MS4 discharges is not warranted.

(d) For all other constituents where runoff constitutes more than ten percent of the flow, composite samples must be collected for a duration adequate to be representative of changes in pollutant concentrations and runoff flows using one of the following techniques:

(i) Time-weighted composites composed of 24 discrete hourly samples, which may be collected through the use of automated equipment, or

(ii) Flow-weighted composites collected over a typical 24-hour period, which may be collected through the use of automated equipment;

(e) Only one analysis of the composite of aliquots is required;

(f) Analysis for the following constituents is required:

(i) Constituents contributing to the highest priority water quality conditions identified in the Water Quality Improvement Plan,

(ii) Constituents listed as a cause for impairment of receiving waters in the Watershed Management Area listed on the CWA section 303(d) List,

(iii) Constituents for implementation plans or load reduction plans (e.g. Bacteria Load Reduction Plans, Comprehensive Load Reduction Plans) developed for watersheds where the Copermittees are listed responsible parties under the TMDLs in Attachment E to this Order,

(iv) Applicable NAL constituents, and

(v) Constituents listed in Table D-3.

Table D-3. Analytical Monitoring Constituents for Receiving Water Monitoring Stations

Conventionals, Nutrients	Metals (Total and Dissolved)	Pesticides	Indicator Bacteria
• Total Dissolved Solids • Total Suspended Solids • Turbidity • Total Hardness • Total Organic Carbon • Dissolved Organic Carbon • Sulfate • Methylene Blue Active Substances (MBAS) • Total Phosphorus • Orthophosphate • Nitrite[1]	• Arsenic • Cadmium • Chromium • Copper • Iron • Lead • Mercury • Nickel • Selenium • Thallium • Zinc	• Organophosphate Pesticides • Pyrethroid Pesticides	• Total Coliform • Fecal Coliform[2] • *Enterococcus*

• Nitrate[1] • Total Kjeldhal Nitrogen • Ammonia			

Notes:
1. Nitrite and nitrate may be combined and reported as nitrite+nitrate.
2. *E. Coli* may be substituted for Fecal Coliform.

(4) Dry Weather Receiving Water Toxicity Monitoring

For each dry weather monitoring event, the Copermittees must collect grab or composite samples from each long-term receiving water monitoring station to be analyzed for toxicity in accordance with Table D-4:

Table D-4. Dry Weather Toxicity Testing for Receiving Water Monitoring Stations

Freshwater Organism	Test Approach	USEPA Protocol[2]
Pimephales promelas	1 acute 1 chronic[1]	EPA-821-R-02-012
Hyalella Azteca	1 acute 1 chronic[1]	EPA-821-R-02-012
Psuedokirchneriella subcapitata	1 acute 1 chronic[1]	EPA-821-R-02-013

Notes:
1. Chronic toxicity testing is not required at receiving water monitoring stations located at mass loading stations if the channel flows are diverted year-round during dry weather conditions to the sanitary sewer for treatment.
2. USEPA protocols must be utilized for toxicity testing unless alternate toxicity testing protocols have been approved by the San Diego Water Board.

(5) Dry Weather Receiving Water Bioassessment Monitoring

Bioassessment monitoring for each long-term receiving water monitoring station is required at least once during the term of this Order. The Copermittees must conduct bioassessment monitoring during at least one dry weather monitoring event at each long-term receiving water monitoring station as follows:

(a) The following bioassessment samples and measurements must be collected:

(i) Macroinvertebrate samples must be collected in accordance with the "Reachwide Benthos (Multihabitat) Procedure" in the most current Surface Water Ambient Monitoring Program (SWAMP) Bioassessment Standard Operating Procedures (SOP), and amendments, as applicable;[13]

(ii) The "Full" suite of physical habitat characterization measurements

[13] Ode, P.R.. 2007. Standard operating procedures for collecting macroinvertebrate samples and associated physical and chemical data for ambient bioassessments in California. California State Water Resources Control Board Surface Water Ambient Monitoring Program (SWAMP) Bioassessment SOP 001. http://www.swrcb.ca.gov/water_issues/programs/swamp/tools.shtml#monitoring

must be collected in accordance with the most current SWAMP Bioassessment SOP, and as summarized in the SWAMP Stream Habitat Characterization Form – Full Version;[14] and

(iii) Freshwater algae samples must be collected in accordance with the SWAMP Standard Operating Procedures for Collecting Algae Samples.[15] Analysis of samples must include algal taxonomic composition (diatoms and soft algae) and algal biomass.

(b) The bioassessment samples, measurements, and appropriate water chemistry data must be used to calculate the following:

(i) An Index of Biological Integrity (IBI) for macroinvertebrates for each monitoring station where bioassessment monitoring was conducted, based on the most current calculation method;[16] and

(ii) An IBI for algae for each monitoring station where bioassessment monitoring was conducted, when a calculation method is developed.[17]

(c) In lieu of the requirements of Provision D.1.c.(5)(a), the Copermittees may conduct the bioassessment monitoring in accordance with the "Triad" assessment approach[18] to calculate the IBIs required for Provision D.1.c.(5)(b). The Copermittees must conduct sampling, analysis, and reporting of specified in-stream biological and habitat data according to the protocols specified in the SCCWRP Technical Report No. 539, or subsequent protocols, if developed.

(6) Dry Weather Receiving Water Hydromodification Monitoring

In addition to the hydromodification monitoring conducted as part of the Copermittees' Hydromodification Management Plans, hydromodification monitoring for each long-term receiving water monitoring station is required at least once during the term of this Order. The Copermittees must collect the

[14] Available at:
http://www.waterboards.ca.gov/water_issues/programs/swamp/docs/reports/fieldforms_fullversion052908.pdf
[15] Fetscher et al. 2009. Standard Operating Procedures for Collecting Stream Algae Samples and Associated Physical Habitat and Chemical Data for Ambient Bioassessments in California.
[16] The most current calculation method at the time the Order was adopted is outlined in "A Quantitative Tool for Assessing the Integrity of Southern California Coastal Streams" (Ode, et al. 2005. Environmental Management. Vol. 35, No. 1, pp. 1-13). If an updated or new calculation method is developed, either both (i.e. current and updated/new) methods must be used, or historical IBIs must be recalculated with the updated or new calculation method.
[17] When a calculation method is developed, IBIs must be calculated for all available and appropriate historical data.
[18] Stormwater Monitoring Coalition Model Monitoring Technical Committee, 2004. Model Monitoring Program for Municipal Separate Storm Sewer Systems in Southern California. Technical Report #419. August 2004.

following hydromodification monitoring observations and measurements within an appropriate domain of analysis during at least one dry weather monitoring event for each long-term receiving water monitoring station:

(a) Channel conditions, including:

(i) Channel dimensions,

(ii) Hydrologic and geomorphic conditions, and

(iii) Presence and condition of vegetation and habitat;

(b) Location of discharge points;

(c) Habitat integrity;

(d) Photo documentation of existing erosion and habitat impacts, with location (i.e. latitude and longitude coordinates) where photos were taken;

(e) Measurement or estimate of dimensions of any existing channel bed or bank eroded areas, including length, width, and depth of any incisions; and

(f) Known or suspected cause(s) of existing downstream erosion or habitat impact, including flow, soil, slope, and vegetation conditions, as well as upstream land uses and contributing new and existing development.

d. WET WEATHER RECEIVING WATER MONITORING

During the term of the Order, the Copermittees must perform monitoring during at least three wet weather monitoring events at each long-term receiving water monitoring station. At least one wet weather monitoring event must be conducted during the first wet weather event of the wet season (October 1 – April 30), and at least one wet weather monitoring event during a wet weather event that occurs after February 1.

(1) Wet Weather Receiving Water Field Observations

For each wet weather monitoring event, the following narrative descriptions and observations must be recorded at each long-term receiving water monitoring station:

(a) A narrative description of the station that includes the location, date and duration of the storm event(s) sampled, rainfall estimates of the storm event, and the duration between the storm event sampled and the end of the previous measurable (greater than 0.1 inch rainfall) storm event;

(b) The flow rates and volumes measured or estimated (data from nearby

USGS gauging stations may be utilized, or flow rates may be measured or estimated in accordance with the USEPA Storm Water Sampling Guidance Document (EPA-833-B-92-001), section 3.2.1, or other method proposed by the Copermittees that is acceptable to the San Diego Water Board);

(c) Station condition (i.e. deposits or stains, vegetation condition, structural condition, observable biology); and

(d) Presence and assessment of trash in and around station.

(2) Wet Weather Receiving Water Field Monitoring

For each wet weather monitoring event, the Copermittees must monitor and record the parameters in Table D-2 at each long-term receiving water monitoring station.

(3) Wet Weather Receiving Water Analytical Monitoring

For each wet weather monitoring event, the Copermittees must collect and analyze samples from each long-term receiving water monitoring station as follows:

(a) Analytes that are field measured are not required to be analyzed by a laboratory;

(b) The Copermittees must implement consistent sample collection methods for regional comparability of data, unless site-specific conditions indicate the need for alternate methods;

(c) Grab samples may be collected for pH, temperature, specific conductivity, dissolved oxygen, turbidity, hardness, and indicator bacteria;

(d) For all other constituents, composite samples must be collected for a duration adequate to be representative of changes in pollutant concentrations and runoff flows using one of the following techniques:

(i) Time-weighted composites composed of 24 discrete hourly samples, which may be collected through the use of automated equipment, or

(ii) Flow-weighted composites collected over the length of the storm event or a typical 24-hour period, which may be collected through the use of automated equipment;

(e) Only one analysis of the composite of aliquots is required;

(f) Analysis for the following constituents is required:

(i) Constituents contributing to the highest priority water quality conditions identified in the Water Quality Improvement Plan,

(ii) Constituents listed as a cause for impairment of receiving waters in the Watershed Management Area listed on the CWA section 303(d) List,

(iii) Constituents for implementation plans or load reduction plans (e.g. Bacteria Load Reduction Plans, Comprehensive Load Reduction Plans) developed for watersheds where the Copermittees are listed responsible parties under the TMDLs in Attachment E to this Order,

(iv) Applicable SAL constituents, and

(v) Constituents listed in Table D-3.

(4) Wet Weather Receiving Water Toxicity Monitoring

For each wet weather monitoring event, the Copermittees must collect grab or composite samples from each long-term receiving water monitoring station to be analyzed for toxicity in accordance with Table D-5:

Table D-5. Wet Weather Toxicity Testing for Receiving Water Monitoring Stations

Freshwater Organism	Test Approach	USEPA Protocol[1]
Pimephales promelas	1 acute	EPA-821-R-02-012
Hyalella Azteca	1 acute	EPA-821-R-02-012
Psuedokirchneriella subcapitata	1 acute	EPA-821-R-02-013

Notes:
1. USEPA protocols must be utilized for toxicity testing unless alternate toxicity testing protocols have been approved by the San Diego Water Board.

e. OTHER RECEIVING WATER MONITORING REQUIREMENTS

(1) Regional Monitoring

The Copermittees must participate in the following regional receiving waters monitoring programs, as applicable to the Watershed Management Area and the Copermittee's MS4 discharges:

(a) Storm Water Monitoring Coalition Regional Monitoring; and

(b) Southern California Bight Regional Monitoring.

(2) Sediment Quality Monitoring

The applicable Copermittees must perform sediment monitoring to assess compliance with sediment quality receiving water limits applicable to MS4 discharges to enclosed bays and estuaries. The monitoring may be performed either by individual or multiple affected Copermittees to assess compliance with receiving water limits, or through participation in a water body monitoring coalition. The Copermittees must identify sediment sampling stations that are spatially representative of the sediment within the water body segment or region of interest. Sediment quality monitoring must be conducted in conformance with the monitoring requirements set forth in the State Water Board Sediment Quality Control Plan.

(3) ASBS Monitoring

For Watershed Management Areas with ASBS, the applicable Copermittees must implement the monitoring requirements of Attachment B to State Water Board Resolution No. 2012-0012, included in Attachment A to this Order.

f. ALTERNATIVE WATERSHED MONITORING REQUIREMENTS

The San Diego Water Board may direct the Copermittees to participate in an effort to develop alternative watershed monitoring with other regulated entities, other interested parties, and the San Diego Water Board to refine, coordinate, and implement regional monitoring and assessment programs to determine the status and trends of water quality conditions in 1) coastal waters, 2) enclosed bays, harbors, estuaries, and lagoons, and/or 3) streams. As directed by the San Diego Water Board, such alternative watershed monitoring would be done in place and stead of the commensurate requirements set forth in Provision D.1.

2. MS4 Outfall Discharge Monitoring Requirements

The Copermittees must develop and conduct a program to monitor the discharges from the major MS4 outfalls to receiving waters in each Watershed Management Area during dry weather and wet weather. Following acceptance of the Water Quality Improvement Plans and schedule for implementation of monitoring for each Watershed Management Area, the Copermittees must conduct MS4 outfall discharge monitoring during implementation of the Water Quality Improvement Plan to assess the effectiveness of their jurisdictional runoff management programs toward effectively prohibiting non-storm water discharges into the MS4 and reducing pollutants in ~~storm water~~ discharges ~~to and~~ from their MS4s to the MEP. Any available monitoring data not collected specifically for this Order that meet the quality assurance criteria of the Copermittees and the monitoring requirements of this Order may be utilized by the Copermittees. The Copermittees must conduct the following MS4 outfall monitoring procedures:

Comment [A37]: Suggest same edits for SD and OC.

a. TRANSITIONAL MS4 OUTFALL DISCHARGE MONITORING

Beginning October 1st or May 1st (whichever is sooner) following enrollment under this order and until~~Until~~ the monitoring requirements of Provisions D.2.b-c are incorporated into a Water Quality Improvement Plan and schedule for implementation of monitoring that is accepted by the San Diego Water Board pursuant to Provision F.1, the Copermittees must conduct the following monitoring of MS4 outfall discharges to flowing receiving waters ~~monitoring~~ in the Watershed Management Area:

(1) MS4 Outfall Discharge Monitoring Station Inventory

Each Municipal Copermittee must identify all major MS4 outfalls (including those operated by a Special District Copermittee) that discharge directly to receiving waters within its jurisdiction and geo-locate those outfalls on a map of the MS4 pursuant to Provision E.2.b.(1). This information must be compiled into a MS4 outfall discharge monitoring station inventory, and must include the following information:

(a) Latitude and longitude of MS4 outfall point of discharge;

(b) Watershed Management Area;

(c) Hydrologic subarea;

(d) Outlet size;

(e) Accessibility (i.e. safety and without disturbance of critical habitat);

(f) Approximate drainage area; and

(g) Classification of whether the MS4 outfall is known to have persistent dry weather flows, transient dry weather flows, no dry weather flows, or unknown dry weather flows.

(2) Transitional Dry Weather MS4 Outfall ~~Discharge~~ Field Screening ~~Monitoring~~

Until the monitoring requirements of Provision D.2.b are incorporated into a Water Quality Improvement Plan that is accepted by the San Diego Water Board pursuant to Provision F.1, each Municipal Copermittee must perform the following dry weather MS4 outfall field screening monitoring to identify non-storm water and illicit discharges being discharged from MS4s within its jurisdiction in accordance with Provision E.2.c, to determine which discharges are transient ~~flows~~ and which are persistent discharges to flowing receiving waters~~flows~~, and prioritize the dry weather MS4 discharges that will be investigated and eliminated in accordance with Provision E.2.d. ~~Each Copermittee must conduct the following dry weather MS4 outfall discharge field screening monitoring within its jurisdiction:~~

Comment [A38]: Suggested change of title to better characterize the requirements of this section, compared to that of D.2.b.

Comments in this section are discussed in section 3.5.3 of the comment letter.

Comment [A39]: Duplicative of previous sentence

(a) Transitional Dry Weather MS4 Outfall Discharge Field Screening Monitoring Frequency

Each Municipal Copermittee must field screen the accessible MS4 outfalls in its inventory developed pursuant to Provision D.2.a.(1) as follows:

(i) ~~For Copermittees with less than 125 major MS4 outfalls that discharge to receiving waters within a Watershed Management Area, at least 80 percent of the outfalls must be visually inspected two times per year during dry weather conditions.~~

(ii) For Municipal Copermittees with ~~125 major MS4 outfalls or more, but~~ less than or equal to 500 MS4 outfalls~~,~~ that discharge to receiving waters within a Watershed Management Area, ~~all~~ at least 80 percent of the accessible outfalls must be visually inspected at least annually during dry weather conditions.

(iii) For Municipal Copermittees with more than 500 major MS4 outfalls that discharge to receiving waters within a Watershed Management Area, at least 500 outfalls must be visually inspected at least annually during dry weather conditions. Copermittees with more than 500 major MS4 outfalls within a Watershed Management Area must identify and prioritize at least 500 outfalls to be inspected considering the following:

[a] Assessment of connectivity of the discharge to a flowing receiving water;
[b] Reported exceedances of NALs in water quality monitoring data;
[c] Surrounding land uses;
[d] Presence of constituents listed as a cause for impairment of receiving waters in the Watershed Management Area listed on the CWA section 303(d) List; and
[e] Flow rate.

(iv) Municipal Copermittees with more than 500 major MS4 outfalls within its jurisdiction that are located in more than one Watershed Management Area, at least 500 major MS4 outfalls within its inventory must be visually inspected at least annually during dry weather conditions. Copermittees with more than 500 major MS4 outfalls in more than one Watershed Management Area must identify and prioritize at least 500 outfalls to be inspected considering the following:

[a] Assessment of connectivity of the discharge to a flowing receiving water;
[b] Reported exceedances of NALs in water quality monitoring data;
[c] Surrounding land uses;

[d] Presence of constituents listed as a cause for impairment of receiving waters in the Watershed Management Area listed on the CWA section 303(d) List; and

[e] Flow rate.

(v) Inspections of major MS4 outfalls conducted in response to public reports and staff or contractor reports and notifications may count toward the required visual inspections of MS4 outfall discharge monitoring stations.

(b) Transitional Dry Weather MS4 Outfall Discharge Field Screening Visual Observations

(i) An antecedent dry period of at least 72 hours following any storm event producing measurable rainfall greater than 0.1 inch is required prior to conducting field screening visual observations during a field screening monitoring event.

(ii) During the field screening monitoring event, each Municipal Copermittee must record visual observations consistent with Table D-6 at each MS4 outfall discharge monitoring station inspected.

Table D-6. Field Screening Visual Observations for MS4 Outfall Discharge Monitoring Stations

Field Observations
• Station identification and location • Presence of flow, or pooled or ponded water • If flow is present: - Flow estimation (i.e. width of water surface, approximate depth of water, approximate flow velocity, flow rate) - Flow characteristics (i.e. presence of floatables, surface scum, sheens, odor, color) - Flow source(s) suspected or identified from non-storm water source investigation - Flow source(s) eliminated during non-storm water source identification • If pooled or ponded water is present: - Characteristics of pooled or ponded water (i.e. presence of floatables, surface scum, sheens, odor, color) - Known or suspected source(s) of pooled or ponded water • Assessment of any observed MS4 discharge ~~with~~ to a flowing receiving water. • Station description (i.e. deposits or stains, vegetation condition, structural condition, observable biology) • Presence and assessment of trash in and around station • Evidence or signs of illicit connections or illegal dumping

(iii) Each Municipal Copermittee must implement the requirements of Provisions E.2.d.(2)(c)-(e) based on the field observations.

(iv) Each Copermittee must evaluate field observations together with existing information available from prior reports, inspections and monitoring results to determine whether any observed flowing, pooled, or ponded waters are likely to be transient or persistent flow.[19]

Comment [A40]: See footnote edits

(c) Transitional Dry Weather MS4 Outfall Discharge Field Screening ~~Monitoring~~ Records

Based upon the results of the transitional dry weather MS4 outfall discharge field screening monitoring conducted pursuant to Provisions D.2.a.(2)(a)-(b), each Municipal Copermittee must update its MS4 outfall discharge monitoring station inventory, compiled pursuant to Provision D.2.a.(1), with any new information on the classification of whether the MS4 outfall produces persistent flow, transient flow, or no dry weather flow.

(3) Transitional Wet Weather MS4 Outfall Discharge Monitoring

Comment [A41]: See discussion in section 3.5.3 of the comment letter.

Until the monitoring requirements of Provision D.2.c are incorporated into a Water Quality Improvement Plan that is accepted by the San Diego Water Board pursuant to Provision F.1, the Copermittees must conduct the following wet weather MS4 outfall discharge monitoring within the Watershed Management Area:

(a) Transitional Wet Weather MS4 Outfall Discharge Monitoring Stations

The Copermittees must select at least five wet weather MS4 outfall discharge monitoring stations from the inventories developed pursuant to Provision D.2.a.(1) that are representative of storm water discharges from areas consisting primarily of residential, commercial, industrial, and typical mixed-use land uses present within the Watershed Management Area.

(b) Transitional Wet Weather MS4 Outfall Discharge Monitoring Frequency

Each wet weather MS4 outfall discharge monitoring station selected pursuant to Provision D.2.a.(3)(a) must be monitored twice during the wet season (October 1 – April 30)~~).~~) in the transitional period. The~~). One~~ wet weather monitoring ~~event~~events shall be selected to be representative of the range of hydrologic conditions experienced in the region. At least 10% of samples~~event~~ must be conducted during the first wet weather event of the wet season, ~~and~~to include~~and one wet weather monitoring event~~ at least one such sample in each Watershed Management Area~~, a month after the first wet weather event of the wet season.~~

[19] Persistent flow, for the purposes of provision II.D.2.b.(2) is defined as the presence of an MS4 discharge that is hydraulically connected to a flowing receiving~~, pooled, or ponded~~ water more than 72 hours after a measureable rainfall event of 0.1 inch or greater, during three consecutive monitoring and/or inspection events. All other flowing, pooled, or ponded water is considered transient.

(c) Transitional Wet Weather MS4 Outfall Discharge Field Observations

For each wet weather monitoring event, the following narrative descriptions and observations must be recorded of the flow from~~at~~ each wet weather MS4 outfall discharge monitoring station:

(i) A narrative description of the station that includes the location, date and duration of the storm event(s) sampled, rainfall estimates of the storm event, and the duration between the storm event sampled and the end of the previous measurable (greater than 0.1 inch rainfall) storm event; and

(ii) The flow rates and volumes measured or estimated from the outfall (data from nearby USGS gauging stations may be utilized, or flow rates may be measured or estimated in accordance with the USEPA Storm Water Sampling Guidance Document (EPA-833-B-92-001), section 3.2.1, or other method proposed by the Copermittees that is acceptable to the San Diego Water Board);

(iii) ~~Station condition (i.e. deposits or stains, vegetation condition, structural condition, observable biology); and~~

(iv) Presence ~~and assessment~~ of trash in and around station.

Comment [A42]: This isn't appropriate for a wet weather event.

Comment [A43]: This isn't appropriate for a wet weather event.

(d) Transitional Wet Weather MS4 Outfall Discharge Field Monitoring

For each wet weather monitoring event, the Copermittees must monitor and record the parameters in Table D-2 at each wet weather MS4 outfall discharge monitoring station.

(e) Transitional Wet Weather MS4 Outfall Discharge Analytical Monitoring

For each wet weather monitoring event, the Copermittees must collect and analyze samples from each wet weather MS4 outfall discharge monitoring station as follows:

(i) Analytes that are field measured are not required to be analyzed by a laboratory;

(ii) The Copermittees must implement consistent sample collection methods for regional comparability of data, unless site-specific conditions indicate the need for alternate methods;

(iii) Grab samples may be collected for pH, temperature, specific conductivity, dissolved oxygen, turbidity, and indicator bacteria;

(iv) For all other constituents, composite samples must be collected for a duration adequate to be representative of changes in pollutant concentrations and runoff flows using one of the following techniques:

[a] Time-weighted composites composed of 24 discrete hourly samples, which may be collected through the use of automated equipment, or
[b] Flow-weighted composites collected over the length of the storm event or a typical 24 hour period, whichever is shorter, which may be collected through the use of automated equipment, or
[c] If automated compositing is not feasible, a composite sample may be collected using a minimum of 4 grab samples, collected during the first 24 hours of the storm water discharge, or for the entire storm water discharge if the storm event is less than 24 hours;

(v) Only one analysis of the composite of aliquots is required;

(vi) The samples must be analyzed for the following constituents:

[a] Constituents listed as a cause for impairment of receiving waters in the Watershed Management Area listed on the CWA section 303(d) List,
[b] Constituents for implementation plans or load reduction plans (e.g. Bacteria Load Reduction Plans, Comprehensive Load Reduction Plans) developed for watersheds where the Copermittees are listed responsible parties under the TMDLs in Attachment E to this Order, and
[c] Constituents listed in in Table D-7.

Table D-7. Analytical Monitoring Constituents for Wet Weather MS4 Outfall Discharge Monitoring Stations

Conventionals, Nutrients	Metals (Total and Dissolved)	Indicator Bacteria
• Total Dissolved Solids • Total Suspended Solids • Turbidity • Total Hardness • Total Organic Carbon • Dissolved Organic Carbon • Sulfate • Methylene Blue Active Substances (MBAS) • Total Phosphorus • Orthophosphate • Nitrite[1] • Nitrate[1] • Total Kjeldhal Nitrogen • Ammonia	• Arsenic • Cadmium • Chromium • Copper • Iron • Lead • Nickel • Selenium • Thallium • Zinc	• Total Coliform • Fecal Coliform[2] • *Enterococcus*

Notes:
1. Nitrite and nitrate may be combined and reported as nitrite+nitrate.
2. *E. Coli* may be substituted for Fecal Coliform.

(f) Other Transitional Wet Weather MS4 Outfall Discharge Monitoring

The San Diego County Copermittees must continue the wet weather MS4 outfall monitoring program developed under Order No. R9-2007-0001, as approved by the San Diego Water Board, through its planned completion.

b. DRY WEATHER MS4 OUTFALL DISCHARGE MONITORING

Each Municipal Copermittee must perform the following dry weather MS4 outfall monitoring within its jurisdiction to identify non-storm water and illicit discharges within its jurisdiction pursuant to Provision E.2.c, and to prioritize the dry weather MS4 discharges that will be investigated and eliminated pursuant to Provision E.2.d. ~~Each Copermittee must conduct the following dry weather MS4 outfall discharge monitoring within its jurisdiction:~~

(1) Dry Weather MS4 Outfall Discharge Field Screening Monitoring

Each Municipal Copermittee must continue to perform the dry weather MS4 outfall discharge field screening monitoring in accordance with the requirements of Provision D.2.a.(2), ~~. The~~ however the Municipal Copermittee may adjust the field screening monitoring frequencies and locations for the MS4 outfalls in its inventory, as needed, to identify and eliminate sources of persistent ~~flow~~ non-storm water illegal discharges from the MS4 to flowing receiving waters in accordance with the highest priority water quality conditions identified in the Water Quality Improvement Plan. ~~, provided the~~

Comment [A44]: Repetitive of previous sentence

Comment [A45]: See discussion in section 3.5.3 of the comment letter.

~~number of visual inspections performed is equivalent to the number of visual inspections required under Provision D.2.a.(2)(a).~~

Comment [A46]: See comments in comment letter

(2) Non-Storm Water Persistent Flow MS4 Outfall Discharge Monitoring

Each Municipal Copermittee must perform the following non-storm water monitoring of MS4 outfalls that persistently ~~flow MS4 outfall~~ discharge to flowing receiving waters ~~monitoring~~ to determine which persistent non-storm water discharges contain concentrations of pollutants below NALs, and which persistent non-storm water discharges impact receiving water quality during dry weather. ~~Each Copermittee must conduct the following non-storm water persistent flow MS4 outfall discharge monitoring within its jurisdiction:~~

Comment [A47]: Repetitive of previous sentence.

(a) Prioritization of Non-Storm Water Persistent Flow MS4 Outfalls

Based upon the dry weather MS4 outfall discharge field screening monitoring records developed pursuant to Provision D.2.a.(2)(c), each Municipal Copermittee must identify and prioritize the MS4 outfalls within its jurisdiction that have~~with~~ persistent discharges to flowing receiving waters ~~flows~~ based on the highest priority water quality conditions identified in the Water Quality Improvement Plan and any additional criteria developed by the Copermittee, which may include historical data and data from sources other than what the Copermittee collects.

(b) Non-Storm Water Persistent Flow MS4 Outfall Discharge Monitoring Frequency

Comment [A48]: See comment letter section 3.5.3

(i) Based on the prioritization of major MS4 outfalls developed under Provision D.2.b.(2)(a), each Municipal Copermittee must identify, at a minimum, the top 10 percent of the~~10~~ highest priority major MS4 outfalls with non-storm water persistent flows that the Copermittee will monitor within each Watershed Management Area within its jurisdiction, with a minimum of one persistent ~~flow~~discharge outfall, and a maximum of 5 required per WMA. The location of the selected highest priority non-storm water persistent ~~flow~~ discharge MS4 outfall monitoring stations must be identified on the map required pursuant to Provision E.2.b.(1).

(ii) Each of the highest priority non-storm water persistent flow MS4 outfall monitoring stations identified pursuant to Provision D.2.b.(2)(b)(i) must be monitored under dry weather conditions at least ~~semi-~~annually until one of the following occurs:

[a] The non-storm water discharges have been effectively eliminated (i.e. no flowing, pooled, or ponded water) for three consecutive dry weather monitoring events; or

[b] The source(s) of the persistent flows has been identified as a category of non-storm water discharges that does not require an NPDES permit and does not have to be addressed as an illicit discharge because it was not identified as a source of pollutants (i.e. constituents in non-storm water discharge do not exceed NALs), and the persistent flow can be re-prioritized to a lower priority; or

[c] The constituents in the persistent flow non-storm water discharge do not exceed NALs, and the persistent flow can be re-prioritized to a lower priority; or

[d] The source(s) of the persistent flows has been identified as a non-storm water discharge authorized by a separate NPDES permit.

(iii) Where the criteria under Provision D.2.b.(2)(c)(ii) are not met, but the threat to water quality has been reduced by the Copermittee, the highest priority persistent flow MS4 outfall monitoring stations may be reprioritized accordingly for continued dry weather MS4 outfall discharge field screening monitoring required pursuant to Provision D.2.b.(1).

(iv) Each Municipal Copermittee must document removal or re-prioritization of the highest priority persistent flow MS4 outfall monitoring stations identified under Provision D.2.b.(2)(b) in the Annual Report. Persistent flow MS4 outfall monitoring stations that have been removed must be replaced with the next highest prioritized MS4 major outfall in the Watershed Management Area within its jurisdiction, unless there are no remaining qualifying major MS4 outfalls within the Copermittee's jurisdiction in the Watershed Management Area.

(c) Non-Storm Water Persistent Flow MS4 Outfall Discharge Field Observations

During each semi-annual monitoring event, each Municipal Copermittee must record field observations consistent with Table D-6 at each of the highest priority persistent flow MS4 outfall monitoring stations within its jurisdiction.

(d) Non-Storm Water Persistent Flow MS4 Outfall Discharge Field Monitoring

During each ~~semi-annual~~ monitoring event, if conditions allow the collection of the data, each Municipal Copermittee must monitor and record the parameters in Table D-2 at each of the highest priority persistent flow MS4 outfall monitoring stations within its jurisdiction.

(e) Non-Storm Water Persistent Flow MS4 Outfall Discharge Analytical Monitoring

Comment [A49]: See discussion in section 3.5.3 of the comment letter.

During each semi-annual monitoring event in which measurable flow from the MS4 outfall to a flowing receiving water is present, each Municipal Copermittee must collect and analyze samples from each of the highest priority persistent flow MS4 outfall monitoring stations within its jurisdiction as follows:

(i) Analytes that are field measured are not required to be analyzed by a laboratory;

(ii) The Copermittees must implement consistent sample collection methods for regional comparability of data, unless site-specific conditions indicate the need for alternate methods;

(iii) During development of the WQIP, for each WMA, consider the following sources to select constituents for collection of~~Collect~~ grab or composite samples to be analyzed at a qualified analytical laboratory::~~for the following constituents:~~

[a] Constituents contributing to the highest priority water quality conditions identified in the Water Quality Improvement Plan,
[b] Constituents listed as a cause for impairment of receiving waters in the Watershed Management Area listed on the CWA section 303(d) List,
[c] Constituents for implementation plans or load reduction plans (e.g. Bacteria Load Reduction Plans, Comprehensive Load Reduction Plans) developed for watersheds where the Copermittees are listed responsible parties under the TMDLs in Attachment E to this Order,
[d] Applicable NAL constituents, and
[e] Constituents listed in Table D-8, unless the Copermittee has historical data that can demonstrate or provide justification that the analysis of the constituent is not necessary.

(iv) Copermittees may adjust the analytical list for a given WMA in successive monitoring events to add or eliminate constituents based on data that can demonstrate or provide justification regarding need or lack of need for the analysis of specific constituents.

Table D-8. Analytical Monitoring Constituents for Persistent Flow MS4 Outfall Discharge Monitoring Stations

Conventionals, Nutrients	Metals (Total and Dissolved)	Indicator Bacteria
• Total Dissolved Solids • Total Suspended Solids • Total Hardness • Total Phosphorus • Orthophosphate • Nitrite[1] • Nitrate[1] • Total Kjeldhal Nitrogen	• Cadmium • Copper • Lead • Zinc	• Total Coliform • Fecal Coliform[2] • *Enterococcus*

• Ammonia		

Notes:
1. Nitrite and nitrate may be combined and reported as nitrite+nitrate.
2. *E. Coli* may be substituted for Fecal Coliform.

~~(iv)~~(v) If the Copermittee identifies and eliminates the source of the persistent flow non-storm water discharge, analysis of the sample is not required.

c. WET WEATHER MS4 OUTFALL DISCHARGE MONITORING

The Copermittees must perform wet weather MS4 outfall monitoring to identify sources areas of pollutants in ~~storm water~~ discharges from the MS4s in the Watershed Management Area. The Copermittees must conduct the following wet weather MS4 outfall discharge monitoring within the Watershed Management Area:

(1) Wet Weather MS4 Outfall Discharge Monitoring Stations

The Copermittees may adjust the wet weather MS4 outfall discharge monitoring locations and frequencies in the Watershed Management Area, as needed, to identify sources of pollutants in storm water discharges from MS4s in the Watershed Management Area in accordance with the highest priority water quality conditions identified in the Water Quality Improvement Plan, provided the number of stations is at least equivalent to the number of stations required under Provision D.2.a.(3)(a).

(2) Wet Weather MS4 Outfall Discharge Monitoring Frequency

The Copermittees must monitor the wet weather MS4 outfall discharge monitoring stations in the Watershed Management Area at an appropriate frequency to identify source areas of pollutants in ~~storm water~~ discharges from the MS4s causing or contributing to the highest priority water quality conditions identified in the Water Quality Improvement Plan.

(3) Wet Weather MS4 Outfall Discharge Field Observations

For each wet weather monitoring event, the following narrative descriptions and observations must be recorded at each wet weather MS4 outfall discharge monitoring station:

(a) A narrative description of the station that includes the location, date and duration of the storm event(s) sampled, rainfall estimates of the storm event, and the duration between the storm event sampled and the end of the previous measurable (greater than 0.1 inch rainfall) storm event; and

(b) The flow rates and volumes measured or estimated (data from nearby USGS gauging stations may be utilized, or flow rates may be measured or estimated in accordance with the USEPA Storm Water Sampling Guidance Document (EPA-833-B-92-001), section 3.2.1, or other method proposed by the Copermittees that is acceptable to the San Diego Water Board);

~~(c) Station condition (i.e. deposits or stains, vegetation condition, structural condition, observable biology); and~~

~~(d) Presence and assessment of trash in and around station.~~

Comment [A50]: These are inappropriate for wet weather observations.

(4) <u>Wet Weather MS4 Outfall Discharge Field Monitoring</u>

For each wet weather monitoring event, the Copermittees must monitor and record the parameters in Table D-2 at each wet weather MS4 outfall discharge monitoring station.

(5) <u>Wet Weather MS4 Outfall Discharge Analytical Monitoring</u>

For each wet weather monitoring event, the Copermittees must collect and analyze samples from each wet weather MS4 outfall discharge monitoring station as follows:

(a) Analytes that are field measured are not required to be analyzed by a laboratory;

(b) The Copermittees must implement consistent sample collection methods for regional comparability of data, unless site-specific conditions indicate the need for alternate methods;

(c) Grab samples may be collected for pH, temperature, specific conductivity, dissolved oxygen, turbidity, hardness, and indicator bacteria;

(d) For all other constituents, composite samples must be collected for a duration adequate to be representative of changes in pollutant concentrations and runoff flows using one of the following techniques:

(i) Time-weighted composites composed of 24 discrete hourly samples, which may be collected through the use of automated equipment, or

(ii) Flow-weighted composites collected over the length of the storm event or a typical 24 hour period, whichever is shorter, which may be collected through the use of automated equipment, or

(iii) If automated compositing is not feasible, a composite sample may be collected using a minimum of 4 grab samples, collected during the first 24 hours of the storm water discharge, or for the entire storm water discharge if the storm event is less than 24 hours.

(e) Only one analysis of the composite of aliquots is required;

(f) Analysis for the following constituents is required:

(i) Constituents contributing to the highest priority water quality conditions identified in the Water Quality Improvement Plan,

(ii) Constituents listed as a cause for impairment of receiving waters in the Watershed Management Area listed on the CWA section 303(d) List,

(iii) Constituents for implementation plans or load reduction plans (e.g. Bacteria Load Reduction Plans, Comprehensive Load Reduction Plans) developed for watersheds where the Copermittees are listed responsible parties under the TMDLs in Attachment E to this Order, and

(iv) Applicable SAL constituents.

3. Special Studies

Comment [A51]: See discussion in section 3.5.3 of the comment letter.

a. Within the term of this Order, the Copermittees must initiate~~develop and implement~~ the following special studies:

(1) At least two~~three~~ special studies in each Watershed Management Area to address pollutant and/or stressor data gaps and/or develop information necessary to more effectively address the pollutants and/or stressors that cause or contribute to highest priority water quality conditions identified in the Water Quality Improvement Plan.

(2) At least one~~two~~ special study~~studies~~ for the San Diego Region to address pollutant and/or stressor data gaps and/or develop information necessary to more effectively address the pollutants and/or stressors that are impacting receiving waters on a regional basis in the San Diego Region.

(3) One of the two~~three~~ special studies in each Watershed Management Area may be replaced by a special study implemented pursuant to Provision D.3.a.(2).

b. The special studies must, at a minimum, be in conformance with the following criteria:

(1) The special studies must be related to the highest priority water quality conditions identified by the Copermittees in the Watershed Management Area and/or for the entire San Diego Region;

(2) The special studies developed pursuant to Provision D.3.a.(1) must:

(a) Be implemented within the applicable Watershed Management Area, and

(b) Require some form of participation by all the Copermittees within the Watershed Management Area;

(3) The special studies developed pursuant to Provision D.3.a.(2) must:

(a) Be implemented within the San Diego Region, and

(b) Require some form of participation by all Copermittees covered under the requirements of this Order.

c. Special studies developed to identify sources of pollutants and/or stressors should be pollutant and/or stressor specific and based on historical monitoring data and monitoring performed pursuant to Provisions D.1 and D.2. Development of source identification special studies should include the following:

(1) A compilation of known information on the specific pollutant and/or stressor, including data on potential sources and movement of the pollutant and/or stressor within the watershed. Data generated by the Copermittees and others, as well as information available from a literature research on the pollutant and/or stressor should be compiled and analyzed as appropriate.

(2) An identification of data gaps, based on the compiled information generated on the specific pollutant and/or stressor in Provision D.3.d.(1). Source identification special studies should be developed to fill identified data gaps.

(3) A monitoring plan that will collect and provide data the Copermittees can utilize to do the following:

(a) Quantify the relative loading or impact of a pollutant and/or stressor from a particular source or pollutant generating activity;

(b) Improve understanding of the fate of a pollutant and/or stressor in the environment;

(c) Develop an inventory of known and suspected sources of a pollutant and/or stressor in the Watershed Management Area; and/or

(d) Prioritize known and suspected sources of a pollutant and/or stressor based on relative magnitude in discharges, geographical distribution (i.e., regional or localized), frequency of occurrence in discharges, human health risk, and controllability.

d. Special studies initiated prior to the term~~acceptance~~ of ~~the~~this Order~~the Water Quality Improvement Plan~~ that meet the requirements of Provision D.3.b and are implemented~~completed~~ during the term of this Order may be utilized to fulfill the special study requirements of Provision D.3.a.

e. The Copermittees must submit the monitoring plans for the special studies in the Water Quality Improvement Plans required pursuant to Provision F.1.

f. The Copermittees are encouraged to share the results of the special studies regionally among the Copermittees to provide information useful in improving and adapting the management of non-storm water and storm water runoff through the implementation of the Water Quality Improvement Plans.

4. Assessment Requirements

Each Copermittee must evaluate the data collected pursuant to Provisions D.1, D.2 and D.3, and information collected during the implementation of the jurisdictional runoff management programs required pursuant to Provision E, to assess the progress of the water quality improvement strategies in the Water Quality Improvement Plan toward achieving compliance with Provisions A.1.a, A.1.c and A.2.a. Assessments must be performed as described in the following provisions:

a. RECEIVING WATERS ASSESSMENTS

(1) The Copermittees must assess and report the conditions of the receiving waters in the Watershed Management Area as follows:

(a) Based on data collected pursuant to Provision D.1.a, the assessments under Provision D.4.a.(2) must be included in the transitional~~first~~ Annual Report required pursuant to Provision F.3.b.(2~~1~~).

Comment [A52]: See our edits to that section

(b) Based on the data collected pursuant to Provisions D.1.a-e, the assessments required under Provision D.4.a.(2) must be included in the Report of Waste Discharge required pursuant to Provision F.5.b.

(2) The Copermittees must assess the status and trends of receiving water quality conditions in 1) coastal waters, 2) enclosed bays, harbors, estuaries, and lagoons, and 3) streams under dry weather and wet weather conditions, as those conditions are affected by discharges from the Copermittees' MS4, to determine the progress towards meeting interim or final goals of the Water Quality Implementation Plan for the Watershed Management Area~~.~~ For each of the three types of receiving waters that are present in each Watershed Management Area the applicable Copermittees must:

Comment [A53]: See discussion in section 3.5.3 of the comment letter.

(a) Determine whether or not the conditions of the receiving waters are meeting any applicable numeric goals established pursuant to provision B.2.e.~~protective of the designated beneficial uses~~;

~~(b) Identify the most critical beneficial uses that must be protected or restored to ensure overall health of the receiving water;~~

~~(c) Determine whether or not those critical beneficial uses are being protected and where those beneficial used must be restored;~~

~~(d)~~(b) Identify short-term and/or long-term improvements or degradation of Receiving Water conditions related to those numeric goals~~those critical beneficial uses~~;

~~(e)~~(c) Identify data gaps in the monitoring data necessary to assess Provisions D.4.a.(2)(a)-(d).

b. MS4 OUTFALL DISCHARGES ASSESSMENTS

(1) Non-Storm Water Discharges Reduction Assessments

(a) ~~Each Copermittee must assess and report the progress of its illicit discharge detection and elimination program, required to be implemented pursuant to Provision E.2, toward reducing and effectively prohibiting non-storm water and illicit discharges into the MS4 within its jurisdiction as follows:~~

~~(i) Based on data collected pursuant to Provisions D.2.a.(2), the assessments under Provision D.4.b.(1)(b) must be included when complete in the Annual Report required pursuant to Provision F.3.b.(1).~~

~~(ii) Based on the data collected pursuant to Provisions D.2.b, the assessments required under Provision D.4.b.(1)(c) must be included in the first Annual Report required pursuant to Provision F.3.b.(1), and annually thereafter.~~

~~(iii) Based on the data collected pursuant to Provisions D.2.b, the assessment required under Provision D.4.b.(1)(c) must be included in the Report of Waste Discharge required pursuant to F.5.b.~~

(b) Based on the transitional dry weather MS4 outfall discharge field screening monitoring required pursuant to Provision D.2.a.(2), each

Comment [A54]: See discussion in section 3.5.3 of the comment letter for key changes. Other changes are described in comments below.

Comment [A55]: For clarity and simplicity, these timelines were integrated into the following sections.

Municipal Copermittee must assess and report the following, as applicable to discharges from the MS4 (including Special District Copermittee MS4s) to flowing receiving waters within their jurisdiction, in the Annual Report required pursuant to Provision F.3.b.(2):~~:~~

Comment [A56]: Per edits to that section

(i) Identify the known and suspected controllable sources (e.g. facilities, areas, land uses, pollutant generating activities) of transient and persistent flow discharges to flowing receiving waters~~flows~~ within the Copermittee's jurisdiction in the Watershed Management Area;

(ii) Identify sources of transient and persistent flow discharges to flowing receiving waters~~flows~~ within the Copermittee's jurisdiction in the Watershed Management Area that have been reduced or eliminated; and

(iii) Identify modifications to the field screening monitoring locations and frequencies for the MS4 outfalls in its inventory necessary to identify and eliminate sources of persistent flow non-storm water discharges to flowing receiving waters, pursuant to Provision D.2.b.(1).

(c) Based on the dry weather MS4 outfall discharge field screening monitoring required pursuant to Provision D.2.b, each Municipal Copermittee must assess and report the following, as applicable to discharges from the MS4 (including Special District Copermittee MS4s) within their jurisdiction, in each Annual Report required pursuant to F.3.b.(3) and in the Report of Waste Discharge required pursuant to Provision F.5.b.:~~:~~

Comment [A57]: Per edits to that section

(i) The assessments required pursuant to Provision D.4.b.(1)(a~~b~~);

Comment [A58]: Per edits above

(ii) Based on the data collected and applicable NALs in the Water Quality Improvement Plan, rank the MS4 outfalls in the Copermittee's jurisdiction according to potential threat to receiving water quality, and produce a prioritized list of major MS4 outfalls for follow-up action to update the Water Quality Improvement Plan, with the goal of eliminating persistent flow non-storm water discharges to flowing receiving waters and/or pollutant loads in order of the ranked priority list through targeted programmatic actions and source investigations;

(iii) For the highest priority major MS4 outfalls with persistent flow discharges to a flowing receiving water~~flows~~ that are in exceedance of NALs, identify the known and suspected sources within the Copermittee's jurisdiction in the Watershed Management Area that may cause or contribute to the NAL exceedances;

(iv) Each Copermittee must analyze the data collected pursuant to Provision D.2.b.(2), and: ~~utilize a model or other method, to calculate or estimate the non-storm water volumes and pollutant loads collectively discharged from all the major MS4s outfalls in its jurisdiction identified as having persistent dry weather flows during~~

Comment [A59]: Edits to this section (and sub-sections) is different than SD edits.

~~the monitoring year. These calculations or estimates must be updated annually. Each Copermittee must calculate or estimate:~~

[a] Calculate or estimate annual non-storm water volumes and pollutant loads (associated with the priority constituents identified in the WQIP) collectively discharged from the monitored persistently flowing ~~Copermittee's~~ major MS4 outfalls discharging to flowing receiving waters within the Copermittee's jurisdiction, or discharged into another Copermittee's MS4 as demonstrated through provision E.2.d.~~with an estimate of the percent contribution from each known and suspected source for each MS4 outfall~~;

[b] Identify ~~identify~~ and quantify, where feasible, known sources of non-stormwater flows not ~~[b] Annual non-storm water volumes and pollutant loads from areas or facilities~~ subject to the Copermittee's legal authority that are discharged from the Copermittee's major MS4 outfalls to downstream receiving waters.

(v) Each Copermittee must review the data collected pursuant to Provision D.2.b and findings from the assessments required pursuant to Provision D.4.b.(1)(c)(i)-(iv) ~~once per Permit term~~~~on an annual basis, and then report~~ within the Regional Monitoring and Assessment Report per Provision F.3.c., the following ~~to~~:

[a] Identify reductions and progress in achieving reductions in non-storm water and illicit discharges to the Copermittee's MS4 in the Watershed Management Area;

[b] Assess the effectiveness of water quality improvement strategies being implemented by the Copermittees within the Watershed Management Area toward reducing or eliminating non-storm water and pollutant loads discharging from the MS4 to receiving waters within its jurisdiction, with an estimate, if possible, of the non-storm water volume and/or pollutant load reductions attributable to specific water quality strategies implemented by the Copermittee; and

[c] Identify modifications necessary to increase the effectiveness of the water quality improvement strategies implemented by the Copermittee in the Watershed Management Area toward reducing or eliminating non-storm water and pollutant loads discharging from the MS4 to receiving waters within its jurisdiction.

(vi) Identify data gaps in the monitoring data necessary to assess Provisions D.4.b.(2)(c)(i)-(v).

(2) Storm Water Pollutant Discharges Reduction Assessments

(a) ~~The Copermittees must assess and report the progress of the water quality improvement strategies, required to be implemented pursuant to~~

Comment [A60]: This is to help ensure jurisdictional accountability for what is being discharged from their jurisdiction.

~~Provisions B and E, toward reducing pollutants in storm water discharges from the MS4s within the Watershed Management Area as follows:~~

~~(i) Based on data collected pursuant to Provisions D.2.a.(3), the assessments under Provision D.4.b.(2)(b) must be included in the first Annual Report required pursuant to Provision F.3.b.(1).~~

~~Based on the data collected pursuant to Provisions D.2.c, the assessments required under ProvisionProvision first Annual Report required pursuant to Provision F.3.b.(1), and annually thereafter.~~

~~Based on the data collected pursuant to Provisions D.2.c, the assessment required under Provisions D.4.b.(2)(c)-(d) must be included in the Report of Waste Discharge required pursuant to F.5.b.~~

(b) Based on the transitional wet weather MS4 outfall discharge monitoring required pursuant to Provision D.2.a.(3) the Copermittees must assess and report the following in the Transitional Period Monitoring Report required pursuant to Provision F.3.b.(2):

(i) The Copermittees must analyze the monitoring data collected pursuant to Provision D.2.a.(3), and utilize a watershed model or other method, to calculate or estimate: ~~storm water volumes and pollutant loads discharged from the MS4s in each Copermittee's jurisdiction within the Watershed Management Area. The Copermittees must calculate or estimate the following for each monitoring year:~~

[a] The average storm water runoff coefficient for each land use type within the Watershed Management Area;

[b] The volume of storm water and pollutant loads discharged from each of the Copermittee's monitored major MS4 outfalls in its jurisdiction to receiving waters within the Watershed Management Area for each monitored storm event with measurable rainfall greater than 0.1 inch, for each of the priority water quality constituents identified in the WQIP;

[c] The total volume and pollutant loads potentially discharged from each Municipal Copermittee's jurisdiction within the watershed management area, for each monitored event, extrapolated from the data produced from the monitored outfalls.

~~The pollutant loads discharged from each of the Copermittee's major MS4 outfalls in its jurisdiction to receiving waters within the Watershed Management Area for each storm event with measurable rainfall greater than 0.1 inch; and~~

~~[d] The percent contribution of storm water volumes and pollutant loads discharged from each land use type within the drainage basin to each of the Copermittee's major MS4 outfalls in its~~

Comment [A61]: See discussion in section 3.5.3 of the comment letter.

Comment [A62]: Removed as this was confusing as it was duplicative of the subsections below.

Comment [A63]: There is no need to perform this analysis for other pollutants not identified as priorities in the WQIP.

~~jurisdiction to receiving waters within the Watershed Management Area for each storm event with measurable rainfall greater than 0.1 inch.~~

(ii) Identify modifications to the wet weather MS4 outfall discharge monitoring locations and frequencies necessary to identify ~~sources~~ pollutants in storm water discharges from the MS4s in the Watershed Management Area pursuant to Provision D.2.c.(1).

(c) Based on the wet weather MS4 outfall discharge monitoring required pursuant to Provision D.2.c the Copermittees must assess and report (i) and (ii) below in the annual reports required per F.3.b.(3), and (i) through (iv) below in the Regional Monitoring and Assessment Report required per F.3.c. ~~the following~~:

(i) The assessments required pursuant to Provision D.4.b.(2)(a~~b~~);

(ii) Based on the data collected and applicable SALs in the Water Quality Improvement Plan, analyze and compare the monitoring data to the analyses and assumptions used to develop the Water Quality Improvement Plans, including strategies developed per Provision B.3, and evaluate whether ~~, rank the MS4 outfalls in the Watershed Management Area according to potential threat to receiving water quality, and produce a prioritized list of major MS4~~ there is a need to update the Water Quality Improvement Plan;

(iii) The Copermittees must review the data collected pursuant to Provision D.2.c and findings from the assessments required pursuant to Provisions D.4.b.(2)(c)(i)-(ii) ~~on an annual basis~~ to:

[a] Identify reductions and progress in achieving reductions in pollutant concentrations and/or pollutant loads from different land uses and/or drainage areas discharging from the Copermittees' MS4s in the Watershed Management Area;

[b] Assess the effectiveness of water quality improvement strategies being implemented by the Copermittees within the Watershed Management Area toward reducing pollutants in ~~storm water~~ discharges from the MS4s to receiving waters within the Watershed Management Area to the MEP, with an estimate, if possible, of the pollutant load reductions attributable to specific water quality strategies implemented by the Copermittees; and

[c] Identify modifications necessary to increase the effectiveness of the water quality improvement strategies implemented by the Copermittees in the Watershed Management Area toward reducing pollutants in ~~storm water~~ discharges from the MS4s to receiving waters in the Watershed Management Area to the MEP.

(iv) Identify data gaps in the monitoring data necessary to assess Provisions D.4.b.(2)(c)(i)-(iii).

Comment [A64]: See discussion in section 3.5.3 of the comment letter.

Comment [A65]: Per edits to that section

Comment [A66]: Per edits above

(d) Within the Regional Monitoring and Assessment report required pursuant to F.3.c.~~The~~ Copermittees must evaluate all the data collected pursuant to Provision D.2.c, and incorporate new outfall monitoring data into time series plots for each long-term monitoring constituent for the Watershed Management Area, and perform statistical trends analysis on the cumulative long-term wet weather MS4 outfall discharge water quality data set.

c. SPECIAL STUDIES ASSESSMENTS

The Copermittees must in the applicable annual report required pursuant to F.3.b.,~~annually~~ evaluate the results and findings from the special studies developed and implemented pursuant to Provision D.3, and assess their relevance to the Copermittees' efforts to characterize receiving water conditions, understand sources of pollutants and/or stressors, and control and reduce the discharges of pollutants from the MS4 outfalls to receiving waters in the Watershed Management Area. The Copermittees must report the results of the special studies assessments applicable to the Watershed Management Area, and identify any necessary modifications or updates to the Water Quality Improvement Plan based on the results in the Annual Reports required pursuant to Provision F.3.b.

d. INTEGRATED ASSESSMENT OF WATER QUALITY IMPROVEMENT PLAN

As part of the iterative approach and adaptive management process required for the Water Quality Improvement Plan pursuant to Provision B.5, the Copermittees in each Watershed Management Area must integrate the data collected pursuant to Provisions D.1-D.3, the findings from the assessments required pursuant to Provisions D.4.a-c, and information collected during the implementation of the jurisdictional runoff management programs required pursuant to Provision E to assess the effectiveness of, and identify necessary modifications to, the Water Quality Improvement Plan as follows:

(1) The Copermittees must re-evaluate the priority water quality conditions and numeric goals for the Watershed Management Area, as needed, during the term of this Order pursuant to Provision B.5.a. The re-evaluation and recommendations for modifications to the priority water quality conditions, and/or numeric goals and corresponding schedules may be provided in the Annual Reports required pursuant to Provision F.3.b, but must at least be provided in the Regional Monitoring and Assessment Report ~~of Waste Discharge~~ pursuant to Provision F.3.c~~5.b~~. The priority water quality conditions and numeric goals for the Watershed Management Area must be re-evaluated as follows:

(a) Re-evaluate the receiving water conditions in the Watershed Management Area in accordance with Provision B.2.a;

(b) Re-evaluate the impacts on receiving waters in the Watershed Management Area from MS4 discharges in accordance with Provision B.2.b;

(c) Re-evaluate the identification of MS4 sources of pollutants and/or stressors in accordance with Provision B.2.d;

(d) Identify beneficial uses of the receiving waters that are protected or must be restored in accordance with Provision D.4.a;

(e) Evaluate the progress toward achieving the interim and final numeric goals for restoring impacted beneficial uses in the receiving waters.

(2) The Copermittees must re-evaluate the water quality improvement strategies for the Watershed Management Area during the term of this Order pursuant to Provision B.5.b. The re-evaluation and recommendations for modifications to the water quality improvement strategies and schedules may be provided in the Annual Reports required pursuant to Provision F.3.b, but must at least be provided in the Regional Monitoring and Assessment Report pursuant to Provision F.3.c~~must be provided in the Annual Reports required pursuant to Provision F.3.b, and provided in the Report of Waste Discharge pursuant to Provision F.5.b~~. The water quality improvement strategies for the Watershed Management Area must be re-evaluated as follows:

(a) Identify the non-storm water and storm water pollutant loads from the Copermittees' MS4 outfalls in the Watershed Management Area, calculated or estimated pursuant to Provisions D.4.b;

(b) Identify the non-storm water and storm water pollutant load reductions, or other improvements to receiving water or water quality conditions, that are necessary to attain the interim and final numeric goals identified in the WQIP~~for restoring impacted beneficial uses in the receiving waters~~;

(c) Identify any~~the~~ non-storm water and storm water pollutant load reductions, or other improvements to the quality of MS4 discharges, that are necessary for the Copermittees to ~~demonstrate that non-storm water and storm water~~ reduce discharges of pollutants from their MS4s that have been demonstrated to be~~are not~~ causing or contributing to exceedances of receiving water limitations;

(d) Evaluate the progress of the water quality improvement strategies toward achieving the interim and final numeric goals identified in the WQIP~~for restoring impacted beneficial uses in the receiving waters~~.

(3) The Copermittees must re-evaluate and adapt the water quality monitoring and assessment program for the Watershed Management Area when new information becomes available to improve the monitoring and assessment

Comment [A67]: See discussion in section 3.5.3 of the comment letter.

program pursuant to Provision B.5.c. The re-evaluation and recommendations for modifications to the monitoring and assessment program may be provided in the Annual Reports required pursuant to Provision F.3.b, but must at least be provided in the Regional Monitoring and Assessment Report ~~of Waste Discharge~~ pursuant to Provision F.3.c~~5.b~~. Modifications to the water quality monitoring and assessment program must be consistent with the requirements of Provision D.1-D.3. The re-evaluation of the water quality monitoring and assessment program for the Watershed Management Area must consider the data gaps identified by the assessments required pursuant to Provisions D.4.a-b, and results of the special studies implemented pursuant to Provision D.4.c.

5. Monitoring Provisions

Each Copermittee must comply with all the monitoring, reporting, and recordkeeping provisions of the Standard Permit Provisions and General Provisions contained in Attachment B to this Order.

E. JURISDICTIONAL RUNOFF MANAGEMENT PROGRAMS

The purpose of this provision is for each Copermittee to implement a program to control the contribution of pollutants to and the discharges from the MS4 within its jurisdiction. The goal of the jurisdictional runoff management programs is to implement strategies that effectively prohibit non-storm water discharges to the MS4 and reduce the discharge of pollutants in ~~storm water~~ to the MEP. This goal will be accomplished through implementing the jurisdictional runoff management programs in accordance with the strategies identified in the Water Quality Improvement Plans.

Each Copermittee must update its jurisdictional runoff management program document, in accordance with Provision F.2.a, to incorporate all the requirements of Provision E, consistent with their legal authority. Until the Copermittee has updated its jurisdictional runoff management program document with the applicable requirements of Provision E, the Copermittee must continue implementing its current jurisdictional runoff management program.

Modification of Jurisdictional Runoff Management Program Requirements

Modifications shall be considered and where selected, proposed according to the process in Provision B.5. Proposed modifications may increase, decrease, and/or replace minimum requirements identified in Provision E.

1. Legal Authority Establishment and Enforcement

Comment [A68]: See discussion in section 3.6 of the comment letter.

a. Each Copermittee must establish, maintain, and enforce adequate legal authority within its jurisdiction to control pollutant discharges into and from its MS4 through statute, ordinance, permit, or series of contracts, ~~order, or similar means~~ which~~. This legal authority must~~, at a minimum, authorize the Copermittee to:

(1) Effectively prohibit through ordinance, order or other similar means~~Prohibit and eliminate all~~ illicit discharges ~~and illicit connections~~ to its MS4;

(2) Control, through ordinance, permit, contract, order or similar means the contribution of pollutants in discharges to the MS4 by storm water discharges ~~of runoff~~ associated with industrial and construction activity ~~to its MS4~~, and ~~control~~ the quality of storm water discharges ~~runoff~~ from sites of industrial and construction activity~~sites~~, whose discharges have not been separately authorized through ~~that do not, including industrial and construction sites which~~ have coverage under the statewide General Permit for Discharges of Storm Water Associated with Industrial Activities (Industrial General Permit) or General Permit for Discharges of Storm Water Associated with Construction Activities (Construction General Permit)~~, as well as to those sites which do not;~~

Comment [A69]: See discussion in section 3.6.2 of the comment letter.

(3) Control, through ordinance, order or similar means the discharge to the MS4 of spills, dumping, or disposal of materials other than storm water ~~into its~~

Comment [A70]: See discussion in section 3.6.2 of the comment letter.

~~MS4~~;

(4) Control through interagency agreements among Copermittees the contribution of pollutants from one portion of the MS4 to another portion of the MS4;

(5) ~~Control, by coordinating and cooperating with other owners of the MS4 such as Caltrans, the U.S. federal government, or sovereign Native American Tribes through interagency agreements, where possible, the contribution of from their portion of the MS4 to the portion of the MS4 within the Copermittee's jurisdiction;~~

(6) Require compliance with conditions in its ~~statutes,~~ ordinances, permits, contracts, or orders~~, or similar means~~ ~~to hold dischargers to its MS4 accountable for their contributions of pollutants and flows~~;

(7) ~~Require the use of BMPs to prevent or reduce the discharge of pollutants in storm water from its MS4 to the MEP;~~

(8) ~~Require documentation on the effectiveness of BMPs implemented to prevent or reduce the discharge of pollutants in storm water from its MS4 to the MEP;~~

(9) ~~Utilize enforcement mechanisms to require compliance with its statutes, ordinances, permits, contracts, orders, or similar means; and~~

(10) Carry out all inspections, surveillance, and monitoring procedures necessary to determine compliance and noncompliance with permit conditions~~its statutes, ordinances, permits, contracts, orders, or similar means and with the requirements of this Order~~, including the prohibition of illicit discharges and connections to its MS4; ~~the Copermittee must also have authority to enter, monitor, inspect, take measurements, review and copy records, and require regular reports from industrial facilities, including construction sites, discharging into its MS4.~~

b. With the first Annual Report required pursuant to Provision F.3.b, each Copermittee must submit a statement certified by its Principal Executive Officer, Ranking Elected Official, or Duly Authorized Representative that the Copermittee has taken the necessary steps to obtain and maintain full legal authority within its jurisdiction to implement and enforce each of the requirements contained in this Order.

2. Illicit Discharge Detection and Elimination

Each Copermittee must implement a program to actively detect and eliminate illicit discharges and improper disposal into the MS4, or otherwise require the discharger

Comment [A71]: See discussion in section 3.6.2 of the comment letter.

Comment [A72]: See discussion in section 3.6.2 of the comment letter.

Comment [A73]: See discussion in section 3.6.2 of the comment letter.

Comment [A74]: See discussion in section 3.6.2 of the comment letter.

Comment [A75]: See discussion in section 3.7 of the comment letter.

to apply for and obtain a separate NPDES permit. The illicit discharge detection and elimination program must be implemented in accordance with the strategies identified in the Water Quality Improvement Plan and include, at a minimum, the following requirements:

STRATEGIES TO ADDRESS THE HIGHEST PRIORITY WATER QUALITY CONDITIONS

Each Copermittee must describe in its jurisdictional runoff management program document the strategies and/or activities that will be implemented as part of the illicit discharge detection and elimination program to address ~~non-storm water and~~ illicit discharges and connections that the Copermittee has identified as potential sources of pollutants and/or stressors that contribute to the highest priority water quality conditions in the Watershed Management Area as follows:

(1) Provide specific details about how the strategies and/or activities will be implemented (e.g. designate ~~additional~~ BMPs, focus education, and/or increase/decrease frequency of inspections in specific areas); and

(2) The strategies and/or activities ~~must~~ may be modified from ~~consistent with~~ the default requirements of Provisions E.2.~~b-e~~a-d ~~and~~ to be consistent with the strategies identified in the Water Quality Improvement Plan;

(3) The requirements of the programs as outlined in the following sub-provisions may be modified and prioritized as appropriate for consistency with the highest water quality priorities and strategies as identified in the corresponding Water Quality improvement Plan(s).

a. NON-STORM WATER DISCHARGES

To the extent allowable by law, each~~Each~~ Copermittee must address all non-storm water discharges ~~from~~into the MS4 as illicit discharges, where the likelihood exists that they are a source of pollutants to the Receiving Waters, unless ~~a non-storm water~~the discharge is either identified as a discharge authorized by a separate NPDES permit, or identified as a category of non-storm water discharges or flows that is consistent with~~must be addressed pursuant to~~ the following requirements:

(1) ~~Discharges of non-storm water to the MS4 from the following categories must be addressed as illicit dischargeunless the discharge has coverage under NPDES Permit No. CAG919001 (Order No. R9-2007-0034, or subsequent order) for discharges to San Diego Bay, or NPDES Permit No. CAG919002 (Order No. R9-2008-0002, or subsequent order) for discharges to surface waters other than San Diego Bay.~~

Comment [A76]: See discussion in section 3.7.2 of the comment letter.

~~(a) Uncontaminated pumped ground water;~~

~~(b) Discharges from foundation drains;[20]~~

~~(c) Water from crawl space pumps; and~~

~~(d) Water from footing drains.[19]~~

(2) Discharges of non-storm water from water line flushing and water main breaks to the MS4 must be addressed as illicit discharges unless the discharge has coverage under a valid NPDES Permit, ~~No. CAG 679001~~ (Order No. R9-2010-0003, or a subsequent order). This category includes potable water line flushing ~~and water main break~~ discharges from water purveyors issued a water supply permit by the California Department of Public Health or federal military installations. Discharges from recycled or reclaimed water lines to the MS4 must be addressed as illicit discharges, unless the discharges have coverage under a separate NPDES permit.

Comment [A77]: See discussion in section 3.7.2 of the comment letter.

(3) Discharges of non-storm water into the MS4 from the following categories must be addressed by the Copermittee as illicit discharges only if the Copermittee or the San Diego Water Board identifies the individual discharge as a source of pollutants to receiving waters:

Comment [A78]: See discussion in section 3.7.2 of the comment letter.

(a) Diverted stream flows;

(b) Rising ground waters;

(c) Uncontaminated ground water infiltration to MS4s;

(d) Uncontaminated pumped ground water;

(e) Springs;

(f) Water from crawl space pumps;

~~(c)~~(g) Flows from riparian habitats and wetlands;

(h) Landscape irrigation;

(i) Irrigation water;

(j) Lawn watering;

Comment [A79]: See Legal Comments discussion.

~~[20] Provision E.2.a.(1) only applies to this category on non-storm water if the system is designed to be located at or below the highest historical groundwater table to actively or passively extract groundwater during any part of the year.~~

~~(d)~~(k) Discharges from potable water sources;

~~(e)~~(l) Discharges from foundation drains;[21] and

(m)Discharges from footing drains. .[21]

(4) Discharges of non-storm water into the MS4 from the following categories must be controlled by the requirements given below through statute, ordinance, permit, contract, order, or similar means~~.~~ ~~Discharges of non-storm water to the MS4 from the following categories not controlled by the requirements given below through~~ If such statutes, ordinances, permits, contracts, orders, or similar means have not been enacted by the Copermittee, the applicable categories below must be addressed by the Copermittee as illicit discharges.

(a) Air conditioning condensation

The discharge of air conditioning condensation should~~must~~ be directed to landscaped areas or other pervious surfaces where feasible.

(b) Individual residential vehicle washing

(i) The discharge of wash water ~~must~~ should be directed to landscaped areas or other pervious surfaces where feasible; and

(ii) Minimize the use of water for vehicle washing, use as little washing detergent and other vehicle wash products as possible, wash vehicles at commercial wash facilities, and implement other practices or behaviors that will prevent the discharge of pollutants associated with individual residential vehicle washing from entering the MS4.

(c) Dechlorinated swimming pool discharges

(i) Eliminate residual chlorine, algaecide, filter backwash, or other pollutants from swimming pools prior to discharging to the MS4; and

(ii) The discharge of saline swimming pool water must be directed to the sanitary sewer, landscaped areas, or other pervious surfaces that can accommodate the volume of water, unless the saline swimming pool water can be discharged via a pipe or concrete channel directly to a naturally saline water body (e.g. Pacific Ocean).

(5) Firefighting discharges to the MS4 must be addressed by the Copermittee as

Comment [A80]: See discussion in section 3.7.2 of the comment letter.

Comment [A81]: See discussion in section 3.7.2 of the comment letter.

~~[21] Provision E.2.a.(3) only applies to this category of non-storm water discharge if the system is designed to be located above the highest historical groundwater table at all times of the year, and the system is only expected to discharge non-storm water under unusual circumstances.~~

follows:~~illicit discharges only if the Copermittee or the San Diego Water Board identifies the discharge as a significant source of pollutants to receiving waters. Firefighting discharges to the MS4 not identified as a significant source of pollutants to receiving waters, must be addressed, at a minimum, as follows:~~

(a) Non-emergency firefighting discharges

(i) Building fire suppression system maintenance discharges (e.g~~.~~.,~~.~~ sprinkler line flushing) to the MS4 must be addressed as illicit discharges unless appropriate BMPs are implemented.

(ii) Non-emergency firefighting discharges (i.e., discharges from controlled or practice blazes, firefighting training, and maintenance activities not associated with building fire suppression systems) must be addressed by a program, to be developed and implemented by the Copermittee in conjunction with the local Fire Authority/District, to reduce or eliminate pollutants in such discharges from entering the MS4.

(b) Emergency firefighting discharges (i.e., flows necessary for the protection of life or property) do not require BMPs and need not be prohibited.

~~Each Copermittee should develop and encourage implementation of BMPs to reduce or eliminate pollutants in emergency firefighting discharges to the MS4s and receiving waters within its jurisdiction. During emergency situations, priority of efforts should be directed toward life, property, and the environment (in descending order). BMPs should not interfere with immediate emergency response operations or impact public health and safety.~~

(6) If the Copermittee or San Diego Water Board identifies any category of non-storm water discharges listed under Provisions E.2.a.(1)-(4) as a source of pollutants to receiving waters, the category must be effectively prohibited through ordinance, order, or similar means and addressed as an illicit discharge.

(7) ~~Each Copermittee must, where feasible, reduce or eliminate non-storm water discharges listed under Provisions E.2.a.(1)-(4) into its MS4 whether or not the non-storm water discharge has been identified as an illicit discharge, unless a non-storm water discharge is identified as a discharge authorized by a separate NPDES permit.~~

Comment [A82]: See discussion in section 3.7.2 of the comment letter.

b. PREVENT AND DETECT ILLICIT DISCHARGES AND CONNECTIONS

Each Copermittee must include the following measures within its program to prevent and detect illicit discharges to the MS4:

(1) Each Copermittee must maintain an updated map of its entire MS4 and the corresponding drainage areas. The accuracy of the MS4 map must be confirmed during the field screening required pursuant to Provision E.2.c. The MS4 map must be included as part of the jurisdictional runoff management program document. Any geographic information system (GIS) layers or files used by the Copermittee to maintain the MS4 map must be made available to the San Diego Water Board upon request. The MS4 map must identify the following:

(a) All segments of the MS4 owned, operated, and maintained by the Copermittee;

(b) All known locations of inlets that discharge and/or collect runoff into the Copermittee's MS4;

(c) All known locations of connections with other MS4s not owned or operated by the Copermittee (e.g. Caltrans MS4s);

(d) All known locations of major MS4 outfalls as defined by 40 CFR §122.26(b)(5-6) ~~and private outfalls,~~ that discharge runoff collected from areas within the Copermittee's jurisdiction;

(e) All segments of receiving waters within the Copermittee's jurisdiction that receive and convey runoff discharged from the Copermittee's MS4 outfalls;

(f) Locations of the MS4 outfalls, identified pursuant to Provision D.2.a.(1), within its jurisdiction; and

(g) Locations of the non-storm water persistent flow MS4 outfall discharge monitoring stations, identified pursuant to Provision D.2.b.(2)(b), within its jurisdiction.

(2) Each Copermittee must use Copermittee personnel and contractors to assist in identifying and reporting illicit discharges and connections during their daily employment activities.

(3) Each Copermittee must promote, publicize, and facilitate public reporting of the presence of illicit discharges or water quality impacts associated with discharges to or from the MS4, including the following methods for public reporting:

(a) Operate a public hotline, which can be Copermittee-specific or shared by the Copermittees, and must be capable of receiving reports in both English and Spanish 24 hours per day and seven days per week; and

Comment [A83]: See discussion in section 3.7.2 of the comment letter.

(b) Designate an e-mail address for receiving electronic reports from the public, which can be Copermittee-specific or shared by the Copermittees, and must be prominently displayed on the Copermittee's webpage and the Regional Clearinghouse required pursuant to Provision F.4.

(4) Each Copermittee must implement practices and procedures (including a notification mechanism) to prevent, respond to, contain, and clean up any spills that may discharge into the MS4 within its jurisdiction from any source. Such practices and procedures may include the coordination with other parties, such as sanitary sewer operators. The Copermittee must coordinate, to the extent possible, with spill response teams to prevent entry of spills into the MS4~~, and prevent contamination of surface water, ground water, and soil.~~ The Copermittee must coordinate spill prevention, containment, and response activities throughout all appropriate internal~~Copermittee~~ departments, programs, and agencies.

Comment [A84]: See discussion in section 3.7.2 of the comment letter.

(5) Each Copermittee must implement practices and procedures to ~~prevent~~ control and limit infiltration of seepage from sanitary sewers owned by a Copermittee agency (including private laterals and failing septic systems) to the MS4.

(6) Each Copermittee shall~~must~~ coordinate, when necessary, with upstream Copermittees and/or entities to prevent illicit discharges from upstream sources into the MS4 within its jurisdiction.

c. Field Screening

Each Copermittee must conduct field screening (i.e. visual observations, field testing, and/or analytical testing) of MS4 outfalls and other portions of its MS4 within its jurisdiction to detect non-storm water and illicit discharges and connections to the MS4 in accordance with the dry weather MS4 outfall discharge monitoring requirements in Provisions D.2.a.(2) and D.2.b.(1).

d. Investigate and Eliminate Illicit Discharges And Connections

Each Copermittee must include the following measures within its program to investigate and eliminate illicit discharges to the MS4 to comply with provision A.1.b:

(1) Each Copermittee must prioritize and determine when follow-up investigations will be performed in response to visual observations and/or water quality monitoring data collected during an investigation of a detected non-storm water ~~or~~ illicit discharge into or from the MS4. The criteria for prioritizing investigations must consider the following:

(a) Pollutants identified as causing or contributing to the highest water quality priorities identified in the Water Quality Improvement Plan;

(b) Pollutants identified as causing or contributing, or threatening to cause or contribute to impairments in water bodies on the 303(d) List and/or in environmentally sensitive areas (ESAs), located within its jurisdiction;

(c) Pollutants identified from sources or land uses known to exist within the area, drainage basin, or watershed that discharges to the portion of the MS4 within its jurisdiction included in the investigation;

(d) Pollutants identified as causing or contributing to an exceedance of a NAL in the Water Quality Improvement Plan, where the source has not been identified as natural or otherwise permitted; and

(e) Pollutants identified as an immediate and significant threat to human health or the environment.

(2) Each Copermittee must implement procedures to investigate and inspect portions of its MS4 that, based on reports or notifications, field screening, or other appropriate information, indicate a reasonable potential of receiving, containing, or discharging pollutants due to illicit discharges, or illicit connections~~, or other sources of non-storm water~~. The procedures must include the following:

(a) Each Copermittee must develop criteria to:

(i) Assess the validity of each report or notification received; and

(ii) Prioritize the response to each report or notification received.

(b) Each Copermittee must prioritize and respond to each valid report or notification (e.g., public reports, staff or contractor reports and notifications, etc.) of an incident in a timely manner.

(c) ~~Each~~In accordance with the procedures defined in Provision E.2.d.(1), each~~Each~~ Copermittee must investigate and seek to identify the source(s) of discharges of non-storm water illicit discharges or illicit connections ~~where flows are~~ observed into and from the MS4 during the field screening required pursuant to Provision D.2.b.(1) as follows:

(i) Obvious illicit discharges (i.e., unusual color or odor) must be immediately investigated to identify the source(s) of non-storm water illegal discharges;

(ii) The investigation must include field investigations to identify sources or potential sources for the discharge, unless the source or potential source has already been identified during previous investigations; and

(iii) The investigation may include follow-up field investigations and/or reviewing Copermittee inventories and other land use data to identify potential sources of the discharge.

(d) Each Copermittee must maintain records and a database of the following information:

(i) Location of incident, including hydrologic subarea, portion of MS4 receiving the non-storm water ~~or~~ illicit discharge, and point of discharge or potential discharge from MS4 to receiving water;

(ii) Source of information initiating the investigation (e.g., public reports, staff or contractor reports and notifications, field screening, etc.);

(iii) Date the information used to initiate the investigation was received;

(iv) Date the investigation was initiated;

(v) Dates of follow-up investigations;

(vi) Identified or suspected source of the illicit discharge or connection, if determined;

(vii) Known or suspected related incidents, if any;

(viii) Result of the investigation; and

(ix) If a source cannot be identified and the investigation is not continued, a rationale for why a discharge does not pose a threat to water quality and/or does not require additional investigation.

(e) Each Copermittee must ~~track~~ document, and where feasible quantify, any readily~~and seek to~~ identifiabley the source(s) of non-storm water illegal discharges from the MS4 where there is evidence of non-storm water ~~having been discharged~~illegal discharges or connections into or from the MS4 (e.g., pooled water), in accordance with MS4 outfall discharge monitoring requirements in Provisions D.2.a.(2) and D.2.b.

(3) Each Copermittee must initiate the implementation of procedures, in a timely manner, to eliminate all detected and identified illicit discharges and connections within its jurisdiction. The procedures must include the following responses:

(a) Each Copermittee must enforce its legal authority, as required under Provision E.1, to eliminate illicit discharges and connections to the MS4.

(b) If the Copermittee identifies the source as a controllable source of non-storm water ~~or~~ illicit discharge or connection, the Copermittee must implement its Enforcement Response Plan pursuant to Provision E.6 and enforce its legal authority to effectively prohibit and with the goal of eliminatinge illicit discharges and connections to its MS4.

Comment [A85]: See discussion in section 3.7.2 of the comment letter.

(c) If the Copermittee identifies the source of the discharge as a category of non-storm water discharges in Provision E.2.a, and the discharge is in exceedance of NALs in the Water Quality Improvement Plan, then the Copermittee must determine if: (1) this is an isolated incident or set of circumstances that will be addressed through its Enforcement Response Plan pursuant to Provision E.6, or (2) the category of discharge must be addressed through the effective prohibition of that category of discharge as an illicit discharge pursuant to Provision E.2.a.(6).

(d) If the Copermittee suspects the source of the non-storm water discharge as natural in origin (i.e. non-anthropogenically influenced) and in conveyance into the MS4, then the Copermittee must document and provide the data and evidence necessary to demonstrate to the San Diego Water Board that it is natural in origin and does not require further investigation.

(e) If the Copermittee identifies that the discharge is coming from another Copermittees' jurisdiction, the receiving Copermittee must document and provide the findings to the upstream Copermittee. The obligation to implement the requirements of provision E.2.d.(3) are thenceforth the responsibility of the upstream Copermittee.

(f) If the Copermittee identifies the source as a non-storm water discharge that has been separately authorized by the San Diego Water Board, or that is contributing pollutants to the MS4 and that may require coverage under a WDR from the San Diego Water Board, the Copermittee shall provide all relevant findings to the San Diego Water Board and may back charge the Regional Board for the entire cost of conducting the source investigation.

~~(e)~~(g) If the Copermittee is unable to identify and document the source of a recurring non-storm water discharge to or from the MS4, then the Copermittee must ~~address the discharge as an illicit discharge and~~ update its jurisdictional runoff management program to address the common and suspected sources of the non-storm water discharge within its jurisdiction in accordance with the Copermittee's priorities.

(4) Each Copermittee must submit a summary of the non-storm water discharges and illicit discharges and connections investigated and eliminated within its jurisdiction with each Annual Report required under Provision F.3.b of this Order.

3. Development Planning

Each Copermittee must, within their jurisdiction, use their land use and planning

Comment [A86]: See discussion in section 3.7.2 of the comment letter.

Comment [A87]: See discussion in section 3.8 of the comment letter.

authorities, to the extent that they may lawfully impose requirements, to implement a development planning program in accordance with the strategies identified in the Water Quality Improvement Plan and includes, at a minimum, the following requirements:

STRATEGIES TO ADDRESS THE HIGHEST PRIORITY WATER QUALITY CONDITIONS

Comment [A88]: See discussion in section 3.8.2 of the comment letter.

Each Copermittee must describe in its jurisdictional runoff management program document the strategies and/or activities that will be implemented as part of the development planning program to address development and redevelopment projects that may become sources of pollutants and/or stressors that contribute to the highest priority water quality conditions in the Watershed Management Area as follows:

(1) Provide specific details about how the strategies and/or activities will be implemented (e.g. designate additional or alternative BMPs, focus education, increase frequency of verifications and/or inspections, alternative compliance options);

(2) Each Copermittee must identify areas within its jurisdiction where Priority Development Projects may be allowed or should be encouraged to implement or contribute toward the implementation of alternative compliance retrofitting and/or stream, channel, or habitat rehabilitation projects;

(3) Each Copermittee should collaborate and cooperate with other Copermittees and/or entities in the Watershed Management Area to identify regional alternative compliance projects that Priority Development Projects may be allowed or should be encouraged to implement or participate in implementing; and

(4) The requirements of the programs as outlined in the following sub-provisions may be modified and prioritized as appropriate for consistency with the highest water quality priorities and strategies as identified in the corresponding Water Quality improvement Plan(s).~~The strategies and/or activities must be consistent with the requirements of Provisions E.3.a-c and E.3.e-f and the strategies identified in the Water Quality Improvement Plan.~~

a. BMP REQUIREMENTS FOR ALL DEVELOPMENT PROJECTS

Each Copermittee, as practical and feasible, must prescribe the following BMP requirements during the planning process (i.e. prior to project approval and issuance of local permits) for all development projects (regardless of project type or size), where local permits are issued, including unpaved roads and flood management projects, except emergency / public safety projects implemented for the protection of persons and property:

(1) General Requirements

(a) Onsite BMPs must be located so as to remove pollutants from runoff prior to its discharge to any receiving waters, and as close to the source as possible; and

(b) Structural BMPs must not be constructed within a waters of the U.S.. ~~, or waters of the state.~~

(2) Source Control BMP Requirements

The following source control BMPs must be implemented at all development projects where applicable and feasible:

(a) Prevention of illicit discharges into the MS4;

(b) Storm drain system stenciling or signage;

(c) Properly designed outdoor material storage areas;

(d) Properly designed outdoor work areas;

(e) Properly designed trash storage areas; and

(f) Any additional BMPs determined necessary by the Copermittee to minimize pollutant generation at each project.

(3) Low Impact Development (LID) ~~BMP Requirements~~Principles

Comment [A89]: See discussion in section 3.8.2 of the comment letter.

The following LID ~~BMPs~~ Principles must be implemented at all development projects where applicable and feasible:

(a) Maintenance or restoration of natural storage reservoirs and drainage corridors (including topographic depressions, areas of permeable soils, natural swales, and ephemeral and intermittent streams);[22]

(b) Buffer zones for natural water bodies (where buffer zones are technically infeasible, require project applicant to include other buffers such as trees, access restrictions, etc.);

(c) Conservation of natural areas within the project footprint including existing trees, other vegetation, and soils;

[22] Development projects proposing to dredge or fill materials in waters of the U.S. must obtain a CWA Section 401 Water Quality Certification. Projects proposing to dredge or fill waters of the state must obtain waste discharge requirements.

(d) Construction of streets, sidewalks, or parking lot aisles to the minimum widths necessary, provided public safety is not compromised;

(e) Minimization of the impervious footprint of the project;

(f) Minimization of soil compaction to landscaped areas;

(g) Disconnection of impervious surfaces through distributed pervious areas;

(h) Landscaped or other pervious areas designed and constructed to effectively receive and infiltrate, retain and/or treat runoff from impervious areas, prior to discharging to the MS4;

(i) Small collection strategies located at, or as close as possible to, the source (i.e. the point where storm water initially meets the ground) to minimize the transport of runoff and pollutants to the MS4 and receiving waters;

(j) Use of permeable materials for projects with low traffic areas and appropriate soil conditions;

(k) Landscaping with native or drought tolerant species; and

(l) Harvesting and using precipitation.

b. PRIORITY DEVELOPMENT PROJECTS

(1) Definition of Priority Development Project

Priority Development Projects include the following:

(a) All new development projects that fall under the Priority Development Project categories listed under Provision E.3.b.(2) (where a new development project feature, such as a parking lot, falls into a Priority Development Project category, the entire project footprint is subject to Priority Development Project requirements); and

(b) Those redevelopment projects that create, add, or replace at least 5,000 square feet of impervious surfaces on an already developed site, and the redevelopment project is a Priority Development Project category listed under Provision E.3.b.(2) (where redevelopment results in an increase of less than fifty percent of the impervious surfaces of a previously existing development, and the existing development was not subject to Priority Development Project requirements, the performance requirements of Provisions E.3.c.(1) and E.3.c.(2) apply only to the addition or replacement, and not to the entire development; where redevelopment results in an increase of more than fifty percent of the impervious surfaces of a previously existing development, the performance requirements of Provisions E.3.c.(1) and E.3.c.(2) apply to the entire development).

(c) Projects where redevelopment results in an increase of more than fifty percent of impervious surfaces of a previously existing development, and the existing development *was* subject to previous Priority Project Development Requirements, only the altered portion of development is subject to the new Priority Development Project requirements.

Comment [A90]: See discussion in section 3.8.2 of the comment letter.

(2) Priority Development Project Categories

Comment [A91]: See discussion in section 3.8.2 of the comment letter.

(a) New development projects that create 10,000 square feet or more of impervious surfaces (collectively over the entire project site). This category includes commercial, industrial, residential, mixed-use, and public development projects on public or private land which fall under the planning and building authority of the Copermittee.

(b) New development projects that create 5,000 square feet or more of impervious surfaces (collectively over the entire project site), and are designed for support one or more of the following uses (see Appendix for definitions):

(i) Automotive repair shop
(ii) Restaurant
(iii) Parking lot[23]
(iv) Street, road, highway, freeway
(v) Retail gasoline outlet (RGO)

Comment [A92]: See footnote

~~(b) Automotive repair shops. This category is defined as a facility that is categorized in any one of the following Standard Industrial Classification (SIC) codes: 5013, 5014, 5541, 7532-7534, or 7536-7539.~~

~~(c) Restaurants. This category is defined as a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC code 5812), where the land area for development is 5,000 square feet or more.~~

~~(d) Hillside development projects. This category includes any development which creates 5,000 square feet or more of impervious surface which is~~

[23] Excluding parking lots that are not subject to runoff, such as but not limited to covered or subterranean parking lots

~~located in an area with known erosive soil conditions, where the development will grade on any natural slope that is twenty-five percent or greater.~~

~~(e)~~(c) New development projects that create 2,500 square feet or more of impervious surfaces (collectively over the entire project site), and are ~~Environmentally sensitive areas (ESAs). This category includes any development~~ located within, directly adjacent to, or discharging directly to an ESA, ~~which either creates 2,500 square feet of impervious surface on a proposed project site or increases the area of imperviousness of a proposed project site to 10 percent or more of its naturally occurring condition.~~ "Directly adjacent to" means situated within 200 feet of the ESA. "Discharging directly to" means outflow from a drainage conveyance system that collects runoff from the subject development or redevelopment site and terminates at or in receiving waters within the ESA and is not commingled with flows from adjacent or other upstream lands.

~~(f) Parking lots. This category is defined as a land area or facility for the temporary parking or storage of motor vehicles used personally, for business, or for commerce that has 5,000 square feet or more of impervious surface.~~

~~(g) Streets, roads, highways, freeways, and driveways. This category is defined as any paved impervious surface that is 5,000 square feet or more used for the transportation of automobiles, trucks, motorcycles, and other vehicles.~~

~~(h) Retail gasoline outlets (RGOs). This category includes RGOs that meet the following criteria: (a) 5,000 square feet or more or (b) a projected Average Daily Traffic (ADT) of 100 or more vehicles per day.~~

~~(i)~~(d) Large development projects. This category includes any post-construction pollutant-generating new development projects that result in the permanent disturbance of one acre or more of land.

(3) Priority Development Project Exemptions

Comment [A93]: See discussion in section 3.8.2 of the comment letter.

Each Copermittee has the discretion to exempt the following projects from being defined as Priority Development Projects:

(a) New paved sidewalks, driveways, parking lots, bicycle lanes, or trails that meet the following criteria:

(i) Designed and constructed to direct storm water runoff to adjacent vegetated areas, or other non-erodible permeable areas; OR

(ii) Designed and constructed to be hydraulically disconnected from paved streets or roads; OR

(iii) Designed and constructed with permeable pavements or surfaces in accordance with USEPA Green Streets guidance.[24]

(b) Any impervious surface that is 5,000 square feet or more used for the transportation of automobiles, trucks, motorcycles, and other vehicles that is designed and constructed to the Maximum Extent Practicable in accordance with the USEPA Green Streets Guidance “Managing Wet Weather with Green Infrastructure: Green Streets”[25]. ~~Retrofitting of existing paved alleys, streets or roads that meet the following criteria:~~

~~(i) Must be two lanes or less; AND~~

~~(ii) Must be a retrofitting project implemented as part of an alternative compliance project option under Provision E.3.c.(3)(b)(v) to achieve the performance requirements of Provisions E.3.c.(1) and/or E.3.c.(2) for a Priority Development Project; AND~~

~~(iii) Designed and constructed in accordance with the USEPA Green Streets guidance.~~[26]

(c) Single-family residential projects that meet the following criteria:

(i) Must not be constructed as part of a larger development or proposed subdivision;

(ii) Successfully incorporate and document that they have incorporated, each of the applicable Source Control and LID BMP strategies identified in provisions E.3.a.(2)-(3) to the MEP.

~~(c) New single family residences that meet the following criteria:~~

~~(i) Must not be constructed as part of a larger development or proposed subdivision; AND~~

~~(ii) Designed and constructed to be certified under the U.S. Green Building Council (USGCB) Leadership in Energy and Environmental Design (LEED) for Homes green building certification program, receiving at least four (4) Surface Water Management credits under the Sustainable Sites category~~[27] ~~OR~~

~~Designed and constructed with structural BMPs that will achieve the~~

[24] USEPA. 2008. http://water.epa.gov/infrastructure/greeninfrastructure/upload/gi_munichandbook_green_streets.pdf and http://water.epa.gov/infrastructure/greeninfrastructure/gi_policy.cfm#municipalhandbook ~~See “Managing Wet Weather with Green Infrastructure – Municipal Handbook: Green Streets” (USEPA, 2008).~~

[26] ~~Ibid.~~
[27] ~~See LEED for Homes rating system at http://www.usgbc.org~~

~~performance requirements of Provisions E.3.c.(1) and E.3.c.(2) onsite~~

~~(d) Redevelopment of existing single family residences that meet the following criteria:~~

~~(i) Designed and constructed to be certified under the USGCB LEED for Homes green building certification program, receiving at least four (4) Surface Water Management credits under the Sustainable Sites category;[28] OR~~

~~(ii) Designed and constructed with structural BMPs that will achieve the performance requirements of Provisions E.3.c.(1) and E.3.c.(2) onsite.~~

(d) Watershed Protection Projects that meet the following criteria:

(i) Projects undertaken to rehabilitate or prevent environmental, social, and economic damage to the watershed, including receiving waters, by providing one or more of the following:

- Water quality protection by the proper management of stormwater and floodplains
- Flood risk reduction to adjacent land uses, stored matter and stockpiled material
- Elimination of the comingling of stormwater and hazardous materials
- Erosion Mitigation
- Restoration of Rivers and Ecosystems
- Groundwater Recharge
- Creation of new open space and wetlands
- Programs for water conservation, stormwater capture and management
- Retrofit projects constructed to improve water quality or address hydromodification.

(ii) AND are not expected to be pollutant generating or are designed to reduce existing pollutant loads

(iii) AND incorporate and document that they have incorporated, each of the applicable Source Control and LID BMP strategies identified in provisions E.3.a.(2)-(3) to the MEP.

(e) Emergency public safety projects in any of the Priority Development Categories may be excluded if the delay caused due to the requirement for a SSMP compromises public safety, public health and/or environmental protection

~~[28] See LEED for Homes rating system at http://www.usgbc.org~~

c. PRIORITY DEVELOPMENT PROJECT STRUCTURAL BMP PERFORMANCE REQUIREMENTS

In addition to the BMP requirements listed for all development projects under Provision E.3.a, Priority Development Projects must also implement structural BMPs that conform to performance requirements below. If watershed-specific performance requirements are ~~may be~~ developed as part of a Water Quality Improvement Plan; these requirements would take precedence over the general performance requirements below. The watershed-specific requirement must provide at least equal protection as the general performance requirements below.

(1) Storm Water Pollutant Control BMP Requirements

Comment [A94]: See discussion in section 3.8.2 of the comment letter.

Each Copermittee must require each Priority Development Project to implement onsite structural BMPs to control pollutants in storm water that may be discharged from a project as follows:

(a) Each Priority Development Project must be required to implement LID BMPs that are designed to retain (i.e. intercept, store, infiltrate, evaporate, and evapotranspire) onsite the pollutants contained in the design capture volume. The design capture volume is equivalent to:

(i) The volume of storm water runoff produced from a 24-hour 85th percentile storm event;[29] OR

(ii) The volume of storm water runoff produced from a 24-hour 85th percentile storm event, that would be retained onsite ~~if~~ in the pre-project condition. ~~site was fully undeveloped and naturally vegetated~~, ~~as determined using continuous simulation modeling techniques based on site-specific soil conditions and typical native vegetative cover.~~

(b) A Priority Development Project may be allowed to utilize alternative compliance under Provision E.3.c.(3) in lieu of~~to~~ complying with the storm water pollutant control BMP performance requirements of Provision E.3.c.(1)(a).

~~(c) If a Priority Development project is allowed to utilize alternative compliance pursuant to Provisions E.3.c.(1)(b), flow-thru conventional~~

[29] This volume is not a single volume to be applied to all areas covered by this Order. The size of the 85th percentile storm event is different for various parts of the San Diego Region. The Copermittees are encouraged to calculate the 85th percentile storm event for each of its jurisdictions using local rain data pertinent to its particular jurisdiction. In addition, isopluvial maps may be used to extrapolate rainfall data to areas where insufficient data exists in order to determine the volume of the local 85th percentile storm event in such areas. Where the Copermittees will use isopluvial maps to determine the 85th percentile storm event in areas lacking rain data, the Copermittees must describe their method for using isopluvial maps in its BMP Design Manuals. The volume is a single event-based volume that occurs after an extended dry period.

~~treatment control BMPs must be implemented to treat the portion of the design capture volume that is not retained onsite. Additionally, project applicants must mitigate for the portion of the pollutant load in the design capture volume that is not retained onsite through one or more alternative compliance options under Provision E.3.c.(3). Conventional treatment control BMPs must be sized and designed to:~~

~~(i) Remove pollutants from storm water to the MEP;~~

~~(ii) Filter or treat either: 1) the maximum flow rate of runoff produced from a rainfall intensity of 0.2 inch of rainfall per hour, for each hour of a storm event, or 2) the maximum flow rate of runoff produced by the 85th percentile hourly rainfall intensity (for each hour of a storm event), as determined from the local historical rainfall record, multiplied by a factor of two;~~

~~(iii) Be ranked with high or medium pollutant removal efficiency for the Priority Development Project's most significant pollutants of concern. Conventional treatment control BMPs with a low removal efficiency ranking must only be approved by a Copermittee when a feasibility analysis has been conducted which exhibits that implementation of conventional treatment control BMPs with high or medium removal efficiency rankings are infeasible for a Priority Development Project or portion of a Priority Development Project.~~

(2) Hydromodification Management BMP Requirements

Comment [A95]: See discussion in section 3.8.2 of the comment letter.

Each Copermittee must require each Priority Development Project disturbing greater than one acre to implement management measures~~onsite structural BMPs~~ to ensure ~~manage hydromodification~~ that ~~may be caused by~~ storm water runoff discharged from the~~a~~ project won't cause adverse Hydromodification impacts in the downstream receiving waters as follows:

The Copermittees in each Watershed Management Area may establish within the WQIP, watershed specific mitigation requirements that will apply to priority development projects, based on the susceptibility of the receiving waters to Hydromodification impacts caused by the project, and consistent with the priorities and strategies identified in the WQIP. Such requirements may be uniform across a Hydrologic Unit, or identified at an appropriate smaller scale to ensure that receiving waters are properly protected.

(a) Post-project runoff flow rates and durations must not exceed pre-project ~~development (naturally occurring)~~ runoff flow rates and durations by more than 10 percent (for the range of flows that result in increased potential for erosion, or degraded instream habitat conditions downstream of Priority Development Projects~~)~~.

(i) In evaluating the range of flows that results in increased potential for erosion of natural (non-hardened) channels, the lower boundary must correspond with the critical channel flow that produces the critical shear stress that initiates channel bed movement or that erodes the toe of channel banks.

~~(ii) For artificially hardened channels, analysis to identify the lower boundary must use characteristics of a natural stream segment similar to that found in the watershed. The lower boundary must correspond with the critical channel flow that produces the critical shear stress that initiates channel bed movement or erodes the toe of the channel banks.~~

~~(iii)~~(ii) The Copermittees may use monitoring results collected pursuant to Provision D.1.a.(2) to re-define the range of flows resulting in increased potential for erosion, or degraded instream habitat conditions, as warranted by the data.

(b) Priority Development Projects ~~Post-project runoff flow rates and durations~~ must implement appropriate measures to minimize the ~~compensate for~~ the loss of sediment supply delivered ~~due~~ to the Receiving Waters, consistent with WQIP priorities, ~~development project,~~ should loss of sediment supply be anticipated to occur as a result of the development project.

(c) A Priority Development Project may be allowed to utilize alternative compliance under Provision E.3.c.(3) in lieu of~~to comply with~~ the performance requirements of Provisions E.3.c.(2)(a)-(b).

(d) Exemptions

Each Copermittee has the discretion to exempt a Priority Development Project from the hydromodification management BMP performance requirements of Provisions E.3.c.(2)(a)-(b) where the project:

(i) Discharges storm water runoff into existing underground storm drains discharging directly to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean;

(ii) Discharges of storm water into conveyance channels whose bed and bank are engineered and maintained for the 10-year ultimate development flow rate all the way from the point of discharge from the project to an water body that is sufficiently resistant to hydromodification (water storage reservoirs, lakes, enclosed embayments, pacific ocean, or other water bodies identified in the WQIP);

~~(ii)~~(iii) Is a redevelopment Priority Development Project that meets the alternative compliance requirements of Provision E.3.c.(3)(b)(ii); or

~~(iii)~~(iv) Discharges storm water runoff into other areas identified by the San Diego Water Board as exempt from the requirements of Provisions E.3.c.(2)(a)-(b), through an approved WQIP.

(3) Alternative Compliance to Onsite Structural BMP Performance Requirements

Comment [A96]: See discussion in section 3.8.2 of the comment letter.

(a) Applicability

At the discretion of each Copermittee, Priority Development Projects may be allowed to implement one or more of the alternative compliance project options described in E.3.c.(3)(b) below, in lieu of complying with the onsite structural BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2), under the following conditions:

(i) The Copermittee must determine that implementation of the alternative compliance option will have an equal or greater overall water quality benefit for the Watershed Management Area than fully complying with the performance requirements of Provisions E.3.c.(1) and E.3.c.(2) onsite;

(ii) The alternative compliance options must be designed by a registered professional engineer, geologist, architect, biologist, hydrologist, landscape architect, or other appropriate certified professional;

(iii) The alternative compliance option must be consistent with the strategies developed within the WQIP, for the highest priority water quality conditions.

(iv) The alternative compliance options must be implemented within the same Watershed Management Area as the Priority Development Project, and preferably within the same hydrologic subarea;

(v) The alternative compliance options must have reliable sources of funding for operation and maintenance.

(b) Alternative Compliance Options

(i) *LID Biofiltration Treatment Control BMPs*

LID biofiltration treatment control BMPs may be used as an alternative compliance option if the BMPs are sized and designed to:

[a] Remove pollutants from storm water to the MEP; AND
[b] Have an appropriate surface loading rate to prevent erosion, scour and channeling; AND
[c] Biofilter at least 1.0 times the design capture volume that is not reliably retained onsite

(ii) *LEED Certified Redevelopment Projects*

Priority Development Projects that are designed and constructed to be certified under the USGCB LEED for New Construction and Major Renovations green building certification program, or other locally accepted certification of equivalent effectiveness, may be considered as an acceptable alternative compliance option if the project meets the following criteria:

[a] The project is designed to receive at least: One (1) Site Design credit, and Two (2) Stormwater Design credits under the Sustainable Sites category.[30] , and

[b] The existing and future configuration of the receiving water must not be unnaturally altered or adversely impacted by the project.

(iii) *Watershed-Based Planned Development Projects*

Priority Development Projects greater than 100 acres in total project size (or smaller than 100 acres in size yet part of a larger common plan of development that is over 100 acres) may be considered as an acceptable alternative compliance option if the project meets the following conditions:

[a] The Priority Development Project was planned utilizing watershed and/or subwatershed based water quality, hydrologic, and fluvial geomorphologic planning principles that implement regional LID BMPs in accordance with the performance and location criteria of this Order and acceptable to the San Diego Water Board;

[b] Regional LID BMPs may be used provided that the BMPs capture and retain the volume of runoff produced from the design capture volume defined in Provision E.3.c.(1)(a)(i) and that such controls are located upstream of receiving waters;

[c] Regional LID BMPs must clearly exhibit that they will not result in a net impact from pollutant loadings over and above the impact caused by capture and retention of the design capture volume;

[d] Any portion of the design capture volume that is not retained by the regional LID BMPs must be treated using biofiltration BMPs; and

[e] Where regional LID BMPs are demonstrated to the Copermittee as technically infeasible to retain the entire design capture volume, any volume up to and including the design capture volume not retained by regional LID BMPs, nor treated by biofiltration BMPs, must be treated using conventional treatment control BMPs and the project applicant must implement additional alternative compliance project, in-lieu fee and/or water quality

[30] See LEED for New Construction and Major Renovations rating system at http://www.usgbc.org

credit system options below.

(iv) *Offsite Projects*

Offsite Projects, such as but not limited to Regional BMPs; Retrofitting Projects; Channel, Stream or Habitat Rehabilitation Projects; Water Supply Augmentation Projects; or other Offsite Projects proposed by a project proponent, may be considered as an acceptable alternative compliance option if the offsite project meets the following requirements:

- The project must provide a net result of at least the same level of pollutant removal, and/or protection from potential downstream and upstream erosion in the receiving water as would be required to meet the performance requirements of Provision E.3.c.(1) and E.3.c.(2), as applicable.
- The project must be consistent with the strategies identified in the WQIP.
- The project must be constructed and operational prior to occupancy being granted for the PDP.

(v) *Conventional Treatment Control BMPs*

Onsite Conventional Treatment Control BMPs may be used as an alternative compliance option, only if the following criteria have been met:

[a] It has been demonstrated to the satisfaction of the Copermittee that it is technically infeasible to comply with the onsite requirements of E.3.c.(1), AND

[b] It has been demonstrated to the satisfaction of the Copermittee that it is technically infeasible to implement onsite Biofiltration Treatment Control BMPs, AND

[c] The Conventional Treatment Control BMPs will remove pollutants from storm water to the MEP; AND

[d] The Conventional Treatment Control BMPs will filter or treat either: 1) the maximum flow rate of runoff produced from a rainfall intensity of 0.2 inch of rainfall per hour, for each hour of a storm event, or 2) the maximum flow rate of runoff produced by the 85th percentile hourly rainfall intensity (for each hour of a storm event), as determined from the local historical rainfall record, multiplied by a factor of two; AND

[e] The Conventional Treatment Control BMPs are ranked with high or medium pollutant removal efficiency for the Priority Development Project's most significant pollutants of concern. Conventional treatment control BMPs with a low removal

efficiency ranking must only be approved by a Copermittee when a feasibility analysis has been conducted which exhibits that implementation of conventional treatment control BMPs with high or medium removal efficiency rankings are infeasible for a Priority Development Project or portion of a Priority Development Project.

~~(a) Applicability~~

~~At the discretion of each Copermittee, Priority Development Projects may be allowed to utilize an alternative option to comply with the onsite structural BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2) under the following conditions:~~

~~(i) The Copermittee must determine that implementation of the alternative compliance option will have a greater overall water quality benefit for the Watershed Management Area than fully complying with the performance requirements of Provisions E.3.c.(1) and E.3.c.(2) onsite;~~

~~(ii) The alternative compliance options must be designed by a registered professional engineer, geologist, architector landscape architect;~~

~~(iii) The alternative compliance options must be implemented within the same hydrologichydrologic unit as the Priority Development Project, and preferably within the same hydrologic subarea;~~

~~(iv) Receiving waters must not be utilized to convey storm water runoff to the alternative compliance options;~~

~~(v) The pollutants in storm water runoff from the Priority Development Project must be treated to the MEP by the alternative compliance options prior to being discharged to receiving waters;~~

~~(vi) Unless otherwise allowed by Provision E.3.c.(3)(b), the alternative compliance options must have a net result of at least the same level of pollutant removal as would have been achieved if the Priority Development Project had fully complied with the storm water pollutant control BMP performance requirements of Provision E.3.c.(1) onsite;~~

~~(vii) Unless otherwise allowed by Provision E.3.c.(3)(b), the alternative compliance options must have a net result of at least the same level of protection from potential downstream and upstream erosion in the receiving water as would have been achieved if the Priority Development Project had fully complied with the hydromodification management BMP performance requirements of Provision E.3.c.(2) onsite; and~~

~~(viii) The alternative compliance options utilized by the Priority Development Project must have reliable sources of funding for operation and maintenance.~~

~~(b) Alternative Compliance Project Options~~

~~The Copermittee may allow implementation of one or more of the following project options as part of an alternative approach to complying with the onsite structural BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2):~~

~~(i) *Onsite LID Biofiltration Treatment Control BMPs*~~

~~The Copermittee may allow Priority Development Projects to utilize onsite LID biofiltration treatment control BMPs to comply with the storm water pollutant control BMP performance requirements of Provision E.3.c.(1). Onsite LID biofiltration treatment control BMPs must be sized and designed to:~~

~~[a] Remove pollutants from storm water to the MEP; AND~~
~~[b] Have an appropriate surface loading rate to prevent erosion, scour and channeling within the BMP; AND~~
~~[c] Biofilter at least 1.5 times the design capture volume that is not reliably retained onsite; OR~~
~~[d] Biofilter up to the design capture volume that is not reliably retained onsite, AND 1) treat the remaining portion of the design capture volume not retained onsite with conventional treatment control BMPs in accordance with Provision E.3.c.(1)(c), and 2) if necessary, mitigate for the portion of the pollutant load in the design capture volume not retained onsite through one or more alternative compliance project, in-lieu fee and/or water quality credit system options below.~~

~~(ii) *LEED Certified Redevelopment Projects*~~

~~The Copermittee may allow redevelopment Priority Development Projects to comply with designed and constructed to be certified under the USGCB LEED for New Construction and Major Renovations green building certification program. The Priority Development Project must receive at least one (1) Site Design credit and two (2) Stormwater Design credits under the Sustainable Sites category.[31] In addition, the existing and future configuration of the receiving water must not be unnaturally altered or adversely impacted by storm water flow rates and durations discharged from the site.~~

~~(iii) *Watershed-Based Planned Development Projects*~~

~~The Copermittee may allow Priority Development Projects greater than 100 acres in total project size (or smaller than 100 acres in size~~

~~[31] See LEED for New Construction and Major Renovations rating system at http://www.usgbc.org~~

~~yet part of a larger common plan of development that is over 100 acres) to comply with the onsite structural BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2). The Priority Development Project must comply with the following conditions:~~

~~[a] The Priority Development Project was planned utilizing watershed and/or subwatershed based water quality, hydrologic, and fluvial geomorphologic planning principles that implement regional LID BMPs in accordance with the performance and location criteria of this Order and acceptable to the San Diego Water Board;~~
~~[b] Regional LID BMPs may be used provided that the BMPs capture and retain the volume of runoff produced from the design capture volume defined in Provision E.3.c.(1)(a)(i) and that such controls are located upstream of receiving waters;~~
~~[c] Regional LID BMPs must clearly exhibit that they will not result in a net impact from pollutant loadings over and above the impact caused by capture and retention of the design capture volume;~~
~~[d] Any portion of the design capture volume that is not retained by the regional LID BMPs must be treated using biofiltration BMPs; and~~
~~[e] Where regional LID BMPs are demonstrated to the Copermittee as technically infeasible to retain the entire design capture volume, any volume up to and including the design capture volume not retained by regional LID BMPs, nor treated by biofiltration BMPs, must be treated using conventional treatment control BMPs and the project applicant must implement additional alternative compliance project, in-lieu fee and/or water quality credit system options below.~~

~~(iv) *Offsite Regional BMPs*~~

~~[a] The Copermittee may allow Priority Development Projects to utilize offsite regional BMPs to comply with the storm water pollutant control BMP performance requirements of Provision E.3.c.(1) if the offsite regional BMPs have the capacity to receive and retain at least 1.1 times the design capture volume that is not reliably retained onsite.~~
~~[b] The Copermittee may allow Priority Development Projects to utilize offsite regional BMPs to comply with the hydromodification management BMP performance requirements of Provision E.3.c.(2) if the offsite regional BMPs have the capacity to manage the storm water flows rates and durations from the site such that the receiving waters are protected from the potential for increased erosion that would be caused if the unmanaged portion of the runoff was discharged from the site.~~

~~(v) *Offsite Retrofitting Projects*~~

~~The Copermittee may allow Priority Development Projects to utilize offsite retrofitting projects to comply with the storm water pollutant control and hydromodification management BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2) if the retrofitting projects have been identified within the strategies included in the Water Quality Improvement Plan, or identified as potential retrofitting projects by the Copermittee pursuant to Provision E.5.~~

~~(vi) *Offsite Channel, Stream, or Habitat Rehabilitation Projects*~~

~~The Copermittee may allow Priority Development Projects to utilize offsite channel, stream, or habitat rehabilitation projects to comply with the hydromodification management BMP performance requirements of Provision E.3.c.(2) if the rehabilitation projects have been identified within the strategies included in the Water Quality Improvement Plan, or identified as potential channel rehabilitation projects by the Copermittee pursuant to Provision E.5. The channel, stream, or habitat rehabilitation project cannot be utilized for pollutant treatmentexcept where artificial wetlands areand located upstream of receiving waters.~~

~~(vii) *Offsite Regional Water Supply Augmentation Projects*~~

~~The Copermittee may allow Priority Development Projects to utilize offsite regional water supply augmentation projects (i.e. groundwater recharge, recycled water, storm water harvesting) to comply with the storm water pollutant control and hydromodification management BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2) if the projects have been identified within the strategies included in the Water Quality Improvement Plan.~~

~~(viii) *Project Applicant Proposed Alternative Compliance Projects*~~

~~The Copermittee may allow one or more Priority Development Project applicant(s) to propose and implement alternative compliance projects to comply with the storm water pollutant control and hydromodification management BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2) if the alternative compliance projects are consistent with, and will address the highest water quality priorities of the Water Quality Improvement Plan, and comply with the requirements of Provision E.3.c.(3)(a).~~

(c) Alternative Compliance In-Lieu Fee Option

The Copermittee may develop and implement an alternative compliance in-lieu fee option, individually or with other Copermittees and/or entities, as a means for designing, developing, constructing, operating and/or maintaining offsite alternative compliance projects under Provision E.3.c.(3)(b). Priority Development Projects allowed to utilize the alternative compliance in-lieu fee option must comply with the following conditions:

(i) The in-lieu fee must be collected and held in accordance with the Mitigation Fee Act and all other applicable development fee laws. ~~transferred to the Copermittee (for public projects) or an escrow account (for private projects) prior to the date construction of the Priority Development Project is initiated~~.

Comment [A97]: Please see Legal Comments.

(ii) If the in-lieu fee is applied to the development, design, ~~and~~ construction, operation and maintenance of offsite alternative compliance projects, the following conditions must be met:

[a] The offsite alternative compliance projects must meet ~~allow~~ the criteria identified within E.3.c.(3)(b)-, for each Priority Development Project relying on~~to comply with~~ the alternative compliance project;~~onsite BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2);~~

[b] The offsite alternative compliance projects must be constructed as soon as possible, but no later than 4 years after the certificate of occupancy is granted for the first Priority Development Project that contributed funds toward the construction of the offsite alternative compliance projects, unless a longer period of time is provided for in an approved WQIP~~authorized by the San Diego Water Board Executive Officer~~;

~~[c] The in-lieu fee for the Priority Development Project must include mitigation of the pollutant loads and increased storm water flow rates and durations that are allowed to discharge from the site before the offsite alternative compliance projects are constructed; and~~

[d] The in-lieu fee must also include the cost to operate and maintain the offsite alternative compliance projects for the anticipated life of the constructed priority development project.

(iii) If the in-lieu fee applies only~~is applied~~ to the operation and maintenance of offsite alternative compliance projects that have already been constructed, the offsite alternative compliance projects must meet~~allow~~ the requirements of E.3.c.(3)(a)(iv) and (v) as applicable, for each Priority Development Project relying on~~to comply with~~ the alternative compliance project..~~onsite structural BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2).~~

(d) Alternative Compliance Water Quality Credit System Option

The Copermittee may develop and implement an alternative compliance water quality credit system option, individually or with other Copermittees and/or entities, provided that such a credit system clearly exhibits that it will not allow discharges from Priority Development Projects to cause or contribute to a net impact over and above the impact caused by projects meeting the onsite structural BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2). Any credit system that a Copermittee chooses to implement must be submitted to the San Diego Water Board Executive Officer for review and acceptance as part of the Water Quality Improvement Plan.

(4) Long-Term Structural BMP Maintenance

Each Copermittee must require the project applicant to submit proof of the mechanism under which ongoing long-term maintenance of all structural BMPs will be conducted.

(5) Infiltration and Groundwater Protection

(a) Structural BMPs designed to primarily function as large, centralized infiltration devices (such as large infiltration trenches and infiltration basins) must not cause or contribute to an exceedance of an applicable groundwater quality objective. At a minimum, such infiltration BMPs must be in conformance with the design criteria listed below, unless the development project applicant demonstrates to the Copermittee that one or more of the specific design criteria listed below are not necessary to protect groundwater quality. The design criteria listed below do not apply to small infiltration systems dispersed throughout a development project.

(i) Runoff must undergo pretreatment such as sedimentation or filtration prior to infiltration;

(ii) Pollution prevention and source control BMPs must be implemented at a level appropriate to protect groundwater quality at sites where infiltration BMPs are to be used;

(iii) Infiltration BMPs must be adequately maintained to remove pollutants in storm water to the MEP;

(iv) The vertical distance from the base of any infiltration BMP to the seasonal high groundwater mark must be at least 10 feet. Where groundwater basins do not support beneficial uses, this vertical distance criteria may be reduced, provided groundwater quality is maintained;

(v) The soil through which infiltration is to occur must have physical and chemical characteristics (e.g., appropriate cation exchange capacity, organic content, clay content, and infiltration rate) which are adequate for proper infiltration durations and treatment of runoff for the protection of groundwater beneficial uses;

(vi) Infiltration BMPs must not be used for areas of industrial or light industrial activity, and other high threat to water quality land uses and activities as designated by each Copermittee, unless first treated or filtered to remove pollutants prior to infiltration; and

(vii) Infiltration BMPs must be located a minimum of 100 feet horizontally from any water supply wells.

(b) The Copermittee may develop, individually or with other Copermittees, alternative mandatory design criteria to that listed above for infiltration BMPs which are designed to primarily function as centralized infiltration devices. Before implementing the alternative design criteria in the development planning process the Copermitee(s) must:

(i) Notify the San Diego Water Board of the intent to implement the alternative design criteria submitted; and

(ii) Comply with any conditions set by the San Diego Water Board.

d. BMP DESIGN MANUAL UPDATE

Each Copermittee must update and implement its BMP Design Manual[32] pursuant to Provision F.2.b. ~~Until the Copermittee has updated its BMP Design Manual with the requirements of Provisions E.3.a-c, the Copermittee must continue implementing its current BMP Design Manual. Unless directed otherwise by the San Diego Water Board, the Copermittee must implement the BMP Design Manual within 180 days of completing the update.~~ The update of the BMP Design Manual must include the following:

Comment [A98]: This info was incorporated into F.2.b.

(1) Updated procedures to determine the nature and extent of storm water requirements applicable to a potential development or redevelopment projects. These procedures must inform project applicants of the storm water management requirements applicable to their project including, but not limited to, general requirements for all development projects, structural BMP design procedures and requirements, hydromodification management requirements, requirements specific to phased projects, and procedures specific to private developments and public improvement projects;

(2) Updated procedures to identify ~~pollutants and conditions of concern for selecting~~ the most appropriate structural BMPs that consider, at a minimum, the following:

(a) The requirements of E.3.c.(1) and (2)

~~(a)~~(b) Receiving water quality (including pollutants for which receiving waters are listed as impaired under the CWA section 303(d) List);

[32] The BMP Design Manual was formerly known as the Standard Storm Water Mitigation Plan under Order Nos. R9-2007-0001, R9-2009-0002, and R9-2010-0016.

~~(b)~~(c) Pollutants, stressors, and/or receiving water conditions that cause or contribute to the highest priority water quality conditions identified in the Water Quality Improvement Plan;

~~(c)~~(d) Land use type of the project and pollutants associated with that land use type; and

~~(d)~~(e) Pollutants expected to be present onsite.

(3) Updated procedures for designing structural BMPs, including any updated performance requirements to be consistent with the requirements of Provision E.3.c for all structural BMPs listed in the BMP Design Manual;

(4) Long-term maintenance criteria for each structural BMP listed in the BMP Design Manual; and

(5) Alternative compliance criteria, in accordance with the requirements under Provision E.3.c.(3), if the Copermittee elects to allow Priority Development Projects within its jurisdiction to utilize alternative compliance.

e. PRIORITY DEVELOPMENT PROJECT BMP IMPLEMENTATION AND OVERSIGHT

Each Copermittee must implement a program that requires and confirms structural BMPs on all Priority Development Projects are designed, constructed, and maintained to remove pollutants in storm water to the MEP.

(1) Structural BMP Approval and Verification Process

(a) Each Copermittee must require and confirm that for all Priority Development Project applications that have not received prior lawful approval by the Copermittee by 18 months after the commencement of coverage under this Order, the requirements of Provision E.3 are implemented. For project applications that have received prior lawful approval by 18 months after the commencement of coverage under this Order, the Copermittee may allow previous land development requirements to apply.

(b) Each Copermittee must identify the roles and responsibilities of their various municipal departments in implementing the structural BMP requirements, including each stage of a project from application review and approval through BMP maintenance and inspections.

(c) Each Copermittee must require and confirm that appropriate easements and ownerships are properly recorded in public records and the information is conveyed to all appropriate parties when there is a change in project or site ownership.

(d) Each Copermittee must require and confirm that prior to occupancy and/or intended use of any portion of the Priority Development Project, each structural BMP is inspected to verify that it has been constructed and is operating in compliance with all of its specifications, plans, permits, ordinances, and the requirements of this Order.

(2) Priority Development Project Inventory and Prioritization

(a) Each Copermittee must develop, maintain, and update ~~at~~regularly~~at least annually~~, a watershed-based database to track and inventory all constructed Priority Development Projects and associated structural BMPs within its jurisdiction. Inventories must be accurate and complete beginning from January 2002 for the San Diego County Copermittees, February 2003 for the Orange County Copermittees, and July 2005 for the Riverside County Copermittees~~.~~, where data is available.~~.~~ The use of an automated database system, such as GIS, is highly recommended. The database must include, at a minimum, the following information:

(i) Priority Development Project location (address and hydrologic subarea);

(ii) Descriptions of structural BMP type(s);

(iii) Date(s) of construction;

(iv) Party responsible for structural BMP maintenance;

(v) Dates and findings of structural BMP maintenance verifications; and

(vi) Corrective actions and/or resolutions when applicable.

(b) Each Copermittee must prioritize the Priority Development Projects with structural BMPs within its jurisdiction. The designation of Priority Development Projects as high priority must consider the following:

(i) The highest water quality priorities identified in the Water Quality Improvement Plan;

(ii) Receiving water quality;

(iii) Number and sizes of structural BMPs;

(iv) Recommended maintenance frequency of structural BMPs;

(v) Likelihood of operation and maintenance issues of structural BMPs;

(vi) Land use and expected pollutants generated; and

(vii) Compliance record.

(3) Structural BMP Maintenance Verifications and Inspections

Each Copermittee is required to verify that structural BMPs on each Priority

Development Project are adequately maintained, and continue to operate effectively to remove pollutants in storm water to the MEP through inspections, self-certifications, surveys, or other equally effective approaches.

(a) All (100 percent) of the structural BMPs at Priority Development Projects that are designated as high priority must be inspected directly by the Copermittee annually prior to each rainy season;

(b) For verifications performed through a means other than direct Copermittee inspection, adequate documentation must be required by the Copermittee to provide assurance that the required maintenance of structural BMPs at each Priority Development Project has been completed; and

(c) Appropriate follow-up measures (including re-inspections, enforcement, etc.) must be conducted to ensure that structural BMPs at each Priority Development Project continue to reduce pollutants in storm water to the MEP as originally designed.

f. DEVELOPMENT PROJECT ENFORCEMENT

Each Copermittee must enforce its legal authority established pursuant to Provision E.1 for all development projects, as necessary, to achieve compliance with the requirements of this Order, in accordance with its Enforcement Response Plan pursuant to Provision E.6.

g. ~~STRATEGIES TO ADDRESS THE HIGHEST PRIORITY WATER QUALITY CONDITIONS~~

~~Each Copermittee must describe in its jurisdictional runoff management program document the strategies and/or activities that will be implemented as part of the development planning program to address development and redevelopment projects that may become sources of pollutants and/or stressors that contribute to the highest priority water quality conditions in the Watershed Management Area as follows:~~

~~(5) Provide specific details about how the strategies and/or activities will be implemented (e.g. designate additional BMPs, focus education, increase frequency of verifications and/or inspections, alternative compliance options);~~

~~(6) Each Copermittee must identify areas within its jurisdiction where Priority Development Projects may be allowed or should be encouraged to implement or contribute toward the implementation of alternative compliance retrofitting and/or stream, channel, or habitat rehabilitation projects;~~

~~(7) Each Copermittee should collaborate and cooperate with other Copermittees and/or entities in the Watershed Management Area to identify regional alternative compliance projects that Priority Development Projects may be allowed or should be encouraged to implement or participate in implementing; and~~

Comment [A99]: This section was moved to the beginning of provision E.3.

~~(8) The strategies and/or activities must be consistent with the requirements of Provisions E.3.a-c and E.3.e-f and the strategies identified in the Water Quality Improvement Plan.~~

4. Construction Management

Each Copermittee must implement a construction management program in accordance with the strategies identified in the Water Quality Improvement Plan and includes, at a minimum, the following requirements:

Strategies to Address the Highest Priority Water Quality Conditions

Comment [A100]: This section was moved from provision E.4.f, Changes are shown in Redline

Each Copermittee must describe in its jurisdictional runoff management program document the strategies and/or activities that will be implemented as part of the construction management program to address construction sites that the Copermittee has identified as potential sources of pollutants and/or stressors that contribute to the highest priority water quality conditions in the Watershed Management Area as follows:

(1) Provide specific details about how the strategies and/or activities will be implemented (e.g. designate additional BMPs, focus education, and/or increase/decrease frequency of inspections for specific types of sites and/or activities); and

(2) The strategies and/or activities must be consistent with the requirements of Provisions E.4.c-e and the strategies identified in the Water Quality Improvement Plan.

(3) The requirements of the programs as outlined in the following sub-provisions may be modified and prioritized as appropriate for consistency with the highest water quality priorities and strategies as identified in the corresponding Water Quality improvement Plan(s).

a. Project Approval Process

Prior to issuance of any local permit(s) that allows the commencement of construction projects that involve ground disturbance or soil disturbing activities that has the reasonable potential to discharge a pollutant load to and from the MS4, as defined in each Copermittees' JRMP~~can potentially generate pollutants in storm water runoff~~, each Copermittee must:

(1) Require a ~~site-specific~~ Pollution Control Plan~~pollution control~~, construction BMP, and/or erosion and sediment control plan, to be submitted by the project applicant to the Copermittee;

(2) Confirm the Pollution Control Plan~~pollution control~~, construction BMP, and/or erosion and sediment control plan, complies with the local grading ordinance, other applicable local ordinances, and the requirements of this Order;

(3) Confirm the Pollution Control Plan~~pollution control~~, construction BMP, and/or erosion and sediment control plan, includes seasonally appropriate and effective BMPs and management measures described in Provision E.4.c, as applicable to the project; and

(4) Verify that the project applicant has obtained coverage under ~~applicable permits, including, but not limited to~~ the Construction General Permit~~, Clean Water Act Section 401 Water Quality Certification and Section 404 Permit, and California Department of Fish and Game Streambed Alteration Agreement~~.

b. Construction Site Inventory and Tracking

(1) Each Copermittee must maintain, and update ~~at least monthly~~regularly, a watershed-based inventory of all construction projects issued a local permit that allows ground disturbance or soil disturbing activities that can potentially generate pollutants in storm water runoff. The use of an automated database system, such as GIS, is highly recommended. The inventory must include:

(a) Relevant contact information for each site (e.g., name, address, phone, and email for the owner and contractor);

(b) The basic site information including location (address and hydrologic subarea), Waste Discharge Identification (WDID) number (if applicable), size of the site, and approximate area of disturbance;

(c) Whether or not the site is considered a high threat to water quality, as defined in Provision E.4.b.(2) below;

(d) The project start and ~~anticipated~~ completion dates;

~~(e) Current construction phase;~~

~~(f)~~(e) The required inspection frequency, as defined in the Copermittee's jurisdictional runoff management program document;

~~(g)~~(f) The date the Copermittee accepted and/or approved the ~~site-specific~~ pollution control plan, construction BMP, and/or erosion and sediment control plan; and

~~(h)~~(g) Whether or not there are ongoing enforcement actions administered to the site.

Comment [A101]: Some of the info can only be updated based on an inspection, which may or may not be monthly year round for all sites.

Comment [A102]: The anticipated completion date is often unknown and can fluctuate based on unpredictable and unforeseen circumstances. Keeping track of accurate dates in an inventory would be difficult and would not add significant value to the database. Construction Inspectors keep a close eye on the progress of projects and would not need to rely on inventory data to achieve effective stormwater management and oversight. Once a project is completed, the date can be entered into the database,.

(2) Each Copermittee must identify all construction sites within its jurisdiction that represent a high threat to downstream surface water quality. The designation of construction sites as high threat to water quality must consider the following:

(a) Sites located within a hydrologic subarea where sediment is known or suspected to contribute to the highest priority water quality conditions identified in the Water Quality Improvement Plan;

(b) Sites located within the same hydrologic subarea and tributary to a water body segment listed as impaired for sediment on the CWA section 303(d) List;

(c) Sites located within, directly adjacent to, or discharging directly to a receiving water within an ESA; and

(d) Other sites determined by the Copermittees or the San Diego Water Board as a high threat to water quality.

c. CONSTRUCTION SITE BMP IMPLEMENTATION

Comment [A103]: See discussion in section 3.9.1 of the comment letter.

Each Copermittee must implement, or require the implementation of effective BMPs (for Copermittee construction sites and private construction sites, respectively) to reduce discharges of pollutants in ~~storm water~~ runoff from construction sites to the MEP, and effectively prohibit~~prevent~~ non-storm water discharges from construction sites into the MS4. These BMPs must be site specific, seasonally appropriate, and construction phase appropriate. BMPs must be implemented at each construction site year round. Dry season BMP implementation must plan for and address unseasonal rain events that may occur during the dry season (May 1 through September 30). Copermittees must implement, or require the implementation of, BMPs in the following categories:

(1) Project Planning;

(2) Good Site Management “Housekeeping”, including waste management;

(3) Non-storm Water Management;

(4) Erosion Control;

(5) Sediment Control;

(6) Run-on and Run-off Control; and

(7) Active/Passive Sediment Treatment Systems, where applicable.

d. CONSTRUCTION SITE INSPECTIONS

Each Copermittee must conduct construction site inspections to require and confirm compliance with its local permits and applicable local ordinances, and the requirements of this Order. Priority for site inspections must consider threat to water quality pursuant to Provision E.4.b as well as the nature of the construction activity, topography, and the characteristics of soils and receiving water quality.

(1) Inspection Frequency

(a) Each Copermittee must conduct inspections at all inventoried sites, including high threat to water quality sites, at an appropriate frequency for each phase of construction to confirm~~ensure~~ the site reduces the discharge of pollutants in runoff~~storm water~~ from construction sites to the MEP, and effectively prevents non-storm water discharges from entering the MS4.

(b) Each Copermittee must establish appropriate inspection frequencies for high threat to water quality sites, and all other sites, for each phase of construction. Inspection frequencies appropriate for addressing the highest water quality priorities identified in the Water Quality Improvement Plan, and for complying with the requirements of this Order must be identified in each Copermittee's jurisdictional runoff management program document.

(c) Based upon inspection findings, each Copermittee must implement all follow-up actions (i.e., re-inspection, enforcement) necessary to require and confirm site compliance with its local permits and applicable local ordinances, and the requirements of this Order.

(2) Inspection Content

Inspections of construction sites by the Copermittee must include, at a minimum:

(a) Verification of coverage under the Construction General Permit (Notice of Intent (NOI) and/or WDID number) during initial inspections, when applicable;

(b) Assessment of compliance with its local permits and applicable local ordinances related to pollution prevention, including the implementation and maintenance of applicable BMPs;

(c) Assessment of BMP adequacy and effectiveness;

(d) Visual observations of actual non-storm water discharges;

(e) Visual observations of actual or potential discharge of sediment and/or construction related materials from the site;

(f) Visual observations of actual or potential illicit connections; and

(g) If any violations are found and BMP corrections are needed, inspectors must take and document appropriate actions in accordance with the Enforcement Response Plan pursuant to Provision E.6.

(3) Inspection Tracking and Records

Each Copermittee must track all inspections and re-inspections at all inventoried construction sites. The Copermittee must retain all inspection records in an electronic database or tabular format, which must be made available to the San Diego Water Board upon request. Inspection records must include, at a minimum:

(a) Site name, location (address and hydrologic subarea), and WDID number (if applicable);

(b) Inspection date;

(c) Weather condition during~~Approximate amount of rainfall since last~~ inspection;

(d) Description of problems observed with BMPs and indication of need for BMP addition/repair/replacement and any scheduled re-inspection, and date of re-inspection;

(e) Descriptions of any other specific inspection comments which must, at a minimum, include rationales for longer compliance time;

(f) Description of enforcement actions issued in accordance with the Enforcement Response Plan pursuant to Provision E.6; and

(g) Resolution of problems noted and date problems fixed.

e. Construction Site Enforcement

Each Copermittee must enforce its legal authority established pursuant to Provision E.1 for all its inventoried construction sites, as necessary, to achieve compliance with the requirements of this Order, in accordance with its Enforcement Response Plan pursuant to Provision E.6.

5. Existing Development Management

Comment [A104]: See discussion in section 3.10 of the comment letter.

Each Copermittee must implement an existing development management program in accordance with the strategies identified in the Water Quality Improvement Plan. ~~and includes, at a minimum, the following requirements:~~

STRATEGIES TO ADDRESS THE HIGHEST PRIORITY WATER QUALITY CONDITIONS

Comment [A105]: Moved from sub-provision e. Changes shown in redline

Each Copermittee must implement the water quality improvement strategies, where necessary, to address areas of existing development within its jurisdiction that are identified as sources of pollutants and/or stressors contributing to the highest priority water quality conditions in the Watershed Management Area. For the existing development management program, the following strategies must be implemented:

(1) Specific Existing Development Management Program Strategies

Each Copermittee must describe in its jurisdictional runoff management program document the strategies and/or activities that will be implemented within its jurisdiction to address areas of existing development that the Copermittee has identified as sources of pollutants and/or stressors that contribute to the highest priority water quality conditions in the Watershed Management Area as follows:

(a) Provide specific details about how the strategies and/or activities will be implemented (e.g. designate additional BMPs, focus education, and/or increase/decrease frequency of inspections for specific types of facilities, areas and/or activities);

(b) The facilities and/or areas within the Copermittee's jurisdiction where the strategies and/or activities will be implemented; and

(2) The requirements of the programs as outlined in the following sub-provisions may be modified and prioritized as appropriate for consistency with the highest water quality priorities and strategies as identified in the corresponding Water Quality improvement Plan(s).~~The strategies and/or activities must be consistent with the requirements of Provisions E.5.b-d and the strategies identified in the Water Quality Improvement Plan.~~

a. EXISTING DEVELOPMENT INVENTORY AND TRACKING

Each Copermittee must maintain, and update at least annually, a watershed-based inventory of the existing development within its jurisdiction that ~~may~~has the reasonable potential to~~may~~ discharge a high priority pollutant load to and from the MS4, as defined in the Copermittee's JRMP. The use of an automated database system, such as GIS, is highly recommended. The inventory must, at a minimum, evaluate and include the following if identified as a source of a high priority pollutant~~include~~:

(1) Name, location (hydrological subarea and address, if applicable) of the following types of existing development with its jurisdiction:

(a) Commercial facilities or areas;

(b) Industrial facilities;

(c) Copermittee owned Municipal facilities, including:

(i) MS4 and related structures,[33]

(ii) Roads, streets, and highways,

(iii) Parking facilities,

(iv) Municipal airfields,

(v) Parks and recreation facilities,

(vi) Flood management projects and flood control devices and structures,

(vii) Operating or closed municipal landfills,

(viii) Publicly owned treatment works (including water and wastewater treatment plants) and sanitary sewer collection systems,

(ix) Corporate yards, including maintenance and storage yards for materials, waste, equipment, and vehicles,

(x) Hazardous waste collection facilities,

(xi) Other treatment, storage or disposal facilities for municipal waste, and

(xii) Other Copermittee owned municipal facilities that the Copermittee determines may contribute a significant high priority pollutant load to the MS4; and

(d) Residential areas, which may be designated by one or more of the following:

(i) Residential management area,

(ii) Drainage basin or area,

(iii) Land use (e.g., single family, multi-family, rural),

(iv) Neighborhood,

[33] The inventory may refer to the MS4 map required to be maintained pursuant to Provision E.2.b.(1).

(v) Common Interest Area,

(vi) Home Owner Association,

(vii) Mobile home park, and/or

(viii) Other designations accepted by the San Diego Water Board Executive Officer.

(2) A description of the facility or area, including the following information:

(a) Classification as commercial, industrial, municipal, or residential;

(b) Status of facility or area as active or inactive;

(c) Identification if a business is a mobile business;

(d) SIC Code or NAICS Code, if applicable;

(e) Industrial General Permit NOI and/or WDID number, if applicable;

(f) Identification if a residential area is or includes a Common Interest Area / Home Owner Association, or mobile home park;

(g) Identification of pollutants generated and potentially generated by the facility or area;

(h) Whether the facility or area is adjacent to an ESA;

(i) Whether the facility or area is tributary to and within the same hydrologic subarea as a water body segment listed as impaired on the CWA section 303(d) List and generates pollutants for which the water body segment is impaired; and

(j) Whether the facility or area contributes or potentially contributes to the highest priority water quality conditions identified in the Water Quality Improvement Plan.

(3) An annually updated map showing the location of inventoried existing development, watershed boundaries, and water bodies.

b. EXISTING DEVELOPMENT BMP IMPLEMENTATION AND MAINTENANCE

Each Copermittee must designate a minimum set of BMPs required for all inventoried existing development, including special event venues. The designated minimum BMPs must be specific to facility or area types and pollutant generating activities, as appropriate.

(1) Commercial, Industrial, and Municipal Facilities and Areas

(a) Pollution Prevention

Each Copermittee must require the use of appropriate pollution prevention methods by the commercial, industrial, and municipal facilities and areas in its inventoried existing development, as determined necessary by the Copermittee to address the priorities and strategies addressed in the WQIP.

(b) BMP Implementation

Comment [A106]: See discussion in section 3.10.2 of the comment letter.

Each Copermittee must ~~implement, or~~ require the implementation of, designated BMPs at commercial facilities and areas, industrial facilities, and implement designated BMPs at municipal facilities in its inventoried existing development, as determined necessary by the Copermittee to address the priorities and strategies addressed in the WQIP.

(c) BMP Operation and Maintenance

(i) Each Copermittee must properly operate and maintain, or require the proper operation and maintenance of designated BMPs at commercial facilities and areas, industrial facilities, and municipal facilities in its inventoried existing development.

(ii) Each Copermittee must implement a schedule of operation and maintenance activities for its MS4 and related structures (including but not limited to catch basins, storm drain inlets, detention basins, etc.), and verify proper operation of all its municipal structural treatment controls designed to reduce pollutants (including floatables) in storm water discharges to or from its MS4s and related drainage structures. Operation and maintenance activities may include, but is not limited to, the following:

[a] Inspections of the MS4 and related structures;
[b] Cleaning of the MS4 and related structures; and
[c] Proper disposal of materials removed from cleaning of the MS4 and related structures.

(iii) Each Copermittee must implement a schedule of operation and maintenance for public streets, unpaved roads, paved roads, and paved highways and freeways within its jurisdiction to minimize pollutants that can be discharged in storm water.

(iv) Each Copermittee must implement the following controls to prevent infiltration of sewage into the MS4 from leaking sanitary sewers:

[a]~~.~~ Copermittees that operate both a municipal sanitary sewer system and a MS4 must implement controls and measures to

prevent and eliminate seeping sewage from infiltrating the MS4.

[b] Copermittees that do not operate both a municipal sanitary sewer system and a MS4 must coordinate with sewering agencies to keep themselves informed of relevant and appropriate maintenance activities and sanitary sewage projects in their jurisdiction that may cause or contribute to seepage of sewage into the MS4.

(d) Pesticides, Herbicides, and Fertilizers BMPs

Comment [A107]: See discussion in section 3.10.2 of the comment letter.

Each Copermittee must ~~implement BMPs, or~~ require the implementation of BMPs, to reduce pollutants in runoff~~storm water~~ discharges to the MEP and effectively prohibit non-storm water discharges associated with the application, storage, and disposal of pesticides, herbicides and fertilizers from commercial facilities and areas, industrial facilities;~~,~~ and implement such BMPs at municipal facilities in its inventoried existing development. Such BMPs must include, as appropriate, educational activities, permits, certifications and other measures for applicators and distributors.

(2) Residential Areas

(a) Pollution Prevention

Each Copermittee must promote and encourage the use of pollution prevention methods, where appropriate, by the residential areas in its inventoried existing development.

(b) BMP Implementation

Each Copermittee must promote and encourage the implementation of designated BMPs at residential areas in its inventoried existing development.

(c) BMP Operation and Maintenance

Each Copermittee must properly operate and maintain, or require the proper operation and maintenance of designated BMPs at residential areas in its inventoried existing development.

(d) Pesticides, Herbicides, and Fertilizers BMPs

Each Copermittee must promote and encourage the implementation of BMPs to reduce pollutants in runoff~~storm water~~ discharges to the MEP and effectively prohibit non-storm water discharges associated with the application, storage, and disposal of pesticides, herbicides and fertilizers from residential areas in its inventoried existing development.

c. EXISTING DEVELOPMENT INSPECTIONS

Each Copermittee must conduct inspections of inventoried existing development that have been identified by the Copermittee as having the reasonable potential to discharge pollutant loads from their MS4, to ensure compliance with applicable local ordinances and permits, and the requirements of this Order.

(1) Inspection Frequency

(a) Each Copermittee must establish appropriate inspection frequencies for inventoried existing development in accordance with the following requirements:

(i) At a minimum, inventoried existing development must be inspected once every five years utilizing one or more of the following methods:

[a] Drive-by inspections by Copermittee municipal and contract staff,
[b] Onsite inspections by Copermittee municipal and contract staff, and/or
[c] Inspections by volunteer monitoring or patrol programs trained by the Copermittee;

(ii) The frequency of inspections must be appropriate to confirm that BMPs are being implemented to reduce the discharge of pollutants in runoff~~storm water~~ from the MS4 to the MEP and effectively prohibit non-storm water discharges to the MS4;

(iii) The frequency of inspections must be based on the potential for a facility or area to discharge non-storm water and pollutants in storm water, and should reflect the priorities set forth in the Water Quality Improvement Plan;

~~(iv) Each Copermittee must annually perform onsite inspections of an equivalent of at least 20 percent of the commercial facilities and areas, industrial facilities, and municipal facilities in its inventoried existing development;[34] and~~

~~(v)~~(iv) Inventoried existing development must be inspected by the Copermittee, as needed, in response to valid public complaints and findings from the Copermittee's municipal and contract staff or volunteer monitoring or patrol program inspections.

(b) Based upon inspection findings, each Copermittee must implement all follow-up actions (i.e. education and outreach, re-inspection, enforcement) necessary to require and confirm compliance with its applicable local

~~[34] If any commercial, industrial, or municipal facilities or areas require multiple onsite inspections during any given year, those additional inspection may count toward the total annual inspection requirement. This requirement excludes linear municipal facilities (i.e., MS4, streets, roads and highways).~~

Comment [A108]: Recommend keeping this instead of SD proposed 'during the permit term'. The 'during the permit term' language is problematic for businesses that are added to the inventory during the permit term. For example, if a business is added to the inventory one month before the expiration of the permit, it may not be reasonable to expect it to be immediately inspected. It is also problematic for Riverside (and OC?), who may be added to the permit less than two years before the end of the permit term.

Comment [A109]: See discussion in section 3.10.2 of the comment letter.

ordinances and permits and the requirements of this Order, in accordance with its Enforcement Response Plan pursuant to Provision E.6.

(2) Inspection Content

(a) Inspections of existing development by the Copermittee or volunteer monitoring or patrol programs must include, at a minimum:

(i) Visual inspections for actual non-storm water discharges, if present;

(ii) Visual inspections for actual or potential discharge of pollutants, if present;

(iii) Visual inspections for actual or potential illicit connections, if present; and

(iv) Verification that the description of the facility or area in the inventory, required pursuant to Provision E.5.a.(2), has not changed.

(b) Onsite inspections of existing development by the Copermittee must include, at a minimum:

(i) Assessment of compliance with its applicable local ordinances and permits related to non-storm water and storm water discharges and runoff;

(ii) Assessment of the implementation of the designated BMPs;

(iii) Verification of coverage under the Industrial General Permit, when applicable; and

(iv) If any problems or violations are found, inspectors must take and document appropriate actions in accordance with the Enforcement Response Plan pursuant to Provision E.6.

(3) Inspection Tracking and Records

Each Copermittee must track all inspections and re-inspections at all inventoried existing development. The Copermittee must retain all inspection records in an electronic database or tabular format, which must be made available to the San Diego Water Board upon request. Inspection records must include, at a minimum:

(a) Name and location of facility or area (address and hydrologic subarea) consistent with the inventory name and location, pursuant to Provision E.5.a.(1);

(b) Inspection and re-inspection date(s);

(c) Inspection method(s) (i.e. drive-by, onsite);

(d) Observations and findings from the inspection(s);

(e) For onsite inspections of existing development by Copermittee municipal or contract staff, the records must also include, as applicable:

(i) Description of any problems or violations found during the inspection(s),

(ii) Description of enforcement actions issued in accordance with the Enforcement Response Plan pursuant to Provision E.6, and

(iii) The date problems or violations were resolved.

d. EXISTING DEVELOPMENT ENFORCEMENT

Each Copermittee must enforce its legal authority established pursuant to Provision E.1 for all its inventoried existing development, as necessary, to achieve compliance with the requirements of this Order, in accordance with its Enforcement Response Plan pursuant to Provision E.6.

e. RETROFITTING AND REHABILITATION~~STRATEGIES TO ADDRESS THE HIGHEST PRIORITY WATER QUALITY CONDITIONS~~

~~Each Copermittee must implement the water quality improvement strategies, where necessary, to address areas of existing development within its jurisdiction that are identified as sources of pollutants and/or stressors contributing to the highest priority water quality conditions in the Watershed Management Area. For the existing development management program, the following strategies must be implemented:~~

~~(3) Specific Existing Development Management Program Strategies~~

~~Each Copermittee must describe in its jurisdictional runoff management program document the strategies and/or activities that will be implemented within its jurisdiction to address areas of existing development that the Copermittee has identified as sources of pollutants and/or stressors that contribute to the highest priority water quality conditions in the Watershed Management Area as follows:~~

~~(a) Provide specific details about how the strategies and/or activities will be implemented (e.g. designate additional BMPs, focus education, and/or increase/decrease frequency of inspections for specific types of facilities, areas and/or activities);~~

~~(b) The facilities and/or areas within the Copermittee's jurisdiction where the strategies and/or activities will be implemented; and~~

~~(c)~~(a) ~~The strategies and/or activities must be consistent with the requirements of Provisions E.5.b-d and the strategies identified in the Water Quality Improvement Plan.~~

~~(4)~~(3) Retrofitting Areas of Existing Development

Where identified in the WQIP as a required strategy to address the highest priority water quality conditions, each~~Each~~ Copermittee must describe in its jurisdictional runoff management program document, a program to retrofit areas of existing development within its jurisdiction to address identified sources of pollutants and/or stressors that contribute to the highest priority water quality conditions in the Watershed Management Area. The program must be implemented as follows:

(a) Each Copermittee must, where necessary pursuant to the strategies identified in the WQIP, identify areas of existing development as candidates for retrofitting, focusing on areas where retrofitting will address pollutants and/or stressors that contribute to the highest priority water quality conditions identified in the Water Quality Improvement Plan;

(b) Candidates for retrofitting projects may be utilized to reduce pollutants that may be discharged in storm water from areas of existing development, and/or address storm water runoff flows and durations from areas of existing development that cause or contribute to hydromodification in receiving waters;

(c) Each Copermittee must develop a strategy to facilitate the implementation of retrofitting projects, where needed in areas of existing development identified as candidates;

(d) Each Copermittee should identify areas of existing development where Priority Development Projects may be allowed or should be encouraged to implement or contribute toward the implementation of alternative compliance retrofitting projects; and

(e) Where retrofitting projects within specific areas of existing development are determined to be infeasible to address the highest priority water quality conditions in the Water Quality Improvement Plan, the Copermittee should collaborate and cooperate with other Copermittees and/or entities in the Watershed Management Area to identify, develop, and implement regional retrofitting projects (i.e. projects that can receive and/or treat storm water from one or more areas of existing development and will result in a net benefit to water quality and the environment) adjacent to and/or downstream of the areas of existing development.

~~(5)~~(4) Stream, Channel and/or Habitat Rehabilitation in Areas of Existing Development

Where identified in the WQIP as a required strategy to address the highest priority water quality conditions, each~~Each~~ Copermittee must describe in its jurisdictional runoff management program document, a program to rehabilitate streams, channels, and/or habitats in areas of existing development within its jurisdiction to address the highest priority water quality conditions in the Watershed Management Area. The program must be implemented as follows:

(a) Each Copermittee must, where necessary pursuant to the strategies identified in the WQIP, identify streams, channels, and/or habitats in areas of existing development as candidates for rehabilitation, focusing on areas where stream, channel, and/or habitat rehabilitation projects will address the highest priority water quality conditions identified in the Water Quality Improvement Plan;

(b) Candidates for stream, channel, and/or habitat rehabilitation projects may be utilized to address storm water runoff flows and durations from areas of existing development that cause or contribute to hydromodification in receiving waters, rehabilitate channelized or hydromodified streams, restore wetland and riparian habitat, restore watershed functions, and/or ~~restore~~ protect beneficial uses of receiving waters;

(c) Each Copermittee must develop a strategy to facilitate the implementation of stream, channel, and/or habitat rehabilitation projects, where needed, in areas of existing development identified as candidates;

(d) Each Copermittee should identify areas of existing development where Priority Development Projects may be allowed or should be encouraged to implement or contribute toward the implementation of alternative compliance stream, channel, and/or habitat rehabilitation projects; and

(e) Where stream, channel, and/or habitat rehabilitation projects within specific areas of existing development are determined to be infeasible to address the highest priority water quality conditions in the Water Quality Improvement Plan, the Copermittee should collaborate and cooperate with other Copermittees and/or entities in the Watershed Management Area to identify, develop, and implement regional stream, channel, and/or habitat rehabilitation projects (i.e. projects that can receive storm water from one or more areas of existing development and will result in a net benefit to water quality and the environment).

(5) Upon Regional Board Executive Officer approval the Copermittees may reallocate resources in the WQIPs for retrofit and rehabilitation project(s).

6. Enforcement Response Plans

Each Copermittee must develop and implement an Enforcement Response Plan as part of its jurisdictional runoff management program document. The Enforcement Response Plan must describe the applicable approaches and options to enforce its legal authority established pursuant to Provision E.1, as necessary, to achieve compliance with the requirements of this Order. Copermittees may continue to utilize and implement established, equivalent guidelines and procedures for enforcement. If such equivalent guidelines and procedures have not been developed, ~~T~~the Enforcement Response Plan must include the following:

a. Enforcement Response Plan Components

The Enforcement Response Plan must include the following individual components:

(1) Illicit Discharge Detection and Elimination Enforcement Component;

(2) Development Planning Enforcement Component;

(3) Construction Management Enforcement Component; and

(4) Existing Development Enforcement Component.

b. Enforcement Response Approaches and Options

Each component of the Enforcement Response Plan must describe the enforcement response approaches that the Copermittee will implement to compel compliance with its statutes, ordinances, permits, contracts, orders, or similar means, and the requirements of this Order. The description must include the protocols for implementing progressively stricter enforcement responses. The enforcement response approaches must include appropriate sanctions, as legally appropriate, to compel compliance, including, at a minimum, the following tools or their equivalent:

(1) Verbal and written notices of violation;

(2) Cleanup requirements;

(3) Fines;

(4) Bonding requirements;

(5) Administrative and criminal (if intentional or criminally negligent) penalties;

(6) Liens;

(7) Stop work orders; and

(8) Permit and occupancy denials.

c. CORRECTION OF VIOLATIONS

(1) Violations must be corrected in a timely manner with the goal of correcting the violations within 30 calendar days after the violations are discovered, or prior to the next predicted rain event, whichever is sooner.

(2) The status of the enforcement actions~~If more than 30 calendar days are required to achieve compliance, then a rationale~~ must be recorded and updated in the applicable electronic database or tabular system used to track violations.

d. ~~ESCALATED~~ PROGRESSIVE ENFORCEMENT

(1) The Enforcement Response Plan must include a definition of "~~escalated~~ progressive enforcement." ~~Escalated~~ Progressive enforcement must include a series of enforcement actions that match the severity of the violations and include distinct, progressive steps. ~~any enforcement scenario where a violation or other non-compliance is determined to cause or contribute to the highest priority water quality conditions identified in the Water Quality Improvement Plan~~. ~~Escalated~~ Progressive enforcement may be defined differently for development planning, construction sites, commercial facilities or areas, industrial facilities, municipal facilities, and/or residential areas.

(2) Where the Copermittee determines ~~escalated~~ the identified progressive enforcement steps ~~is~~are not required, a rationale must be recorded in the applicable electronic database or tabular system used to track violations.

(3) ~~Escalated~~ Progressive enforcement actions must continue to increase in severity, as necessary, to compel compliance as soon as possible.

e. REPORTING OF NON-COMPLIANT SITES

(1) Each Copermittee must notify the San Diego Water Board in writing within ~~2~~25 calendar~~2 working~~ days of issuing escalated enforcement (as defined in the Copermittee's Enforcement Response Plan) to a construction site that poses a significant threat to water quality as a result of violations or other non-compliance with its permits and applicable local ordinances, and the requirements of this Order. Written notification may be provided electronically by email.

Comment [A110]: This is just asking for paperwork violations if someone forgets to write a specific justification – even if all appropriate steps are being diligently pursued. Request alternatively to simply require that the status be updated as appropriate.

Comment [A111]: See discussion in section 3.11.2 of the comment letter.

(2) Each Copermittee must notify the San Diego Water Board of non-filers under the Industrial General Permit and Construction General Permit by email to Nonfilers_R9@waterboards.ca.gov.

7. Public Education and Participation

Each Copermittee must implement, individually or with other Copermittees, a public education and participation program in accordance with the strategies identified in the Water Quality Improvement Plan to promote and encourage the development of programs, management practices, and behaviors that reduce the discharge of pollutants in runoff~~storm water~~ to the MEP, prevent controllable non-storm water discharges from entering the MS4, and protect water quality standards in receiving waters.

STRATEGIES TO ADDRESS THE HIGHEST PRIORITY WATER QUALITY CONDITIONS

Comment [A112]: Recommended move from (c)

Each Copermittee must describe in its jurisdictional runoff management program document the strategies and/or activities that will be implemented within its jurisdiction, as applicable, to educate the public and encourage public participation to address potential sources of pollutants and/or stressors that contribute to the highest priority water quality conditions in the Watershed Management Area as follows:

(1) The target audiences and/or areas within the Copermittee's jurisdiction where the strategies and/or activities will be implemented;

(2) Provide specific details about how the strategies and/or activities will be implemented (e.g. educational topics, materials and/or activities, public outreach and participation programs and/or opportunities);

(3) Each Copermittee should collaborate and cooperate with other Copermittees and/or entities in the Watershed Management Area to identify and implement regional public education and participation activities, programs and opportunities;

(4) Each Copermittee must incorporate a mechanism for evaluating and assessing educational and other public outreach activities, as needed, to identify progress and incorporate modifications necessary to increase the effectiveness of the public education and participation program.

(5) The requirements of the programs as outlined in the following sub-provisions

may be modified and prioritized as appropriate for consistency with the highest water quality priorities and strategies as identified in the corresponding Water Quality improvement Plan(s).

a. **PUBLIC EDUCATION**

The public education program component implemented within the Copermittee's jurisdiction must include, at a minimum, the following:

(1) Educational activities, public information activities, and other appropriate outreach activities intended to reduce pollutants associated with the ~~application of pesticides, herbicides and fertilizer and other pollutants of concern in storm water discharges to and from its MS4 to the MEP, as determined and prioritized by the Copermittee(s) by jurisdiction and/or watershed to address the~~ highest priority water quality conditions identified in the Water Quality Improvement Plan;

(2) Educational activities, public information activities, and other appropriate outreach activities to facilitate the proper management and disposal of used oil and toxic materials; and

(3) Appropriate education and training measures for specific target audiences, such as construction site operators, residents, underserved target audiences and school-aged children, as determined and prioritized by the Copermittee(s) by jurisdiction and/or watershed, based on high risk behaviors and pollutants of concern.

b. **PUBLIC PARTICIPATION**

The public participation program component implemented within the Copermittee's jurisdiction must include, at a minimum, the following:

(1) A process for members of the public to participate in updating the highest priority water quality conditions, numeric goals, and water quality improvement strategies in the Water Quality Improvement Plan.

(2) Opportunities for members of the public to participate in providing the Copermittee recommendations for improving the effectiveness of the water quality improvement strategies implemented within its jurisdiction.

(3) Opportunities for members of the public to participate in programs and/or activities that can result in the prevention or elimination of non-storm water discharges to the MS4, reduction of pollutants in ~~storm wate~~r discharges from

the MS4, and/or ~~restoration and~~ protection of the quality of receiving waters.

8. Fiscal Analysis

a. ~~Each Copermittee must secure the resources necessary to meet all the requirements of this Order~~.

b. Each Copermittee must conduct an annual fiscal analysis of its jurisdictional runoff management program in its entirety. The fiscal analysis must include the following:

(1) Identification of the various categories of expenditures necessary to implement the requirements of this Order, including a description of the specific capital, operation and maintenance, and other expenditure items to be accounted for in each category of expenditures;

(2) The staff resources needed and allocated to meet the requirements of this Order, including any development, implementation, and enforcement activities required;

(3) The estimated expenditures for Provisions E.8.b.(1) and E.8.b.(2) for the current fiscal year; and

(4) The source(s) of funds that are proposed to meet the necessary expenditures described in Provisions E.8.b.(1) and E.8.b.(2), including legal restrictions on the use of such funds, for the current fiscal year and next fiscal year.

c. Each Copermittee must submit a summary of the annual fiscal analysis with each Annual Report required pursuant to Provision F.3.b.

d. Each Copermittee must provide the documentation used to develop the summary of the annual fiscal analysis upon request by the San Diego Water Board.

Comment [A113]: Since the monitoring period is different than a fiscal year, we won't be able to consistently and accurately report monitoring costs incurred by the Copermittees. (which are a big part of overall budgets)

Comment [A114]: Please see Legal Comments.

F. REPORTING

Comment [A115]: See discussion in section 3.14 of the comment letter.

The purpose of this provision is to determine and document compliance with the requirements set forth in this Order. The goal of reporting is to communicate to the San Diego Water Board and the people of the State of California the implementation status of each jurisdictional runoff management program and compliance with the requirements of this Order. This goal is to be accomplished through the submittal of specific deliverables to the San Diego Water Board by the Copermittees.

1. Water Quality Improvement Plans

Comment [A116]: See discussion in section 3.14.1 of the comment letter.

The Copermittees for each Watershed Management Area must develop and submit the Water Quality Improvement Plan in accordance with the following requirements:

a. WATER QUALITY IMPROVEMENT PLAN DEVELOPMENT

Each Water Quality Improvement Plan must be developed in accordance with the following process:

(1) Priority Water Quality Conditions and Numeric Goals

(a) The Copermittees must implement a public participation process to solicit data and information to be utilized in the development and identification of the priority water quality conditions for the Watershed Management Area.

(b) The Copermittees are encouraged to involve the public and key stakeholders as early and often as possible during the development of the priority water quality conditions and numeric goals to be included in the Water Quality Improvement Plan.

(c) Within 6 months after the commencement of coverage under this Order, the Copermittees must develop and submit the Water Quality Improvement Plan requirements of Provision B.2 to the San Diego Water Board. The San Diego Water Board will issue a public notice and solicit public comments on the Water Quality Improvement Plan for a minimum of 60 days.

(d) The Copermittees must revise the priority water quality conditions and numeric goals based on comments received and/or recommendations or direction from the San Diego Water Board Executive Officer.

(2) Water Quality Improvement Strategies and Schedules

(a) The Copermittees are encouraged to involve the public and key stakeholders as early and often as possible during the development of the water quality improvement strategies and schedules to be included in the Water Quality Improvement Plan.

(b) Within 9 months after receipt~~the commencement~~ of public comments and/or recommendations from the Executive Officer per (1)(c) above~~coverage under this Order~~, the Copermittees must develop and submit the Water Quality Improvement Plan requirements of Provision B.3 to the San Diego Water Board. The San Diego Water Board will issue a public notice and solicit public comments on the Water Quality Improvement Plan for a minimum of 60 days.

(c) The Copermittees must revise the water quality improvement strategies and schedules based on comments received and/or recommendations or direction from the San Diego Water Board Executive Officer.

b. Water Quality Improvement Plan Submittal

(1) Within 6~~18~~ months after receipt~~the commencement~~ of public comments and/or recommendations from the Executive Officer per (2)(c) above~~coverage under this Order~~, the Copermittees for each Watershed Management Area must submit a complete Water Quality Improvement Plan in accordance with the requirements of Provision B to the San Diego Water Board. The San Diego Water Board will issue a public notice and solicit public comments on the Water Quality Improvement Plan for a minimum of 30 days.

(2) Based on the comments received, the San Diego Water Board will determine whether to hold a public hearing or to limit public input to submittal of written comments. If no hearing is held the San Diego Water Board will notify the Copermittees within 6 months that the Water Quality Improvement Plan has been accepted as complete following its review and determination that the Water Quality Improvement Plan meets the requirements of this Order.

(3) The Copermittees must revise the Water Quality Improvement Plan based on comments received and/or recommendations or direction from the San Diego Water Board Executive Officer.

(4) The Water Quality Improvement Plan must be made available on the Regional Clearinghouse required pursuant to Provision F.4 within 30 days of acceptance by the San Diego Water Board.

(5) Copermittees must commence with implementation of the BMP strategies identified in the Water Quality Improvement Plan no later than the fiscal year (July 1) following San Diego Water Board approval of the Water Quality Improvement Plan, and the monitoring strategies identified in the Water Quality Improvement Plan no later than October 1st (or May 1st, whichever is sooner) following the San Diego Water Board approval of the Water Quality Improvement Plan.

2. Updates

a. Jurisdictional Runoff Management Program Document Updates

Each Copermittee must update its jurisdictional runoff management program document in accordance with the following requirements:

(1) Each Copermittee is encouraged to involve the public and key stakeholders as early and often as possible to solicit recommendations for updates to its jurisdictional runoff management program document.

(2) Each Copermittee must update its jurisdictional runoff management program document to incorporate the requirements of Provision E and the strategies identified in the applicable WQIPs no later than 6~~18~~ months after approval~~the commencement~~ of the applicable Water Quality Improvement Plans (or updates thereto).~~coverage under this Order.~~

(3) The updated JRMP document must be implemented beginning July 1st following completion of the update, unless directed otherwise by the Executive Officer.

~~(3)~~(4) Each Copermittee must submit any subsequent updates to its jurisdictional runoff management program, with a rationale for the modifications, either in the Annual Report required pursuant to Provision F.3.b, or as part of the Report of Waste Discharge required pursuant to Provision F.5.b.

~~(4)~~(5) The Copermittee must revise the modifications as directed by the San Diego Water Board Executive Officer.

~~(5)~~(6) Updated jurisdictional runoff management program documents must be made available on the Regional Clearinghouse required pursuant to Provision F.4 within 30 days of submitting the Annual Report.

b. BMP Design Manual Updates

Each Copermittee must update its BMP Design Manual in accordance with the following requirements:

(1) Each Copermittee must update its BMP Design Manual to incorporate the requirements of Provisions E.3.a-d, and E.3.g. no later than 6~~18~~ months after approval~~the commencement~~ of the applicable Water Quality Improvement Plans..

(2) Unless directed otherwise by the San Diego Water Board, the Copermittee must implement the updated BMP Design Manual within 180 days of

Comment [A117]: See discussion in section 3.14.1 of the comment letter.

Comment [A118]: This is necessary for the WQIP strategies to inform the Development Planning process

Comment [A119]: An implementation date was missing from the Tentative Order completing updates to the BMP Design Manual.

~~(1)~~(3) Until the Copermittee begins implementation of its updated BMP Design Manual, the Copermittee must continue implementing its current BMP Design Manual~~coverage under this Order~~.

Comment [A120]: This was moved to here

~~(2)~~(4) Subsequent updates must be consistent with the requirements of Provisions E.3.a-d and must be submitted as part of the Annual Reports required pursuant to Provision F.3.b, or as part of the Report of Waste Discharge required pursuant to Provision F.5.b.

~~(3)~~(5) Updated BMP Design Manuals must be made available on the Regional Clearinghouse required pursuant to Provision F.4 within 30 days of completing the update.

c. Water Quality Improvement Plan Updates

The Water Quality Improvement Plans must be updated in accordance with the following process:

(1) The Copermittees must implement a public participation process to solicit data and information to be utilized in updating the Water Quality Improvement Plan.

(2) The Copermittees are encouraged to involve the public and key stakeholders as early and often as possible during the updates to the Water Quality Improvement Plan.

(3) The Copermittees for each Watershed Management Area must submit requested updates to the Water Quality Improvement Plan, with the public input received and the rationale for the requested updates, either in the Annual Reports required pursuant to Provision F.3.b, or as part of the Report of Waste Discharge required pursuant to Provision F.5.b. The requested updates are considered accepted by the San Diego Water Board if no response is provided to the Copermittee after 3 months of submitting the request.

(4) The Copermittees must revise the requested updates as directed by the San Diego Water Board Executive Officer.

(5) Updated Water Quality Improvement Plans must be made available on the Regional Clearinghouse required pursuant to Provision F.4 within 30 days of acceptance of the requested updates by the San Diego Water Board.

3. Progress Reporting

Comment [A121]: See discussion in section 3.14.1 of the comment letter.

a. PROGRESS REPORT PRESENTATIONS

The Copermittees for each Watershed Management Area must appear before the San Diego Water Board, as requested by the San Diego Water Board, to provide progress reports on the implementation of the Water Quality Improvement Plan and jurisdictional runoff management programs.

b. ANNUAL REPORTS

Comment [A122]: See discussion in section 3.14.1 of the comment letter.

(1) Transitional Period JRMP Reports: Each Copermittee must complete and submit a Jurisdictional Runoff Management Program Annual Report Form (Attachment D or accepted revision) no later than October 31 of each year prior to the implementation of updated JRMP programs pursuant to F.2.a. Each Copermittee must submit the information on the Jurisdictional Runoff Management Program Annual Report Form specific to the area within its jurisdiction in each Watershed Management Area.

(2) Transitional Period Monitoring Report: The transitional period monitoring conducted pursuant to D.1.a and D.2.a. shall be reported in a single report that covers the entire reporting period from the initiation of the transitional period monitoring (as described in D.1.a and D.2.a.), through September 30th following approval of the Water Quality Improvement Plan. The Transitional Period Monitoring Report shall include the assessments required per D.4.a.(1)(a), D.4.b.(1)(a) and D.4.b.(2)(a); and be submitted by January 31st following completion of the above mentioned transitional period.

~~(1)~~(3) Post-Transitional Annual Reports – Following the initial transitional period after enrollment into this Order, the~~The~~ Copermittees for each Watershed Management Area must submit an combined Annual Report for each reporting period no later than January 31 of the following year. The annual reporting period consists of two periods: 1) July 1 to June 30 of the following year for the jurisdictional runoff management programs, 2) October 1 to September 30 of the following year for the monitoring and assessment programs~~. The first Annual Report must be prepared for the reporting period beginning July 1 after commencement of coverage under this Order, and upon San Diego Water Board determination that the Water Quality Improvement Plan meets the requirements of this Order to June 30 in the following year for the jurisdictional runoff management programs, and September 30 in the following year for the monitoring and assessment programs.~~ Annual Reports must be made available on the Regional Clearinghouse required pursuant to Provision F.4. Each Annual Report must include the following:

(a) The receiving water and MS4 outfall discharge monitoring data collected pursuant to Provisions D.1 and D.2, summarized and presented in tabular and graphical form;

(b) Progress of the special studies required pursuant to Provision D.3, and the results or findings when a special study, or each phase of a special study, is completed;

(c) The findings from the applicable assessments required pursuant to Provision D.4;

Comment [A123]: Not all are required annually.

(d) The progress of implementing the Water Quality Improvement Plan, including, but not limited to, the following:

(i) The progress toward achieving the interim and final numeric goals for the highest water quality priorities for the Watershed Management Area,

(ii) The water quality improvement strategies that were implemented and/or no longer implemented by each of the Copermittees during the reporting period and previous reporting periods, and are planned to be implemented during the next reporting period,

(iii) Proposed modifications to the water quality improvement strategies, with public input received and rationale for the proposed modifications,

(iv) Previously proposed modifications or updates incorporated into the Water Quality Improvement Plan and/or each Copermittee's jurisdictional runoff management program document and implemented by the Copermittees in the Watershed Management Area, and

(v) Proposed modifications or updates to the Water Quality Improvement Plan and/or each Copermittee's jurisdictional runoff management program document;

(e) A completed Jurisdictional Runoff Management Program Annual Report Form (Attachment D or accepted revision) for each Copermittee in the Watershed Management Area, certified by a Principal Executive Officer, Ranking Elected Official, or Duly Authorized Representative.

~~(2) Each Copermittee must complete and submit a Jurisdictional Runoff Management Program Annual Report Form (Attachment D or accepted revision) no later than October 31 of each year until the first Annual Report is required to be submitted. Each Copermittee must submit the information on the Jurisdictional Runoff Management Program Annual Report Form specific to the area within its jurisdiction in each Watershed Management Area.~~

Comment [A124]: Adapted into new section (1)

~~(3)~~(4) Each Copermittee must provide any data or documentation utilized in developing the Annual Report upon request by the San Diego Water Board. ~~AnyAny~~Copermittee~~Any~~ monitoring data utilized in developing the Annual Report must be uploaded to the California Environmental Data Exchange Network (CEDEN).[35] Any Copermittee monitoring and assessment data utilized in developing the Annual Report must be provided on the Regional Clearinghouse required pursuant to Provision F.4.

c. Regional Monitoring and Assessment Report

(1) The Copermittees must submit a Regional Monitoring and Assessment Report no later than 180 days in advance of the expiration date of this Order. The Regional Monitoring and Assessment Report may be submitted as part of the Report of Waste Discharge required pursuant to Provision F.5.b. The Regional Monitoring and Assessment Report shall incorporate the Integrated Assessment of the Water Quality Improvement Plan per D.4.d.

~~(1) The Copermittees must review the receiving water and MS4 outfall discharge monitoring data collected pursuant to Provisions D.1 and D.2, and findings from the assessments required pursuant to Provision D.4, to assess the following:~~

~~(2)~~

~~(3) The beneficial uses of the receiving waters within the San Diego Region that are protected or must be restored;~~

~~(4)~~

~~(5) The progress toward restoring impacted beneficial uses in the receiving waters within the San Diego Region; and~~

~~(6)~~

~~(7) Pollutants or conditions of emerging concern that may impact beneficial uses in the receiving waters within the San Diego Region.~~

~~(8)~~

~~(9) The Regional Monitoring and Assessment Report must include recommendations for improving the implementation and assessment of the Water Quality Improvement Plans and jurisdictional runoff management programs.~~

(2) Each Copermittee must provide any data or documentation utilized in developing the Regional Monitoring and Assessment Report upon request by the San Diego Water Board. Any monitoring and assessment data utilized in developing the Regional Monitoring and Assessment Report must be provided on the Regional Clearinghouse required pursuant to Provision F.4.

[35] Data must be uploaded to CEDEN Southern California Regional Data Center (http://www.sccwrp.org/Data/DataSubmission/SouthernCaliforniaRegionalDataCenter.aspx) using the templates provided on the CEDEN website.

4. Regional Clearinghouse

The Copermittees must develop, update, and maintain an internet-based Regional Clearinghouse that is made available to the public no later than 18 months after the effective date of this Order.[36]

a. The Copermittees, through the Regional Clearinghouse, must make the following documents and data available, organized by Watershed Management Area, which may be linked to other internet-based data portals and databases where the original documents are stored:

(1) Water Quality Improvement Plan for the Watershed Management Area, and all updated versions with date of update;

(2) Annual Reports for the Watershed Management Area;

(3) Jurisdictional Runoff Management Program document for each Copermittee within the Watershed Management Area, and all updated versions with date of update;

(4) BMP Design Manual for each Copermittee within the Watershed Management Area, and all updated versions with date of update;

(5) Reports from special studies (e.g. source identification, BMP effectiveness assessment) conducted in the Watershed Management Area;

(6) Monitoring data collected pursuant to Provision D for each Watershed Management Area must be uploaded to CEDEN,[37] with links to the uploaded data; and

(7) Available GIS data, layers, and/or shapefiles used to develop the maps generated and maintained by the Copermittees for the Water Quality Improvement Plans, Annual Reports, and jurisdictional runoff management program documents.

b. The Copermittees, through the Regional Clearinghouse, must make the following information and documents available:

(1) Contact information (point of contact, phone number, email address, and mailing address) for each Copermittee;

[36] The Copermittee may elect to develop and maintain the clearinghouse(s) provided by other Copermittees or agencies.
[37] Data must be uploaded to CEDEN Southern California Regional Data Center (http://www.sccwrp.org/Data/DataSubmission/SouthernCaliforniaRegionalDataCenter.aspx) using the templates provided on the CEDEN website.

(2) Public hotline number for reporting non-storm water and illicit discharges for each Copermittee;

(3) Email address for reporting non-storm water and illicit discharges for each Copermittee;

(4) Link to each Copermittee's website, if available, where the public may find additional information about the Copermittee's storm water management program and for requesting records for the implementation of its program;

(5) Information about opportunities for the public to participate in programs and/or activities that can result in the prevention or elimination of non-storm water discharges to the MS4, reduction of pollutants in ~~storm water~~ discharges from the MS4, and/or restoration and protection of the quality of receiving waters; and

(6) Reports from regional monitoring programs in which the Copermittees participate (e.g. Southern California Monitoring Coalition, Southern California Coastal Water Research Project Bight Monitoring);

(7) Regional Monitoring and Assessment Reports; and

(8) Any other information, data, and documents the Copermittees determine as appropriate for making available to the public.

5. Report of Waste Discharge

a. The Orange County Copermittees and the Riverside County Copermittees are required to submit a complete Report of Waste Discharge pursuant to the requirements of their current Orders. The San Diego Water Board will review and consider the Reports of Waste Discharge to determine whether modification to this Order, pursuant to the requirements of Provision H, will be required prior the Orange County Copermittees and/or Riverside County Copermittees becoming covered under this Order. The current Orders for the Orange County Copermittees and Riverside County Copermittees are rescinded upon notification of coverage under this Order except for enforcement purposes.

b. The Copermittees subject to the requirements of this Order must submit to the San Diego Water Board a complete Report of Waste Discharge as an application for the re-issuance of this Order and NPDES permit. The Report of Waste Discharge must be submitted no later than 180 days in advance of the expiration date of this Order. The Report of Waste Discharge must contain the following minimum information:

(1) Names and addresses of the Copermittees;

(2) Names and titles of the primary contacts of the Copermittees;

(3) Proposed changes to the Copermittees' Water Quality Improvement Plans and the supporting justification;

(4) Proposed changes to the Copermittees' jurisdictional runoff management programs and the supporting justification;

(5) Any other information necessary for the re-issuance of this Order;

(6) Any information to be included as part of the Report of Waste Discharge pursuant to the requirements of this Order; and

(7) Any other information required by federal regulations for NPDES permit reissuance.

6. Application for Early Coverage

a. The Orange County Copermittees, collectively, or Riverside County Copermittees, collectively, may apply for early coverage under this Order by submitting a Report of Waste Discharge Form 200, with a written request for early coverage under this Order.

Comment [A125]: This form requests information that is not applicable to MS4s.

b. The San Diego Water Board will review the application for early coverage. A notification of coverage under this Order will be issued to the Copermittees in the respective county by the San Diego Water Board upon completion of the early coverage application requirements. The effective coverage date will be specified in the notification of coverage. The Copermittees in the respective county are authorized to have MS4 discharges pursuant to the requirements of this Order starting on the effective coverage date specified in the notification of coverage. The existing Order for the respective county is rescinded upon the effective coverage date specified in the notification of coverage except for enforcement purposes.

7. Reporting Provisions

Each Copermittee must comply with all the reporting and recordkeeping provisions of the Standard Permit Provisions and General Provisions contained in Attachment B to this Order.

G. PRINCIPAL WATERSHED COPERMITTEE RESPONSIBILITIES

1. The Copermittees within each Watershed Management Area must designate a Principal Watershed Copermittee and notify the San Diego Water Board of the name of the Principal Watershed Copermittee. ~~An individual Copermittee should not be designated a Principal Watershed Copermittee for more than two Watershed Management Areas.~~ The notification may be submitted with the Water Quality Improvement Plan required pursuant to Provision F.1 of this Order.

2. The Principal Watershed Copermittee is responsible for, at a minimum, the following:

   a. Serving as liaison between the Copermittees in the Watershed Management Area and the San Diego Water Board on general permit issues, and when necessary and appropriate, representing the Copermittees in the Watershed Management Area before the San Diego Water Board.

   b. Facilitating the development of the Water Quality Improvement Plan in accordance with the requirements of Provision B of this Order

   c. Coordinating the submittal of the deliverables required by Provisions F.1, F.2, F.3.a, and F.3.b of this Order.

   d. Coordinating the development of~~and developing~~, with the other Principal Watershed Copermittees, the requirements of Provisions F.3.c, F.4, and F.5.b of this Order.

H. MODIFICATION OF PROGRAMS

1. Modifications of the Order may be initiated by the San Diego Water Board or by the Copermittees, including as part of the ROWD process applicable to the Orange County and Riverside County Copermittees. Requests by Copermittees must be made to the San Diego Water Board.

2. Minor modifications to the Order may be made by the San Diego Water Board Executive Officer, where the proposed modification complies with all the effective prohibitions and limitations, and other requirements of this Order.

3. Proposed modifications to the Order outside of the WQIP process that are not minor require amendment of this Order in accordance with this Order's rules, policies, and procedures.

4. The San Diego Water Board may re-open and modify this Order at any time prior to its expiration, after opportunity for public comment and a public hearing, if the State Water Board determines that revisions are warranted to those provisions of the Order addressing compliance with water quality standards in the receiving water and/or those provisions of the Order establishing an iterative process for implementation of management practices to assure compliance with water quality standards in the receiving water.

I. STANDARD PERMIT PROVISIONS AND GENERAL PROVISIONS

Each Copermittee must comply with all the Standard Permit Provisions and General Provisions contained in Attachment B to this Order.

ATTACHMENT A

DISCHARGE PROHIBITIONS AND SPECIAL PROTECTIONS

1. Basin Plan Waste Discharge Prohibitions

California Water Code Section 13243 provides that a Regional Water Board, in a water quality control plan, may specify certain conditions or areas where the discharge of waste or certain types of waste is not permitted. The following waste discharge effective prohibitions in the Water Quality Control Plan for the San Diego Basin (Basin Plan) are applicable to any person, as defined by Section 13050(c) of the California Water Code, who is a citizen, domiciliary, or political agency or entity of California whose activities in California could affect the quality of waters of the state within the boundaries of the San Diego Region.

1. The discharge of waste to waters of the state in a manner causing, or threatening to cause a condition of pollution, contamination or nuisance as defined in California Water Code Section 13050, is prohibited.

2. The discharge of waste to land, except as authorized by waste discharge requirements or the terms described in California Water Code Section 13264 is prohibited.

3. The discharge of pollutants or dredged or fill material to waters of the United States except as authorized by a National Pollutant Discharge Elimination System (NPDES) permit or a dredged or fill material permit (subject to the exemption described in California Water Code Section 13376) is prohibited.

4. Discharges of recycled water to lakes or reservoirs used for municipal water supply or to inland surface water tributaries thereto are prohibited, unless this San Diego Water Board issues a NPDES permit authorizing such a discharge; the proposed discharge has been approved by the State Department of Health Services (DHS) and the operating agency of the impacted reservoir; and the discharger has an approved fail-safe long-term disposal alternative.

5. The discharge of waste to inland surface waters, except in cases where the quality of the discharge complies with applicable receiving water quality objectives, is prohibited. Allowances for dilution may be made at the discretion of the San Diego Water Board. Consideration would include streamflow data, the degree of treatment provided and safety measures to ensure reliability of facility performance. As an example, discharge of secondary effluent would probably be permitted if streamflow provided 100:1 dilution capability.

6. The discharge of waste in a manner causing flow, ponding, or surfacing on lands not owned or under the control of the discharger is prohibited, unless the discharge is authorized by the San Diego Water Board.

7. The dumping, deposition, or discharge of waste directly into waters of the state, or adjacent to such waters in any manner which may permit its being transported into the waters, is prohibited unless authorized by the San Diego Water Board.

8. Any discharge to a storm water conveyance system that is not composed entirely of "*storm water*" is effectively prohibited unless authorized by the San Diego Water Board. [The federal regulations, 40 CFR 122.26(b)(13), define storm water as storm water runoff, snow melt runoff, and surface runoff and drainage. 40 CFR 122.26(b)(2) defines an illicit discharge as any discharge to a storm water conveyance system that is not composed entirely of storm water except discharges pursuant to a NPDES permit and discharges resulting from fire fighting activities.] [§122.26 amended at 56 FR 56553, November 5, 1991; 57 FR 11412, April 2, 1992].

9. The unauthorized discharge of treated or untreated sewage to waters of the state or to a storm water conveyance system is prohibited.

10. The discharge of industrial wastes to conventional septic tank/subsurface disposal systems, except as authorized by the terms described in California Water Code Section 13264, is prohibited.

11. The discharge of radioactive wastes amenable to alternative methods of disposal into the waters of the state is prohibited.

12. The discharge of any radiological, chemical, or biological warfare agent into waters of the state is prohibited.

13. The discharge of waste into a natural or excavated site below historic water levels is prohibited unless the discharge is authorized by the San Diego Water Board.

14. The discharge of sand, silt, clay, or other earthen materials from any activity, including land grading and construction, in quantities which cause deleterious bottom deposits, turbidity or discoloration in waters of the state or which unreasonably affect, or threaten to affect, beneficial uses of such waters is prohibited.

15. The discharge of treated or untreated sewage from vessels to Mission Bay, Oceanside Harbor, Dana Point Harbor, or other small boat harbors is prohibited.

16. The discharge of untreated sewage from vessels to San Diego Bay is prohibited.

17. The discharge of treated sewage from vessels to portions of San Diego Bay that are less than 30 feet deep at mean lower low water (MLLW) is prohibited.

18. The discharge of treated sewage from vessels, which do not have a properly functioning US Coast Guard certified Type I or Type II marine sanitation device, to portions of San Diego Bay that are greater than 30 feet deep at mean lower low water (MLLW) is prohibited.

2. Attachment B to State Water Board Resolution 2012-0012

Special Protections for Areas of Special Biological Significance, Governing Point Source Discharges of Storm Water and Nonpoint Source Waste Discharges

I. PROVISIONS FOR POINT SOURCE DISCHARGES OF STORM WATER AND NONPOINT SOURCE WASTE DISCHARGES

The following terms, effective prohibitions, and special conditions (hereafter collectively referred to as special conditions) are established as limitations on point source storm water and nonpoint source discharges. These special conditions provide Special Protections for marine aquatic life and natural water quality in Areas of Special Biological Significance (ASBS), as required for State Water Quality Protection Areas pursuant to California Public Resources Code Sections 36700(f) and 36710(f). These Special Protections are adopted by the State Water Board as part of the California Ocean Plan (Ocean Plan) General Exception.

The special conditions are organized by category of discharge. The State Water Resources Control Board (State Water Board) and Regional Water Quality Control Boards (Regional Water Boards) will determine categories and the means of regulation for those categories [e.g., Point Source Storm Water National Pollutant Discharge Elimination System (NPDES) or Nonpoint Source].

A. PERMITTED POINT SOURCE DISCHARGES OF STORM WATER

1. General Provisions for Permitted Point Source Discharges of Storm Water

   a. Existing storm water discharges into an ASBS are allowed only under the following conditions:

      (1) The discharges are authorized by an NPDES permit issued by the State Water Board or Regional Water Board;

      (2) The discharges comply with all of the applicable terms, effective prohibitions, and special conditions contained in these Special Protections; and

      (3) The discharges:

         (i) Are essential for flood control or slope stability, including roof, landscape, road, and parking lot drainage;

         (ii) Are designed to prevent soil erosion;

         (iii) Occur only during wet weather;

         (iv) Are composed of only storm water runoff.

   b. Discharges composed of storm water runoff shall not alter natural ocean water quality in an ASBS.

   c. The discharge of trash is effectively prohibited.

d. Only discharges from existing storm water outfalls are allowed. Any proposed or new storm water runoff discharge shall be routed to existing storm water discharge outfalls and shall not result in any new contribution of waste to an ASBS (i.e., no additional pollutant loading). "Existing storm water outfalls" are those that were constructed or under construction prior to January 1, 2005. "New contribution of waste" is defined as any addition of waste beyond what would have occurred as of January 1, 2005. A change to an existing storm water outfall, in terms of re-location or alteration, in order to comply with these special conditions, is allowed and does not constitute a new discharge.

e. Non-storm water discharges are effectively prohibited except as provided below:

(1) The term "non-storm water discharges" means any waste discharges from a municipal separate storm sewer system (MS4) or other NPDES permitted storm drain system to an ASBS that are not composed entirely of storm water.

(2) (i) The following non-storm water discharges are allowed, provided that the discharges are essential for emergency response purposes, structural stability, slope stability or occur naturally:

(a) Discharges associated with emergency fire fighting operations.

(b) Foundation and footing drains.

(c) Water from crawl space or basement pumps.

(d) Hillside dewatering.

(e) Naturally occurring groundwater seepage via a storm drain.

(f) Non-anthropogenic flows from a naturally occurring stream via a culvert or storm drain, as long as there are no contributions of anthropogenic runoff.

(ii) An NPDES permitting authority may authorize non-storm water discharges to an MS4 with a direct discharge to an ASBS only to the extent the NPDES permitting authority finds that the discharge does not alter natural ocean water quality in the ASBS.

(3) Authorized non-storm water discharges shall not cause or contribute to a violation of the water quality objectives in Chapter II of the Ocean Plan nor alter natural ocean water quality in an ASBS.

2. Compliance Plans for Inclusion in Storm Water Management Plans (SWMP) and Storm Water Pollution Prevention Plans (SWPPP).

The discharger shall specifically address the effective prohibition of non-storm water runoff and the requirement to maintain natural water quality for storm water discharges to an ASBS in an ASBS Compliance Plan to be included in its SWMP or a SWPPP, as appropriate to permit type. If a statewide permit includes a SWMP, then the discharger shall prepare a stand-alone compliance plan for ASBS discharges. The ASBS Compliance Plan is subject to approval by the Executive Director of the State Water Board (statewide permits) or

Executive Officer of the Regional Water Board (for permits issued by Regional Water Boards).

a. The Compliance Plan shall include a map of surface drainage of storm water runoff, showing areas of sheet runoff, prioritize discharges, and describe any structural Best Management Practices (BMPs) already employed and/or BMPs to be employed in the future. Priority discharges are those that pose the greatest water quality threat and which are identified to require installation of structural BMPs. The map shall also show the storm water conveyances in relation to other features such as service areas, sewage conveyances and treatment facilities, landslides, areas prone to erosion, and waste and hazardous material storage areas, if applicable. The SWMP or SWPPP shall also include a procedure for updating the map and plan when changes are made to the storm water conveyance facilities.

b. The ASBS Compliance Plan shall describe the measures by which all non-authorized non-storm water runoff (e.g., dry weather flows) has been eliminated, how these measures will be maintained over time, and how these measures are monitored and documented.

c. For Municipal Separate Storm Sewer System (MS4s), the ASBS Compliance Plan shall require minimum inspection frequencies as follows:

   (1) The minimum inspection frequency for construction sites shall be weekly during rainy season;

   (2) The minimum inspection frequency for industrial facilities shall be monthly during the rainy season;

   (3) The minimum inspection frequency for commercial facilities (e.g., restaurants) shall be twice during the rainy season; and

   (4) Storm water outfall drains equal to or greater than 18 inches (457 mm) in diameter or width shall be inspected once prior to the beginning of the rainy season and once during the rainy season and maintained to remove trash and other anthropogenic debris.

d. The ASBS Compliance Plan shall address storm water discharges (wet weather flows) and, in particular, describe how pollutant reductions in storm water runoff, that are necessary to comply with these special conditions, will be achieved through BMPs. Structural BMPs need not be installed if the discharger can document to the satisfaction of the State Water Board Executive Director (statewide permits) or Regional Water Board Executive Officer (Regional Water Board permits) that such installation would pose a threat to health or safety. BMPs to control storm water runoff discharges (at the end-of-pipe) during a design storm shall be designed to achieve on average the following target levels:

   (1) Table B Instantaneous Maximum Water Quality Objectives in Chapter II of the Ocean Plan; or

   (2) A 90% reduction in pollutant loading during storm events, for the applicant's total discharges. The baseline for the reduction is the effective date of the Exception. The

baseline for these determinations is the effective date of the Exception, and the reductions must be achieved and documented within four (4) years of the effective date.

e. The ASBS Compliance Plan shall address erosion control and the prevention of anthropogenic sedimentation in ASBS. The natural habitat conditions in the ASBS shall not be altered as a result of anthropogenic sedimentation.

f. The ASBS Compliance Plan shall describe the non-structural BMPs currently employed and planned in the future (including those for construction activities), and include an implementation schedule. The ASBS Compliance Plan shall include non-structural BMPs that address public education and outreach. Education and outreach efforts must adequately inform the public that direct discharges of pollutants from private property not entering an MS4 are effectively prohibited. The ASBS Compliance Plan shall also describe the structural BMPs, including any low impact development (LID) measures, currently employed and planned for higher threat discharges and include an implementation schedule. To control storm water runoff discharges (at the end-of-pipe) during a design storm, permittees must first consider using LID practices to infiltrate, use, or evapotranspirate storm water runoff on-site.

g. The BMPs and implementation schedule shall be designed to ensure that natural water quality conditions in the receiving water are achieved and maintained by either reducing flows from impervious surfaces or reducing pollutant loading, or some combination thereof.

h. If the results of the receiving water monitoring described in IV.B. of these special conditions indicate that the storm water runoff is causing or contributing to an alteration of natural ocean water quality in the ASBS, the discharger shall submit a report to the State Water Board and Regional Water Board within 30 days of receiving the results.

(1) The report shall identify the constituents in storm water runoff that alter natural ocean water quality and the sources of these constituents.

(2) The report shall describe BMPs that are currently being implemented, BMPs that are identified in the SWMP or SWPPP for future implementation, and any additional BMPs that may be added to the SWMP or SWPPP to address the alteration of natural water quality. The report shall include a new or modified implementation schedule for the BMPs.

(3) Within 30 days of the approval of the report by the State Water Board Executive Director (statewide permits) or Regional Water Board Executive Officer (Regional Water Board permits), the discharger shall revise its ASBS Compliance Plan to incorporate any new or modified BMPs that have been or will be implemented, the implementation schedule, and any additional monitoring required.

(4) As long as the discharger has complied with the procedures described above and is implementing the revised SWMP or SWPPP, the discharger does not have to repeat the same procedure for continuing or recurring exceedances of natural ocean water quality conditions due to the same constituent.

(5) Compliance with this section does not excuse violations of any term, effective prohibition, or condition contained in these Special Protections.

3. Compliance Schedule

a. On the effective date of the Exception, all non-authorized non-storm water discharges (e.g., dry weather flow) are effectively prohibited.

b. Within one year from the effective date of the Exception, the discharger shall submit a written ASBS Compliance Plan to the State Water Board Executive Director (statewide permits) or Regional Water Board Executive Officer (Regional Water Board permits) that describes its strategy to comply with these special conditions, including the requirement to maintain natural water quality in the affected ASBS. The ASBS Compliance Plan shall include a time schedule to implement appropriate non-structural and structural controls (implementation schedule) to comply with these special conditions for inclusion in the discharger's SWMP or SWPPP, as appropriate to permit type.

c. Within 18 months of the effective date of the Exception, any non-structural controls that are necessary to comply with these special conditions shall be implemented.

d. Within four (4) years of the effective date of the Exception, any structural controls identified in the ASBS Compliance Plan that are necessary to comply with these special conditions shall be operational.

e. Within four (4) years of the effective date of the Exception, all dischargers must comply with the requirement that their discharges into the affected ASBS maintain natural ocean water quality. If the initial results of post-storm receiving water quality testing indicate levels higher than the 85th percentile threshold of reference water quality data and the pre-storm receiving water levels, then the discharger must re-sample the receiving water, pre- and post-storm. If after re-sampling the post-storm levels are still higher than the 85th percentile threshold of reference water quality data, and the pre-storm receiving water levels, for any constituent, then natural ocean water quality is exceeded. See attached Flowchart.

f. The Executive Director of the State Water Board (statewide permits) or Executive Officer of the Regional Water Board (Regional Water Board permits) may only authorize additional time to comply with the special conditions d. and e., above if good cause exists to do so. Good cause means a physical impossibility or lack of funding.

   If a discharger claims physical impossibility, it shall notify the Board in writing within thirty (30) days of the date that the discharger first knew of the event or circumstance that caused or would cause it to fail to meet the deadline in d. or e. The notice shall describe the reason for the noncompliance or anticipated noncompliance and specifically refer to this Section of this Exception. It shall describe the anticipated length of time the delay in compliance may persist, the cause or causes of the delay as well as measures to minimize the impact of the delay on water quality, the measures taken or to be taken by the discharger to prevent or minimize the delay, the schedule by which the measures will be implemented, and the anticipated date of compliance. The discharger shall adopt all reasonable measures to avoid and minimize such delays and their impact on water quality.

The discharger may request an extension of time for compliance based on lack of funding. The request for an extension shall require:

(1) for municipalities, a demonstration of significant hardship to discharger ratepayers, by showing the relationship of storm water fees to annual household income for residents within the discharger's jurisdictional area, and the discharger has made timely and complete applications for all available bond and grant funding, and either no bond or grant funding is available, or bond and/or grant funding is inadequate; or
(2) for other governmental agencies, a demonstration and documentation of a good faith effort to acquire funding through that agency's budgetary process.

B. NONPOINT SOURCE DISCHARGES

[NOT INCLUDED]
[PROVISIONS FOR NONPOINT SOURCE DISCHARGES NOT APPLICABLE]

II. ADDITIONAL REQUIREMENTS FOR PARKS AND RECREATION FACILITIES

[NOT INCLUDED]
[ADDITIONAL REQUIREMENTS FOR PARKS AND RECREATION FACILITIES NOT APPLICABLE]

III. ADDITIONAL REQUIREMENTS – WATERFRONT AND MARINE OPERATIONS

[NOT INCLUDED]
[ADDITIONAL REQUIREMENTS FOR WATERFRONT AND MARINE OPERATIONS NOT APPLICABLE]

IV. MONITORING REQUIREMENTS

Monitoring is mandatory for all dischargers to assure compliance with the Ocean Plan. Monitoring requirements include both: (A) core discharge monitoring, and (B) ocean receiving water monitoring. The State and Regional Water Boards must approve sampling site locations and any adjustments to the monitoring programs. All ocean receiving water and reference area monitoring must be comparable with the Water Boards' Surface Water Ambient Monitoring Program (SWAMP).

Safety concerns: Sample locations and sampling periods must be determined considering safety issues. Sampling may be postponed upon notification to the State and Regional Water Boards if hazardous conditions prevail.

Analytical Chemistry Methods: All constituents must be analyzed using the lowest minimum detection limits comparable to the Ocean Plan water quality objectives. For metal analysis, all samples, including storm water effluent, reference samples, and ocean receiving water samples, must be analyzed by the approved analytical method with the lowest minimum detection limits (currently Inductively Coupled Plasma/Mass Spectrometry) described in the Ocean Plan.

A. CORE DISCHARGE MONITORING PROGRAM

1. General sampling requirements for timing and storm size:

   Runoff must be collected during a storm event that is greater than 0.1 inch and generates runoff, and at least 72 hours from the previously measurable storm event. Runoff samples shall be collected when post-storm receiving water is sampled, and analyzed for the same constituents as receiving water and reference site samples (see section IV B) as described below.

2. Runoff flow measurements

   a. For municipal/industrial storm water outfalls in existence as of December 31, 2007, 18 inches (457mm) or greater in diameter/width (including multiple outfall pipes in combination having a width of 18 inches, runoff flows must be measured or calculated, using a method acceptable to and approved by the State and Regional Water Boards.
   b. This will be reported annually for each precipitation season to the State and Regional Water Boards.

3. Runoff samples – storm events

   a. For outfalls equal to or greater than 18 inches (0.46m) in diameter or width:

      (1) samples of storm water runoff shall be analyzed during the same storm as receiving water samples for oil and grease, total suspended solids, and, within the range of the southern sea otter indicator bacteria or some other measure of fecal contamination, ; and

      (2) samples of storm water runoff shall be analyzed for critical life stage chronic toxicity (one invertebrate or algal species) at least once during each storm season when receiving water is sampled in the ASBS

      (3) If an applicant has no outfall greater than 36 inches, then storm water runoff from the applicant's largest outfall shall be further analyzed during the same storm as receiving water samples for Ocean Plan Table B metals for protection of marine life, Ocean Plan polynuclear aromatic hydrocarbons (PAHs), current use pesticides (pyrethroids and OP pesticides), and nutrients (ammonia, nitrate and phosphates).

   b. For outfalls equal to or greater than 36 inches (0.91m) in diameter or width:

      (1) samples of storm water runoff shall be analyzed during the same storm as receiving water samples for oil and grease, total suspended solids, and, within the range of the southern sea otter indicator bacteria or some other measure of fecal contamination; and

      (2) samples of storm water runoff shall be further analyzed during the same storm as receiving water samples for Ocean Plan Table B metals for protection of marine life, Ocean Plan polynuclear aromatic hydrocarbons (PAHs), current use pesticides

(pyrethroids and OP pesticides), and nutrients (ammonia, nitrate and phosphates) and

(3) samples of storm water runoff shall be analyzed for critical life stage chronic toxicity (one invertebrate or algal species) at least once during each storm season when receiving water is sampled in the ASBS.

c. For an applicant not participating in a regional monitoring program [see below in Section IV (B)] in addition to (a.) and (b.) above, a minimum of the two largest outfalls or 20 percent of the larger outfalls, whichever is greater, shall be sampled (flow weighted composite samples) at least three times annually during wet weather (storm event) and analyzed for all Ocean Plan Table A constituents, Table B constituents for marine aquatic life protection (except for toxicity, only chronic toxicity for three species shall be required), DDT, PCBs, Ocean Plan PAHs, OP pesticides, pyrethroids, nitrates, phosphates, and Ocean Plan indicator bacteria. For parties discharging to ASBS in more than one Regional Water Board region, at a minimum, one (the largest) such discharge shall be sampled annually in each Region.

4. The Executive Director of the State Water Board (statewide permits) or Executive Officer of the Regional Water Board (Regional Water Board permits) may reduce or suspend core monitoring once the storm runoff is fully characterized. This determination may be made at any point after the discharge is fully characterized, but is best made after the monitoring results from the first permit cycle are assessed.

B. OCEAN RECEIVING WATER AND REFERENCE AREA MONITORING PROGRAM

In addition to performing the Core Discharge Monitoring Program in Section II.A above, all applicants having authorized discharges must perform ocean receiving water monitoring. In order to fulfill the requirements for monitoring the physical, chemical, and biological characteristics of the ocean receiving waters within their ASBS, dischargers may choose either (1) an individual monitoring program, or (2) participation in a regional integrated monitoring program.

1. Individual Monitoring Program: The requirements listed below are for those dischargers who elect to perform an individual monitoring program to fulfill the requirements for monitoring the physical, chemical, and biological characteristics of the ocean receiving waters within the affected ASBS. In addition to Core Discharge Monitoring, the following additional monitoring requirements shall be met:

a. Three times annually, during wet weather (storm events), the receiving water at the point of discharge from the outfalls described in section (IV)(A)(3)(c) above shall be sampled and analyzed for Ocean Plan Table A constituents, Table B constituents for marine aquatic life, DDT, PCBs, Ocean Plan PAHs, OP pesticides, pyrethroids, nitrates, phosphates, salinity, chronic toxicity (three species), and Ocean Plan indicator bacteria.

The sample location for the ocean receiving water shall be in the surf zone at the point of discharges; this must be at the same location where storm water runoff is sampled. Receiving water shall be sampled at approximately the same time prior to (pre-storm) and during (or immediately after) the same storm (post storm). Reference water quality shall also be sampled and analyzed for the same constituents pre-storm and post-storm, during the same storms when receiving water is sampled. Reference stations will be determined by the State Water Board's Division of Water Quality and the applicable Regional Water Board(s).

b. Sediment sampling shall occur at least three times during every five (5) year period. The subtidal sediment (sand or finer, if present) at the discharge shall be sampled and analyzed for Ocean Plan Table B constituents for marine aquatic life, DDT, PCBs, PAHs, pyrethroids, and OP pesticides. For sediment toxicity testing, only an acute toxicity test using the amphipod Eohaustorius estuarius must be performed.

c. A quantitative survey of intertidal benthic marine life shall be performed at the discharge and at a reference site. The survey shall be performed at least once every five (5) year period. The survey design is subject to approval by the Regional Water Board and the State Water Board's Division of Water Quality. The results of the survey shall be completed and submitted to the State Water Board and Regional Water Board at least six months prior to the end of the permit cycle.

d. Once during each five (5) year period, a bioaccumulation study shall be conducted to determine the concentrations of metals and synthetic organic pollutants at representative discharge sites and at representative reference sites. The study design is subject to approval by the Regional Water Board and the State Water Board's Division of Water Quality. The bioaccumulation study may include California mussels (Mytilus californianus) and/or sand crabs (Emerita analoga or Blepharipoda occidentalis). Based on the study results, the Regional Water Board and the State Water Board's Division of Water Quality, may adjust the study design in subsequent permits, or add or modify additional test organisms (such as shore crabs or fish), or modify the study design appropriate for the area and best available sensitive measures of contaminant exposure.

e. Marine Debris: Representative quantitative observations for trash by type and source shall be performed along the coast of the ASBS within the influence of the discharger's outfalls. The design, including locations and frequency, of the marine debris observations is subject to approval by the Regional Water Board and State Water Board's Division of Water Quality.

f. The monitoring requirements of the Individual Monitoring Program in this section are minimum requirements. After a minimum of one (1) year of continuous water quality monitoring of the discharges and ocean receiving waters, the Executive Director of the State Water Board (statewide permits) or Executive officer of the Regional Water Board (Regional Water Board permits) may require additional monitoring, or adjust, reduce or suspend receiving water and reference station monitoring. This determination may be made at any point after the discharge and receiving water is fully characterized, but is best made after the monitoring results from the first permit cycle are assessed.

2. Regional Integrated Monitoring Program: Dischargers may elect to participate in a regional integrated monitoring program, in lieu of an individual monitoring program, to fulfill the requirements for monitoring the physical, chemical, and biological characteristics of the ocean receiving waters within their ASBS. This regional approach shall characterize natural water quality, pre- and post-storm, in ocean reference areas near the mouths of identified open space watersheds and the effects of the discharges on natural water quality (physical, chemical, and toxicity) in the ASBS receiving waters, and should include benthic marine aquatic life and bioaccumulation components. The design of the ASBS stratum of a regional integrated monitoring program may deviate from the otherwise prescribed individual

monitoring approach (in Section IV.B.1) if approved by the State Water Board's Division of Water Quality and the Regional Water Boards.

a. Ocean reference areas shall be located at the drainages of flowing watersheds with minimal development (in no instance more than 10% development), and shall not be located in CWA Section 303(d) listed waterbodies or have tributaries that are 303(d) listed. Reference areas shall be free of wastewater discharges and anthropogenic non-storm water runoff. A minimum of low threat storm runoff discharges (e.g. stream highway overpasses and campgrounds) may be allowed on a case-by-case basis. Reference areas shall be located in the same region as the ASBS receiving water monitoring occurs. The reference areas for each Region are subject to approval by the participants in the regional monitoring program and the State Water Board's Division of Water Quality and the applicable Regional Water Board(s). A minimum of three ocean reference water samples must be collected from each station, each from a separate storm. A minimum of one reference location shall be sampled for each ASBS receiving water site sampled per responsible party. For parties discharging to ASBS in more than one Regional Water Board region, at a minimum, one reference station and one receiving water station shall be sampled in each region.

b. ASBS ocean receiving water must be sampled in the surf zone at the location where the runoff makes contact with ocean water (i.e. at "point zero"). Ocean receiving water stations must be representative of worst-case discharge conditions (i.e. co-located at a large drain greater than 36 inches, or if drains greater than 36 inches are not present in the ASBS then the largest drain greater than18 inches.) Ocean receiving water stations are subject to approval by the participants in the regional monitoring program and the State Water Board's Division of Water Quality and the applicable Regional Water Board(s). A minimum of three ocean receiving water samples must be collected during each storm season from each station, each from a separate storm. A minimum of one receiving water location shall be sampled in each ASBS per responsible party in that ASBS. For parties discharging to ASBS in more than one Regional Water Board region, at a minimum, one reference station and one receiving water station shall be sampled in each region.

c. Reference and receiving water sampling shall commence during the first full storm season following the adoption of these special conditions, and post-storm samples shall be collected when annual storm water runoff is sampled. Sampling shall occur in a minimum of two storm seasons. For those ASBS dischargers that have already participated in the Southern California Bight 2008 ASBS regional monitoring effort, sampling may be limited to only one storm season.

d. Receiving water and reference samples shall be analyzed for the same constituents as storm water runoff samples. At a minimum, constituents to be sampled and analyzed in reference and discharge receiving waters must include oil and grease, total suspended solids, Ocean Plan Table B metals for protection of marine life, Ocean Plan PAHs, pyrethroids, OP pesticides, ammonia, nitrate, phosphates, and critical life stage chronic toxicity for three species. In addition, within the range of the southern sea otter, indicator bacteria or some other measure of fecal contamination shall be analyzed.

3. Waterfront and Marine Operations: In addition to the above requirements for ocean receiving water monitoring, additional monitoring must be performed for marinas and boat launch and pier facilities:

a. For all marina or mooring field operators, in mooring fields with 10 or more occupied moorings, the ocean receiving water must be sampled for Ocean Plan indicator bacteria, residual chlorine, copper, zinc, grease and oil, methylene blue active substances (MBAS), and ammonia nitrogen.

   (1) For mooring field operators opting for an individual monitoring program (Section IV.B.1 above), this sampling must occur weekly (on the weekend) from May through October.

   (2) For mooring field operators opting to participate in a regional integrated monitoring program (Section IV.B.2 above), this sampling must occur monthly from May through October on a high use weekend in each month. The Water Boards may allow a reduction in the frequency of sampling, through the regional monitoring program, after the first year of monitoring.

b. For all mooring field operators, the subtidal sediment (sand or finer, if present) within mooring fields and below piers shall be sampled and analyzed for Ocean Plan Table B metals (for marine aquatic life beneficial use), acute toxicity, PAHs, and tributyltin. For sediment toxicity testing, only an acute toxicity test using the amphipod Eohaustorius estuarius must be performed. This sampling shall occur at least three times during a five (5) year period. For mooring field operators opting to participate in a regional integrated monitoring program, the Water Boards may allow a reduction in the frequency of sampling after the first sampling effort's results are assessed.

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ATTACHMENT B

STANDARD PERMIT PROVISIONS AND GENERAL PROVISIONS

1. Standard Permit Provisions

Code of Federal Regulations Title 40 Section 122.41 (40 CFR 122.41) includes conditions, or provisions, that apply to all National Pollutant Discharge Elimination System (NPDES) permits. Additional provisions applicable to NPDES permits are in 40 CFR 122.42. All applicable provisions in 40 CFR 122.41 and 40 CFR 122.42 must be incorporated into this Order and NPDES permit. The applicable 40 CFR 122.41 and 40 CFR 122.42 provisions are as follows:

a. DUTY TO COMPLY [40 CFR 122.41(a)]

The Copermittee must comply with all of the provisions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act (CWA) and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

(1) The Copermittee must comply with effluent standards or effective prohibitions established under Section 307(a) of the CWA for toxic pollutants and with standards for sewage sludge use or disposal established under Section 405(d) of the CWA within the time provided in the regulations that establish these standards or effective prohibitions or standards for sewage sludge use or disposal, even if the permit has not yet been modified to incorporate the requirement. [40 CFR 122.41(a)(1)]

(2) The CWA provides that any person who violates Section 301, 302, 306, 307, 308, 318 or 405 of the CWA, or any permit condition or limitation implementing any such sections in a permit issued under Section 402, or any requirement imposed in a pretreatment program approved under Section 402(a)(3) or 402(b)(8) of the CWA, is subject to a civil penalty not to exceed $25,000 per day for each violation. The CWA provides that any person who *negligently* violates Section 301, 302, 306, 307, 308, 318, or 405 of the CWA, or any condition or limitation implementing any of such sections in a permit issued under Section 402 of the CWA, or any requirement imposed in a pretreatment program approved under Section 402(a)(3) or 402(b)(8) of the CWA, is subject to criminal penalties of $2,500 to $25,000 per day of violation, or imprisonment of not more than 1 year, or both. In the case of a second or subsequent conviction for a negligent violation, a person shall be subject to criminal penalties of not more than $50,000 per day of violation, or by imprisonment of not more than 2 years, or both. Any person who *knowingly* violates such sections, or such conditions or limitations is subject to criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment for not more than 3 years, or both. In the case of a second or subsequent conviction for a knowing violation, a person shall be subject to criminal penalties of not more than $100,000 per day of violation, or imprisonment of not more than 6 years, or both. Any person who knowingly violates Section 301, 302, 303, 306, 307, 308, 318 or 405 of the CWA, or any permit condition or limitation implementing any of such sections in a permit issued under Section 402 of the CWA, and who knows at that time that he thereby places another person in imminent danger of death or serious bodily injury, shall, upon conviction, be subject to a fine of

not more than $250,000 or imprisonment of not more than 15 years, or both. In the case of a second or subsequent conviction for a knowing endangerment violation, a person shall be subject to a fine of not more than $500,000 or by imprisonment of not more than 30 years, or both. An organization, as defined in Section 309(c)(3)(B)(iii) of the CWA, shall, upon conviction of violating the imminent danger provision, be subject to a fine of not more than $1,000,000 and can be fined up to $2,000,000 for second or subsequent convictions.
[40 CFR 122.41(a)(2)]

(3) Any person may be assessed an administrative penalty by the San Diego Regional Water Quality Control Board (San Diego Water Board), State Water Resources Control Board (State Water Board), or United States Environmental Protection Agency (USEPA) for violating Section 301, 302, 306, 307, 308, 318 or 405 of the CWA, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of this Act. Administrative penalties for Class I violations are not to exceed $10,000 per violation, with the maximum amount of any Class I penalty assessed not to exceed $25,000. Penalties for Class II violations are not to exceed $10,000 per day for each day during which the violation continues, with the maximum amount of any Class II penalty not to exceed $125,000.
[40 CFR 122.41(a)(3)]

b. DUTY TO REAPPLY [40 CFR 122.41(b)]

If a Copermittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the Copermittee must apply for and obtain a new permit.

c. NEED TO HALT OR REDUCE ACTIVITY NOT A DEFENSE [40 CFR 122.41(c)]

It shall not be a defense for a Copermittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

d. DUTY TO MITIGATE [40 CFR 122.41(d)]

The Copermittee must take all reasonable steps to minimize or prevent any discharge or prevent any discharge or sludge use or disposal in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

e. PROPER OPERATION AND MAINTENANCE [40 CFR 122.41(e)]

The Copermittee must at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Copermittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems that are installed by a Copermittee only when the operation is necessary to achieve compliance with the conditions of this permit.

f. PERMIT ACTIONS [40 CFR 122.41(f)]

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Copermittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

g. PROPERTY RIGHTS [40 CFR 122.41(g)]

This permit does not convey any property rights of any sort, or any exclusive privilege.

h. DUTY TO PROVIDE INFORMATION [40 CFR 122.41(h)]

The Copermittee must furnish to the San Diego Water Board, State Water Board, or USEPA within a reasonable time, any information which the San Diego Water Board, State Water Board, or USPEA may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The Copermittee must also furnish to the San Diego Water Board, State Water Board, or USPEA upon request, copies of records required to be kept by this permit.

i. INSPECTION AND ENTRY [40 CFR 122.41(i)]

The Copermittee must allow the San Diego Water Board, State Water Board, USEPA, and/or their authorized representative (including an authorized contractor acting as their representative), upon presentation of credentials and other documents as may be required by law, to:

(1) Enter upon the Copermittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit; [40 CFR 122.41(i)(1)]

(2) Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit; [40 CFR 122.41(i)(2)]

(3) Inspect and photograph at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; [40 CFR 122.41(i)(3)] and

(4) Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the CWA, any substances or parameters at any location. [40 CFR 122.41(i)(4)]

j. MONITORING AND RECORDS [40 CFR 122.41(j)]

(1) Samples and measurements taken for the purpose of monitoring must be representative of the monitored activity. [40 CFR 122.41(j)(1)]

(2) Except for records of monitoring information required by this permit related to the Copermittee's sewage sludge use and disposal activities, which shall be retained for a period of at least five (5) years (or longer as required by 40 CFR Part 503), the

Copermittee must retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three (3) years from the date of the sample, measurement, report or application. This period may be extended by request of the San Diego Water Board at any time. [40 CFR 122.41(j)(2)]

(3) Records for monitoring information must include: [40 CFR 122.41(j)(3)]

(a) The date, exact place, and time of sampling or measurements; [40 CFR 122.41(j)(3)(i)]
(b) The individual(s) who performed the sampling or measurements; [40 CFR 122.41(j)(3)(ii)]
(c) The date(s) analyses were performed; [40 CFR 122.41(j)(3)(iii)]
(d) The individual(s) who performed the analyses; [40 CFR 122.41(j)(3)(iv)]
(e) The analytical techniques or methods used; [40 CFR 122.41(j)(3)(v)] and
(f) The results of such analyses. [40 CFR 122.41(j)(3)(vi)]

(4) Monitoring must be conducted according to test procedures under 40 CFR Part 136 unless another method is required under 40 CFR Subchapters N or O. [40 CFR 122.41(j)(4)]

In the case of pollutants for which there are no approved methods under 40 CFR Part 136 or otherwise required under 40 CFR Subchapters N and O, monitoring must be conducted according to a test procedure specified in the permit for such pollutants. [40 CFR 122.44(i)(1)(iv)]

(5) The CWA provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or both. [40 CFR 122.41(j)(5)]

k. SIGNATORY REQUIREMENT [40 CFR 122.41(k)]

(1) All applications, reports, or information submitted to the San Diego Water Board, State Water Board, or USEPA must be signed and certified. (See 40 CFR 122.22) [40 CFR 122.41(k)(1)]

(a) *For a municipality, State, Federal, or other public agency.* [All applications must be signed] [b]y either a principal executive officer or ranking elected official. [40 CFR 122.22(a)(3)]

(b) All reports required by permits, and other information requested by the San Diego Water Board, State Water Board, or USEPA must be signed by a person described in paragraph (a) of this section, or by a duly authorized representative of that person. A person is a duly authorized representative only if: [40 CFR 122.22(b)]

(i) The authorization is made in writing by a person described in paragraph (a) of this section; [40 CFR 122.22(b)(1)]

(ii) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company, (A duly authorized representative may thus be either a named individual or any individual occupying a named position.) [40 CFR 122.22(b)(2)] and,

(iii) The written authorization is submitted to the San Diego Water Board and State Water Board. [40 CFR 122.22(b)(3)]

(c) *Changes to authorization.* If an authorization under paragraph (b) of this section is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph (b) of this section must be submitted to the San Diego Water Board prior to or together with any reports, information, or applications to be signed by an authorized representative. [40 CFR 122.22(c)]

(d) *Certification.* Any person signing a document under paragraph (a) or (b) of this section shall make the following certification:

> "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations." [40 CFR 122.22(d)]

(2) The CWA provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or non-compliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both. [40 CFR 122.41(k)(2)]

I. REPORTING REQUIREMENTS [40 CFR 122.41(l)]

(1) *Planned changes.* The Copermittee must give notice to the San Diego Water Board as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when: [40 CFR 122.41(l)(1)]

(a) The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR 122.29(b); [40 CFR 122.41(l)(1)(i)] or

(b) The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which

are subject neither to effluent limitations in the permit, nor to notification requirements under 40 CFR 122.42(a)(1).
[40 CFR 122.41(l)(1)(ii)]

(c) The alteration or addition results in a significant change in the Copermittee's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan. [40 CFR 122.41(l)(1)(iii)]

(2) *Anticipated noncompliance*. The Copermittee must give advance notice to the San Diego Water Board or State Water Board of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.
[40 CFR 122.41(l)(2)]

(3) *Transfers*. This permit is not transferable to any person except after notice to the San Diego Water Board. The San Diego Water Board may require modification or revocation and reissuance of the permit to change the name of the Copermittee and incorporate such other requirements as may be necessary under the CWA.
[40 CFR 122.41(l)(3)]

(4) *Monitoring reports.* Monitoring results must be reported at the intervals specified elsewhere in this permit. [40 CFR 122.41(l)(4)]

(a) Monitoring results must be reported on a Discharge Monitoring Report (DMR) form or forms provided or specified by the San Diego Water Board or State Water Board for reporting results of monitoring of sludge use or disposal practices. [40 CFR 122.41(l)(4)(i)]

(b) If the Copermittee monitors any pollutant more frequently than required by the permit using test procedures approved under 40 CFR Part 136 or another method required for an industry-specific waste stream under 40 CFR Subchapters N or O, the results of this monitoring must be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the San Diego Water Board or State Water Board.
[40 CFR 122.41(l)(4)(ii)]

(c) Calculations for all limitations which require averaging of measurements must utilize an arithmetic mean unless otherwise specified in the permit.
[40 CFR 122.41(l)(4)(iii)]

(5) *Compliance schedules*. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit must be submitted no later than 14 days following each schedule date. [40 CFR 122.41(l)(5)]

(6) *Twenty-four hour reporting.*

(a) The Copermittee must report any noncompliance that may endanger health or the environment. Any information must be provided orally within 24 hours from the time the Copermittee becomes aware of the circumstances. A written submission must also be provided within five (5) days of the time the Copermittee becomes aware of the circumstances. The written submission must contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. [40 CFR 122.41(l)(6)(i)]

(b) The following must be included as information which must be reported within 24 hours under this paragraph: [40 CFR 122.41(l)(6)(ii)]

(i) Any unanticipated bypass that exceeds any effluent limitation in the permit (See 40 CFR 122.41(g)). [40 CFR 122.41(l)(6)(ii)(A)]
(ii) Any upset which exceeds any effluent limitation in the permit. [40 CFR 122.41(l)(6)(ii)(B)] and,
(iii) Violation of a maximum daily discharge limitation for any of the pollutants listed by the San Diego Water Board in the permit to be reported within 24 hours. (See 40 CFR 122.44(g)) [40 CFR 122.41(l)(6)(ii)(C)]

(c) The San Diego Water Board may waive the above-required written report on a case-by-case basis if the oral report has been received within 24 hours. [40 CFR 122.41(l)(6)(iii)]

(7) *Other noncompliance.* The Copermittee must report all instances of noncompliance not reported in accordance with the standard provisions required under 40 CFR 122.41(l)(4), (5), and (6), at the time monitoring reports are submitted. The reports must contain the information listed in the standard provisions required under 40 CFR 122.41(l)(6). [40 CFR 122.41(l)(7))]

(8) *Other information.* When the Copermittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the San Diego Water Board, State Water Board, or USEPA, the Copermittee must promptly submit such facts or information. [40 CFR 122.41(l)(8)]

~~**m. BYPASS** [40 CFR 122.41(m)]~~

~~(1) *Definitions.*~~

~~(a) "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility. [40 CFR 122.41(m)(1)(i)] or~~

~~(b) "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be~~

Comment [A126]: While this is a standard condition for NPDES permits, it is manifestly inapplicable to MS4 permits. Since BMPs constructed to comply with the Order include bypass provisions to protect their entirety, the Copermittees would have to notify the Regional Board whenever a storm was predicted. This provision should be deleted.

~~expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.~~
~~[40 CFR 122.41(m)(1)(ii)]~~

~~(2) *Bypass not exceeding limitations*. The Copermittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the standard provisions required under 40 CFR 122.41(m)(3) and (4).~~
~~[40 CFR 122.41(m)(2)]~~

~~(3) *Notice.*~~

~~(a) *Anticipated bypass*. If the Copermittee knows in advance of the need for a bypass, it must submit a notice, if possible at least ten days before the date of the bypass. [40 CFR 122.41(m)(3)(i)] or~~

~~(b) *Unanticipated bypass*. The Copermittee must submit notice of an unanticipated bypass in accordance with the standard provisions required under 40 CFR 122.41(l)(6) (24-hour notice).~~
~~[40 CFR 122.41(m)(3)(ii)]~~

~~(4) *Prohibition of Bypass.*~~

~~(a) Bypass is prohibited, and the San Diego Water Board may take enforcement action against a Copermittee for bypass, unless:~~
~~[40 CFR 122.41(m)(4)(i)]~~

~~(i) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage; [40 CFR 122.41(m)(4)(i)(A)]~~
~~(ii) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance;~~
~~[40 CFR 122.41(m)(4)(i)(B)] and,~~
~~(iii) The Copermittee submitted notice in accordance with the standard provisions required under 40 CFR 122.41(m)(3).~~
~~[40 CFR 122.41(m)(4)(i)(C)]~~

~~(b) The San Diego Water Board may approve an anticipated bypass, after considering its adverse effects, if the San Diego Water Board determines that it will meet the three conditions listed above.~~
~~[40 CFR 122.41(m)(4)(ii)]~~

~~n.~~m. **UPSET** [40 CFR 122.41(n)]

(1) *Definition.* "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the Copermittee. An upset does not

include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation. [40 CFR 122.41(n)(1)]

(2) *Effect of an upset*. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the standard provisions required under 40 CFR 122.41(n)(3) are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review. [40 CFR 122.41(n)(2)]

(3) *Conditions necessary for a demonstration of upset*. A Copermittee who wishes to establish the affirmative defense of upset must demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that: [40 CFR 122.41(n)(3)]

(a) An upset occurred and that the Copermittee can identify the cause(s) of the upset; [40 CFR 122.41(n)(3)(i)]
(b) The permitted facility was at the time being properly operated; [40 CFR 122.41(n)(3)(ii)] and
(c) The Copermittee submitted notice of the upset in accordance with the standard provisions required under 40 CFR 122.41(l)(6)(ii)(B) (24-hour notice). [40 CFR 122.41(n)(3)(iii)]
(d) The Copermittee complied with any remedial measures pursuant to the standard provisions required under 40 CFR 122.41(d). [40 CFR 122.41(n)(3)(iii)]

(4) *Burden of proof*. In any enforcement proceeding, the Copermittee seeking to establish the occurrence of an upset has the burden of proof. [40 CFR 122.41(n)(4)]

~~o.~~n. STANDARD PERMIT PROVISIONS FOR MUNICIPAL SEPARATE STORM SEWER SYSTEMS
[40 CFR 122.42(c)]

The operator of a large or medium municipal separate storm sewer system or a municipal separate storm sewer that has been designated by the San Diego Water Board or State Water Board under 40 CFR 122.26(a)(1)(v) must submit an annual report by the anniversary of the date of the issuance of the permit for such system. The report must include:

(1) The status of implementing the components of the storm water management program that are established as permit conditions; [40 CFR 122.42(c)(1)]

(2) Proposed changes to the storm water management programs that are established as permit conditions. Such proposed changes must be consistent with 40 CFR 122.26(d)(2)(iii); [40 CFR 122.42(c)(2)] and

(3) Revisions, if necessary, to the assessment of controls and the fiscal analysis reported in the permit application under 40 CFR 122.26(d)(2)(iv) and (v); [40 CFR 122.42(c)(3)]

(4) A summary of data, including monitoring data, that is accumulated throughout the reporting year; [40 CFR 122.42(c)(4)]

(5) Annual expenditures and budget for year following each annual report; [40 CFR 122.42(c)(5)]

(6) A summary describing the number and nature of enforcement actions, inspections, and public education programs; [40 CFR 122.42(c)(6)]

(7) Identification of water quality improvements or degradation. [40 CFR 122.42(c)(7)]

~~p.~~o. **STANDARD PERMIT PROVISIONS FOR STORM WATER DISCHARGES** [40 CFR 122.42(d)]

The initial permits for discharges composed entirely of storm water issued pursuant to 40 CFR 122.26(e)(7) must require compliance with the conditions of the permit as expeditiously as practicable, but in no event later than three years after the date of issuance of the permit.

2. General Provisions

In addition to the standard provisions required to be incorporated into the Order and NPDES permit pursuant to 40 CFR 122.41 and 40 CFR 122.42, several other general provisions apply to this Order. The general provisions applicable to this Order and NPDES permit are as follows:

a. DISCHARGE OF WASTE IS A PRIVILEGE

No discharge of waste into the waters of the State, whether or not such discharge is made pursuant to waste discharge requirements, shall create a vested right to continue such discharge. All discharges of waste into waters of the State are privileges, not rights. [CWC Section 13263(g)]

b. DURATION OF ORDER AND NPDES PERMIT

(1) *Effective date*. This Order and NPDES permit becomes effective on the 50th day after its adoption provided the USEPA has no objection. If the USEPA objects to its issuance, this Order shall not become effective until such objection is withdrawn. This Order supersedes Order No. R9-2007-0001 upon the effective date of this Order, and supersedes Order Nos. R9-2009-0002 and R9-2010-0016 upon their expiration or earlier notice of coverage.

(2) *Expiration*. This Order and NPDES permit expires five years after its effective date. [40 CFR 122.46(a)]

(3) *Continuation of expired order*. After this Order and NPDES permit expires, the terms and conditions of this Order and NPDES permit are automatically continued pending issuance of a new permit if all requirements of the federal NPDES regulations on the continuation of expired permits (40 CFR 122.6) are complied with.

c. AVAILABILITY

A copy of this Order must be kept at a readily accessible location and must be available to on-site personnel at all times.

d. CONFIDENTIALITY OF INFORMATION

Except as provided for in 40 CFR 122.7, no information or documents submitted in accordance with or in application for this Order will be considered confidential, and all such information and documents shall be available for review by the public at the San Diego Water Board office.

Claims of confidentiality for the following information will be denied:
[40 CFR 122.7(b)]

(1) The name and address of any permit applicant or Copermittee;
[40 CFR 122.7(b)(1)] and

(2) Permit applications and attachments, permits, and effluent data.
[40 CFR 122.7(b)(2)]

e. EFFLUENT LIMITATIONS

(1) *Interim effluent limitations*. The Copermittee must comply with any interim effluent limitations as established by addendum, enforcement action, or revised waste discharge requirements which have been, or may be, adopted by the San Diego Water Board.

(2) *Other effluent limitations and standards*. If any applicable toxic effluent standard or effective prohibition (including any schedule of compliance specified in such effluent standard or effective prohibition) is promulgated under Section 307(a) of the CWA for a toxic pollutant and that standard or effective prohibition is more stringent than any limitation on the pollutant in the permit, the San Diego Water Board shall institute proceedings under these regulations to modify or revoke and reissue the permit to conform to the toxic effluent standard or effective prohibition. [40 CFR 122.44(b)(1~~)])]~~)].~~)]~~

f. DUTY TO MINIMIZE OR CORRECT ADVERSE IMPACTS

The Copermittee must take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with this Order, including such accelerated or additional monitoring as may be necessary to determine the nature and impact of the noncompliance.

g. PERMIT ACTIONS

The filing of a request by the Copermittee for modification, revocation and reissuance, or termination of this Order, or a notification of planned change in or anticipated noncompliance with this Order does not stay any condition of this Order. (See 40 CFR 122.41(f)) In addition, the following provisions apply to this Order:

(1) Upon application by any affected person, or on its own motion, the San Diego Water Board may review and revise the requirements in this Order. All requirements must be reviewed periodically. [CWC Section 13263(e)]

(2) This Order may be terminated or modified for cause, including, but not limited to, all of the following: [CWC Section 13381]

   (a) Violation of any condition contained in the requirements of this Order. [CWC Section 13381(a)]

   (b) Obtaining the requirements in this Order by misrepresentation, or failure to disclose fully all relevant facts. [CWC Section 13381(b)]

   (c) A change in any condition that requires either a temporary or permanent reduction or elimination of the permitted discharge. [CWC Section 13381(c)]

(3) When this Order is transferred to a new owner or operator, such requirements as may be necessary under the CWC may be incorporated into this Order.

h. NPDES PERMITTED NON-STORM WATER DISCHARGES

The San Diego Water Board has, in prior years, issued a limited number of individual NPDES permits for non-storm water discharges to MS4s. The San Diego Water Board or State Water Board may in the future, upon prior notice to the Copermittee(s), issue an NPDES permit for any non-storm water discharge (or class of non-storm water discharges) to an MS4. A Copermittee will not be held responsible for pollutants in its MS4 discharge originating from an NPDES-permitted non-storm water discharge.

Comment [A127]: This comment reflects the appropriate responsibility between NPDES dischargers.

i. MONITORING

In addition to the standard provisions required under 40 CFR 122.41(j) and (l)(4), the following general monitoring provisions apply to this Order:

(1) Where procedures are not otherwise specified in Order, sampling, analysis and quality assurance/quality control must be conducted in accordance with the Quality Assurance Management Plan (QAMP) for the State of California's Surface Water Ambient Monitoring Program (SWAMP), adopted by the State Water Resources Control Board (State Water Board).

(2) Pursuant to 40 CFR 122.41(j)(2) and CWC Section 13383(a), each Copermittee must retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least five (5) years from the date of the sample, measurement, report or application. This period may be extended by request of the San Diego Water Board at any time.

Comment [A128]: This provision and the provision in Attachment B 1.j(2) conflict. The Water Board should reconcile these provisions or delete one.

(3) All chemical, bacteriological, and toxicity analyses must be conducted at a laboratory certified for such analyses by the California Department of Public Health or a laboratory approved by the San Diego Water Board.

(4) For priority toxic pollutants that are identified in the California Toxics Rule (CTR) (65 Fed. Reg. 31682), the Copermittees must instruct their laboratories to establish calibration standards that are equivalent to or lower than the Minimum Levels (MLs) published in Appendix 4 of the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SIP). If a Copermittee can demonstrate that a particular ML is not attainable, in accordance with procedures set forth in 40 CFR Part 136, the lowest quantifiable concentration of the lowest calibration standard analyzed by a specific analytical procedure (assuming that all the method specified sample weights, volumes, and processing steps have been followed) may be used instead of the ML listed in Appendix 4 of the SIP. The Copermittee must submit documentation from the laboratory to the San Diego Water Board for approval prior to raising the ML for any priority toxic pollutant.

j. ENFORCEMENT

(1) The San Diego Water Board is authorized to enforce the terms of this Order under several provisions of the CWC, including, but not limited to, CWC Sections 13385, 13386, and 13387.

(2) Nothing in this Order shall be construed to protect the Copermittee from its liabilities under federal, state, or local laws.

(3) The CWC provides for civil and criminal penalties comparable to, and in some cases greater than, those provided for under the CWA.

(4) Except as provided in the standard conditions required under 40 CFR 122.41(m) and (n), nothing in this Order shall be construed to relieve the Copermittee from civil or criminal penalties for noncompliance.

(5) Nothing in this Order shall be construed to preclude the institution of any legal action or relieve the Copermittee from any responsibilities, liabilities, or penalties to which the Copermittee is or may be subject to under Section 311 of the CWA.

(6) Nothing in this Order shall be construed to preclude institution of any legal action or relieve the Copermittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authoring preserved by Section 510 of the CWA.

k. SEVERABILITY

The provisions of this Order are severable, and if any provision of this Order, or the application of any provisions of this Order to any circumstance, is held invalid, the application of such provision to other circumstances and the remainder of this Order shall not be affected thereby.

l. APPLICATIONS

Any application submitted by a Copermittee for reissuance or modification of this Order must satisfy all applicable requirements specified in federal regulations as well as any additional requirements for submittal of a Report of Waste Discharge specified in the CWC and the California Code of Regulations.

m. IMPLEMENTATION

All plans, reports and subsequent amendments submitted in compliance with this Order must be implemented immediately (or as otherwise specified). All submittals by Copermittees must be adequate to implement the requirements of this Order.

n. REPORT SUBMITTALS

(1) All report submittals must include an executive summary, introduction, conclusion, recommendations, and signed certified statement.

(2) Each Copermittee must submit a signed certified statement covering its responsibilities for each applicable submittal.

(3) The Principal Watershed Copermittee(s) must submit a signed certified statement covering its responsibilities for each applicable submittal and the sections of the submittals for which it is responsible.

(4) Unless otherwise directed, the Copermittees must submit one hard copy and one electronic copy of each report required under this Order to the San Diego Water Board, and one electronic copy to the USEPA.

(5) The Copermittees must submit reports and provide notifications as required by this Order to the following:

EXECUTIVE OFFICER
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION
9174 SKY PARK COURT, SUITE 100
SAN DIEGO CA 92123-4340
Telephone: (858) 467-2952   Fax: (858) 571-6972

EUGENE BROMLEY
US ENVIRONMENTAL PROTECTION AGENCY
REGION IX
PERMITS ISSUANCE SECTION (W-5-1)
75 HAWTHORNE STREET
SAN FRANCISCO CA 94105

ATTACHMENT C

ACRONYMS AND ABBREVIATIONS

AMAL	Average Monthly Action Level
ASBS	Area(s) of Special Biological Significance
BMP	Best Management Practice
Basin Plan	Water Quality Control Plan for the San Diego Basin
CEQA	California Environmental Quality Act
CCR	California Code of Regulations
CFR	Code of Federal Regulations
CWA	Clean Water Act
CWC	California Water Code
CZARA	Coastal Zone Act Reauthorization Amendments of 1990
ESAs	Environmentally Sensitive Areas
GIS	Geographic Information System
IBI	Index of Biological Integrity
LID	Low Impact Development
MDAL	Maximum Daily Action Level
MEP	Maximum Extent Practicable
MS4	Municipal Separate Storm Sewer System
NAL	Non-Storm Water Action Level
NAICS	North American Industry Classification System
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
ROWD	Report of Waste Discharge (application for NPDES reissuance)
SAL	Storm Water Action Level
San Diego Water Board	California Regional Water Quality Control Board, San Diego Region
SIC	Standard Industrial Classification Code
State Water Board	State Water Resources Control Board
TMDL	Total Maximum Daily Load
USEPA	United States Environmental Protection Agency
WDID	Waste Discharge Identification Number
WLA	Waste Load Allocation
WQBEL	Water Quality Based Effluent Limitation

DEFINITIONS

Active/Passive Sediment Treatment - Using mechanical, electrical or chemical means to flocculate or coagulate suspended sediment for removal from runoff from construction sites prior to discharge.

Anthropogenic Litter – Trash generated from human activities, not including sediment.

Automotive Repair Shop – a facility that is categorized in any one of the following Standard Industrial Classification (SIC) codes: 5013, 5014, 5541, 7532-7534, or 7536-7539 or equivalent NAICS code.

Average Monthly Action Level – The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month, or the geometric mean for bacteria, as applicable.

Beneficial Uses - The uses of water necessary for the survival or wellbeing of man, plants, and wildlife. These uses of water serve to promote tangible and intangible economic, social, and environmental goals. "Beneficial Uses" ~~of the waters of the State~~ that may be protected include, but are not limited to, domestic, municipal, agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves. Existing beneficial uses are uses that were attained in the surface or ground water on or after November 28, 1975; and potential beneficial uses are uses that would probably develop in future years through the implementation of various control measures. "Beneficial Uses" are equivalent to "Designated Uses" under federal law. [California Water Code Section 13050(f)].

Best Management Practices (BMPs) - Defined in 40 CFR 122.2 as schedules of activities, effective prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs also include treatment requirements, operating procedures and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. In the case of municipal discharge permits, BMPs may be used in the place of numeric effluent limits.

Bioassessment - The use of biological community information to evaluate the biological integrity of a water body and its watershed. With respect to aquatic ecosystems, bioassessment is the collection and analysis of samples of the benthic macroinvertebrate community together with physical/habitat quality measurements associated with the sampling site and the watershed to evaluate the biological condition (i.e. biotic integrity) of a water body.

Biofiltration - Practices that use vegetation and amended soils to detain and treat runoff from impervious areas. Treatment is through filtration, infiltration, adsorption, ion exchange, and biological uptake of pollutants.

Biological Integrity - Defined in Karr J.R. and D.R. Dudley. 1981. Ecological perspective on water quality goals. *Environmental Management* 5:55-68 as: "A balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of natural habitat of the region." Also referred to as ecosystem health.

BMP Design Manual – A plan developed to eliminate, reduce, or mitigate the impacts of runoff from development projects, including Priority Development Projects.

Channel Rehabilitation and Improvement – Remedial measures or activities for the purpose of improving or restoring the environmental health of streams, channels or river systems. Techniques may vary from in-stream restoration techniques to off-line stormwater management practices installed in the system corridor or upland areas. Rehabilitation techniques may include, but are not limited to the following: riparian zone restoration, constructed wetlands, bank stabilization, channel modifications, and day lighting of drainage systems.

Comment [A129]: This term should be defined in Attachment C given its use in the Order.

Clean Water Act Section 303(d) Water Body - An impaired water body in which water quality does not meet applicable water quality standards and/or is not expected to meet water quality standards, even after the application of technology based pollution controls required by the CWA. The discharge of runoff to these water bodies by the Copermittees is significant because these discharges can cause or contribute to violations of applicable water quality standards.

Construction Site – Any project, including projects requiring coverage under the Construction General Permit, that involves soil disturbing activities greater than 10,000 square feet including, but not limited to, clearing, grading, disturbances to ground such as stockpiling, and excavation. This does not include interior construction activities such as interior remodeling, plumbing, electrical, or mechanical work.

Contamination - As defined in the Porter-Cologne Water Quality Control Act, contamination is "an impairment of the quality of waters of the State by waste to a degree which creates a hazard to the public health through poisoning or through the spread of disease. 'Contamination' includes any equivalent effect resulting from the disposal of waste whether or not waters of the State are affected."

Copermittee – An incorporated city within the County of Orange, County of Riverside, or County of San Diego in the San Diego Region~~,~~ (Region 9), ~~,~~ the County of Orange, the County of Riverside, the County of San Diego, the Orange County Flood Control District, the Riverside County Water Conservation and Flood Control District, the San Diego Regional Airport Authority, or the San Diego Unified Port District. See also "Municipal Copermittee" and "Special District Copermittee".

Comment [A130]: As set forth above, the Riverside County Copermittees make a distinction in these classes of Copermittees based on their respective legal authorities.

Copermittees – All of the individual Copermittees, collectively, unless the obligation in question is directed to one or a sub-group of Copermittees.

Comment [A131]: This clarifies that not all obligations in the Order directed to "Copermittees" are in fact applicable to all Copermittees.

Critical Channel Flow (Qc) – The channel flow that produces the critical shear stress that initiates bed movement or that erodes the toe of channel banks. When measuring Qc, it should be based on the weakest boundary material – either bed or bank.

Daily Discharge – Defined as either: (1) the total mass of the constituent discharged over the calendar day or any 24 hour period that reasonably represents a calendar day for purposes of sampling (as specified in the permit), for a constituent with limitations expressed in units of mass or; (2) the unweighted arithmetic mean measurement of the constituent over the day for a constituent with limitations expressed in other units of measurement (e.g. concentration.)

The Daily Discharge may be determined by the analytical results of a composite sample taken over the course of one day (a calendar day, or other 24 hour period other than a day), or by the arithmetic mean of analytical results from one or more grab samples taken over the course of a day.

Development Projects - Construction, rehabilitation, redevelopment, or reconstruction of any public or private residential project, industrial~~,~~ or commercial facility, or any other projects designed for post-construction human activity or occupation and involving land disturbance activities.

Direct Discharge to an Environmentally Sensitive Area – refers to outflow from a drainage conveyance system that collects runoff from the subject development or redevelopment site and terminates at or in receiving waters within the ESA, and is not commingled with flows from adjacent or other upstream lands.

Dry Season –May 1 to September 30.

Dry Weather – Weather is considered dry if the preceding 72 hours has been without measurable precipitation (>0.1 inch).

Enclosed Bays – Enclosed bays are indentations along the coast that enclose an area of oceanic water within distinct headlands or harbor works. Enclosed bays include all bays where the narrowest distance between the headlands or outermost bay works is less than 75 percent of the greatest dimension of the enclosed portion of the bay. Enclosed bays do not include inland surface waters or ocean waters.

Erosion – When land is diminished or worn away due to wind, water, or glacial ice. Often the eroded debris (silt or sediment) becomes a pollutant via storm water runoff. Erosion occurs naturally but can be intensified by land clearing activities such as farming, development, road building, and timber harvesting. This permit is concerned particularly with non-naturally occurring Erosion that eventually results in a Sediment discharge from MS4s into Receiving Waters.

Environmentally Sensitive Areas (ESAs) - Areas that include but are not limited to all Clean Water Act Section 303(d) impaired water bodies; areas designated as Areas of Special Biological Significance by the State Water Board and San Diego Water Board; State Water Quality Protected Areas; water bodies designated with the RARE beneficial use by the State Water Board and San Diego Water Board; areas designated as preserves or their equivalent under the Natural Communities Conservation Program within the Cities and County of Orange; and any other equivalent environmentally sensitive areas which have been identified by the Copermittees.

Estuaries – Waters, including coastal lagoons, located at the mouth of streams that serve as areas of mixing fresh and ocean waters. Coastal lagoons and mouths of streams that are temporarily separated from the ocean by sandbars shall be considered estuaries. Estuarine waters shall be considered to extend from a bay or the open ocean to a point upstream where there is no significant mixing of fresh water and ocean water. Estuaries do not include inland surface waters or ocean waters.

Existing Development – Any area that has been developed and exists for municipal, commercial, industrial, or residential purposes, uses, or activities. May include areas that are not actively used for its originally developed purpose, but may be re-purposed or redeveloped

Comment [A132]: This definition clarifies the nature of Development Projects covered under the Order.

for another use or activity.

Flow Duration – The long-term period of time that flows occur above a threshold that causes significant sediment transport and may cause excessive erosion damage to creeks and streams (not a single storm event duration). The simplest way to visualize this is to consider a histogram of pre- and post-project flows using long-term records of hourly data. To maintain pre-development flow duration means that the total number of hours (counts) within each range of flows in a flow-duration histogram cannot increase between the pre- and post-development condition. Flow duration within the range of geomorphologically significant flows is important for managing erosion.

Grading - The cutting and/or filling of the land surface to a desired slope or elevation.

Hazardous Material – Any substance that poses a threat to human health or the environment due to its toxicity, corrosiveness, ignitability, explosive nature or chemical reactivity. These also include materials named by the USEPA in 40 CFR 116 to be reported if a designated quantity of the material is spilled into the waters of the U.S. or emitted into the environment.

Hazardous Waste - Hazardous waste is defined as "any waste which, under Section 600 of Title 22 of this code, is required to be managed according to Chapter 30 of Division 4.5 of Title 22 of this code" [CCR Title 22, Division 4.5, Chapter 11, Article 1].

Household Hazardous Waste – Paints, cleaning products, and other hazardous wastes generated during home improvement or maintenance activities.

Hydromodification – The change in the natural watershed hydrologic processes and runoff characteristics (i.e., interception, infiltration, overland flow, and groundwater flow) caused by urbanization or other land use changes that result in increased stream flows and sediment transport. In addition, alteration of stream and river channels, such as stream channelization, concrete lining, installation of dams and water impoundments, and excessive streambank and shoreline erosion are also considered hydromodification, due to their disruption of natural watershed hydrologic processes.

Illicit Connection – Any connection to the MS4 that conveys an illicit discharge.

Illicit Discharge - Any discharge to the MS4 that is not composed entirely of storm water except discharges pursuant to a NPDES permit and discharges resulting from fire fighting activities [40 CFR 122.26(b)(2)]. Discharges from natural sources or from conditionally exempt sources described in this Order are not considered Illicit Discharges.

Inactive Areas – Areas of construction activity that are not active and those that have been active and are not scheduled to be re-disturbed for at least 14 days.

Infiltration – Water other than wastewater that enters a sewer system (including sewer service connections and foundation drains) from the ground through such means as defective pipes, pipe joints, connections, or manholes. Infiltration does not include, and is distinguished from, inflow [40 CFR 35.2005(20)].

Comment [A133]: Wrong definition. Should be defining infiltration (of stormwater into soil)

Inland Surface Waters – Includes all surface waters of the U.S.~~State~~ that do not include the ocean, enclosed bays, or estuaries.

Jurisdictional Runoff Management Program Document – A written description of the specific jurisdictional runoff management measures and programs that each Copermittee will implement to comply with this Order and ensure that illicit discharges are effectively prohibited, and storm water pollutant discharges in runoff are reduced to the MEP and do not cause or contribute to a violation of water quality standards.

Low Impact Development (LID) – A storm water management and land development strategy that emphasizes conservation and the use of on-site natural features integrated with engineered, small-scale hydrologic controls to more closely reflect pre-development hydrologic functions.

Low Impact Development Best Management Practices (LID BMPs) – LID BMPs include schedules of activities, effective prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States through storm water management and land development strategies that emphasize conservation ~~s~~and the use of on-site natural features integrated with engineered, small-scale hydrologic controls to more closely reflect pre-development hydrologic functions. LID BMPs include retention practices that do not allow runoff, such as infiltration, rain water harvesting and reuse, and evapotranspiration. LID BMPs also include flow-through practices such as biofiltration that may have some discharge of storm water following pollutant reduction.

Major Outfall – As defined in the Code of Federal Regulations, a major outfall is a MS4 outfall that discharges from a single pipe with an inside diameter of 36 inches or more or its equivalent (i.e. discharge from a single conveyance other than a circular pipe which is associated with a drainage area of more than 50 acres); or, for MS4s that receive storm water from lands zoned for industrial activity (based on comprehensive zoning plans or equivalent), a MS4 outfall that discharges from a single pipe with an inside diameter of 12 inches or more or from its equivalent (i.e. discharge from other than a circular pipe associated with a drainage area of 2 acres or more).

Maximum Daily Action Level (MDAL) –The highest allowable daily discharge of a pollutant, over a calendar day (or 24 hour period). For pollutants with action levels expressed in units of mass, the daily discharge is calculated as the total mass of the pollutant discharged over the day. For pollutants with action levels expressed in other units of measurement, the daily discharge is calculated as the arithmetic mean measurement of the pollutant over the day.

Maximum Extent Practicable (MEP) – The technology-based standard established by Congress in CWA section 402(p)(3)(B)(iii) ~~for storm water~~ that operators of MS4s must meet. Technology-based standards establish the level of pollutant reductions that dischargers must achieve, typically by treatment or by a combination of source control and treatment control BMPs. MEP generally emphasizes pollution prevention and source control BMPs primarily (as the first line of defense) in combination with treatment methods serving as a backup (additional line of defense). MEP considers economics and is generally, but not necessarily, less stringent than BAT. A definition for MEP is not provided either in the statute or in the regulations. Instead the definition of MEP is dynamic and will be defined by the following process over time: municipalities propose their definition of MEP by way of their runoff management programs. Their total collective and individual activities conducted pursuant to the runoff management programs becomes their proposal for MEP as it applies both to their overall effort, as well as to specific activities (e.g., MEP for street sweeping, or MEP for MS4 maintenance). In the absence of a proposal acceptable to the San Diego Water Board, the San Diego Water Board defines MEP.

In a memo dated February 11, 1993, entitled "Definition of Maximum Extent Practicable," Elizabeth Jennings, Senior Staff Counsel, SWRCB addressed the achievement of the MEP standard as follows:

"*To achieve the MEP standard, municipalities must employ whatever Best Management Practices (BMPs) are technically feasible (i.e., are likely to be effective) and are not cost prohibitive. The major emphasis is on technical feasibility. Reducing pollutants to the MEP means choosing effective BMPs, and rejecting applicable BMPs only where other effective BMPs will serve the same purpose, or the BMPs would not be technically feasible, or the cost would be prohibitive. In selecting BMPs to achieve the MEP standard, the following factors may be useful to consider:*

a. Effectiveness: Will the BMPs address a pollutant (or pollutant source) of concern?
b. Regulatory Compliance: Is the BMP in compliance with storm water regulations as well as other environmental regulations?
c. Public Acceptance: Does the BMP have public support?
d. Cost: Will the cost of implementing the BMP have a reasonable relationship to the pollution control benefits to be achieved?
e. Technical Feasibility: Is the BMP technically feasible considering soils, geography, water resources, etc.?

The final determination regarding whether a municipality has reduced pollutants to the maximum extent practicable can only be made by the Regional or State Water Boards, and not by the municipal discharger. If a municipality reviews a lengthy menu of BMPs and chooses to select only a few of the least expensive, it is likely that MEP has not been met. On the other hand, if a municipal discharger employs all applicable BMPs except those where it can show that they are not technically feasible in the locality, or whose cost would exceed any benefit derived, it would have met the standard. Where a choice may be made between two BMPs that should provide generally comparable effectiveness, the discharger may choose the least expensive alternative and exclude the more expensive BMP. However, it would not be acceptable either to reject all BMPs that would address a pollutant source, or to pick a BMP based solely on cost, which would be clearly less effective. In selecting BMPs the municipality must make a serious attempt to comply and practical solutions may not be lightly rejected. In any case, the burden would be on the municipal discharger to show compliance with its permit. After selecting a menu of BMPs, it is the responsibility of the discharger to ensure that all BMPs are implemented."

Monitoring Year – October 1 to September 30

Municipal Copermittee – Any Copermittee, exclusive of Special District Copermittees.

Comment [A134]: This definition clarifies distinction between municipal and special district copermittees.

Municipal Separate Storm Sewer System (MS4) – A conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains): (i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or designated and approved management agency under section 208 of the CWA that discharges to waters of the United States; (ii) Designated or used for collecting or conveying storm water;

(iii) Which is not a combined sewer; (iv) Which is not part of the Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2~~6~~. Copermittees need only comply with permit conditions relating to "discharges from the municipal separate storm sewers for which they are operators." 40 CFR 122.26(a)(vi).

Comment [A135]: These changes correct a citation and clarifies the responsibility of the copermittees as to other MS4s.

National Pollutant Discharge Elimination System (NPDES) - The national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under Sections 307, 318, 402, and 405 of the CWA.

Non-Storm Water - All discharges to and from a MS4 that do not originate from precipitation events (i.e., all discharges from a MS4 other than storm water). ~~Non-storm water includes illicit discharges and NPDES permitted discharges.~~

Comment [A136]: This is overly limiting, There are other types of Non-storm discharges that do not fit these two categories (e.g. irrigated agriculture, natural flows, conditionally exempt flows, others). Rather than trying to identify all types of non-stormwater discharges, suggest just deleting this sentence.

Nuisance - As defined in the Porter-Cologne Water Quality Control Act, a nuisance is "anything which meets all of the following requirements: 1) Is injurious to health, or is indecent, or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property. 2) Affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal. 3) Occurs during, or as a result of, the treatment or disposal of wastes."

Ocean Waters – the territorial marine waters of the State as defined by California law to the extent these waters are outside of enclosed bays, estuaries, and coastal lagoons. Discharges to ocean waters are regulated in accordance with the State Board's California Ocean Plan.

Order – Unless otherwise specified, refers to this Order, Order No. R9-2013-0001 (NPDES No. CAS0109266)

Outfall – *Outfall* means a *point source* as defined by 40 CFR 122.2 at the point where a MS4 discharges to waters of the United States and does not include open conveyances connecting two MS4s, or pipes, tunnels or other conveyances which connect segments of the same stream or other waters of the United States and are used to convey waters of the United. 40 CFR 122.26(b)(9).

Comment [A137]: This federal regulatory definition clarifies the nature of an outfall.

Parking Lot – a land area or facility for the tempraory parking or storage of motor vehicles used personally, for business, or for commerce.

Comment [A138]: Definition placed in Attachment C for consistency.

Persistent Flow - Persistent flow is defined as the presence of an MS4 discharge that is hydraulically connected to a flowing~~, pooled, or ponded~~ receiving water more than 72 hours after a measureable rainfall event of 0.1 inch or greater during three consecutive monitoring and/or inspection events. All other flowing, pooled, or ponded water is considered transient.

Comment [A139]: Changes reflect the necessity of a connection to flowing receiving waters. Discharges that are pooled are not discharges to waters of the United States. Please see Comment Letter section 3.5.3.

Person - A person is defined as an individual, association, partnership, corporation, municipality, State or Federal agency, or an agent or employee thereof [40 CFR 122.2].

Point Source - Any discernible, confined, and discrete conveyance, including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operations, landfill leachate collection systems, vessel, or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.

Pollutant - Any agent that may cause or contribute to the degradation of water quality such that a condition of pollution or contamination is created or aggravated.

Pollution - As defined in the Porter-Cologne Water Quality Control Act, pollution is "the alteration of the quality of the waters of the State by waste, to a degree that unreasonably affects the either of the following: 1) The waters for beneficial uses; or 2) Facilities that serve these beneficial uses." Pollution may include contamination.

Pollution Prevention - Pollution prevention is defined as practices and processes that reduce or eliminate the generation of pollutants, in contrast to source control BMPs, treatment control BMPs, or disposal.

Pre-Project~~Development~~ Runoff Conditions – Runoff conditions that exist~~existed~~ onsite immediately before the ~~existing development was constructed, or exists onsite before~~ planned development activities occur. Pre-development is not intended to be interpreted as that period before any human-induced land disturbance has occurred. 64 FR 68761.

Comment [A140]: This definition reflects the exact language used by U.S. EPA in the Federal Register. Moreover, it avoids the constitutional and statutory problems with requiring developers to mitigate for impacts not attributable to their project. It also is consistent with the CEQA standard for project impact mitigation.

Priority Development Projects - New development and redevelopment projects defined under Provision E.3.b of Order No. R9-2012-0011.

Properly Designed – Designed in accordance with the Copermittee's BMP Design Manual and/or any appropriate design requirements set forth by the Copermittee and based on widely accepted design criteria and in accordance with this Order.

Comment [A141]: This definition is required to address this standard, which is mentioned in the Order but not defined.

Rainy Season (aka Wet Season) –October 1 to April 30

Receiving Waters – Waters of the United States.

Receiving Water Limitations - Waste discharge requirements issued by the San Diego Water Board typically include both: (1) "Effluent Limitations" (or "Discharge Limitations") that specify the technology-based or water-quality-based effluent limitations; and (2) "Receiving Water Limitations" that specify the water quality objectives in the Basin Plan as well as any other limitations necessary to attain those objectives. In summary, the "Receiving Water Limitations" provision is the provision used to implement the requirements of CWA section 402(p)(3)(B).

Redevelopment - The creation, addition, and or replacement of impervious surface on an already developed site. Examples include the expansion of a building footprint, road widening, the addition to or replacement of a structure, and creation or addition of impervious surfaces. Replacement of impervious surfaces includes any activity that is not part of a routine maintenance activity where impervious material(s) are removed, exposing underlying soil during construction. Redevelopment does not include trenching and resurfacing associated with utility work; parking lots; resurfacing existing roadways; cutting and reconfiguring of surface parking lots; new sidewalk construction, pedestrian ramps, or bike lane on existing roads; and routine replacement of damaged pavement, such as pothole repair and emergency restoration and public safety projects.

Comment [A142]: The changes requested in this definition appropriately exempts de minimis or emergency/public safety projects.

Reporting Period – The period of information that is reported in the Annual Report. The reporting period consists of two components: 1) July 1 to June 30, consistent with the fiscal year, for the implementation of the jurisdictional runoff management programs, and 2) October 1 to September 30, consistent with the monitoring year for the monitoring and assessment programs. Together, these two time periods constitute the reporting year for the Annual Report due January 31 following the end of the monitoring year.

Restaurant – a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC code 5812).

Retail gasoline outlet (RGO) – a business that sells automotive or truck fuel to the general public with a projected Average Daily Traffic (ADT) of 100 or more vehicles per day.

Retain –Keep or hold in a particular place, condition, or position without discharge to ~~surface~~ Receiving W~~w~~aters.

Retrofitting – Storm water management practices put into place after development has occurred in watersheds where the practices previously did not exist~~.~~ or are ineffective.~~.~~ Retrofitting of developed areas is intended to improve water quality, protect downstream channels, reduce flooding, or meet other specific objectives. Retrofitting developed areas may include, but is not limited to replacing roofs with green roofs, disconnecting downspouts or impervious surfaces to drain to pervious surfaces, replacing impervious surfaces with pervious surfaces, installing rain barrels, installing rain gardens, and trash area enclosures.

Runoff - All flows in a storm water conveyance system that consists of the following components: (1) storm water (wet weather flows) and (2) non-storm water including dry weather flows.

San Diego Water Board – As used in this document the term "San Diego Water Board" is synonymous with the term "Regional Board" as defined in Water Code section 13050(b) and is intended to refer to the California Regional Water Quality Control Board for the San Diego Region as specified in Water Code Section 13200.

Sediment - Soil, sand, and minerals washed from land into water. Sediment resulting from anthropogenic sources (i.e. human induced land disturbance activities) that is discharged into Receiving Waters is considered a pollutant. This Order regulates only the discharges of sediment from anthropogenic sources into Receiving Waters and does not regulate naturally occurring sources of sediment. Sediment can destroy fish-nesting areas, clog animal habitats, and cloud waters so that sunlight does not reach aquatic plants.

Special District Copermittee – A separate legal entity that may own or operate MS4 systems, but has no land use authorities outside of their MS4. The Riverside County Flood Control and Water Conservation District [and Orange County Flood Control District?] is a [are] Special District Copermittee[s].

Source Control BMP – Land use or site planning practices, or structural or nonstructural measures that aim to prevent runoff pollution by reducing the potential for contamination at the source of pollution. Source control BMPs minimize the contact between pollutants and runoff.

Storm Water – Per 40 CFR 122.26(b)(13), means storm water runoff, snowmelt runoff and surface runoff and drainage. ~~Surface runoff and drainage pertains to runoff and drainage resulting from precipitation events.~~

Comment [A143]: Relocation of definition to Attachment C.

Comment [A144]: Definition added for clarity and consistency with prior redlines

Comment [A145]: Edit clarifies intent of definition.

Stream, Channel, or Habitat Rehabilitation – Measures or activities for the purpose of improving or restoring the environmental health (i.e. physical, chemical and biological integrity) of streams, channels, or river systems. Rehabilitation techniques may include, but are not limited to, riparian zone restoration, constructed wetlands, bank stabilization, channel reconfiguration, and daylighting drainage systems.

Street, Road, Highway, Freeway – Any paved impervious surface that is used for the transportation of automobiles, trucks, motorcycles, and other vehicles, with an ADT of at least 100 vehicles per day.

Structural BMPs - A subset of BMPs which detains, retains, filters, removes, or prevents the release of pollutants to surface waters from development projects in perpetuity, after construction of a project is completed.

Total Maximum Daily Load (TMDL) - The maximum amount of a pollutant that can be discharged into a water body from all sources (point and non-point) and still maintain water quality standards. Under CWA section 303(d), TMDLs must be developed for all water bodies that do not meet water quality standards after application of technology-based controls.

Toxicity - Adverse responses of organisms to chemicals or physical agents ranging from mortality to physiological responses such as impaired reproduction or growth anomalies). The water quality objectives for toxicity provided in the Basin Plan, state in part…“All waters shall be free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life….The survival of aquatic life in surface waters subjected to a waste discharge or other controllable water quality factors, shall not be less than that for the same water body in areas unaffected by the waste discharge”.

Treatment Control BMP – Any engineered system designed to remove pollutants by simple gravity settling of particulate pollutants, filtration, biological uptake, media absorption or any other physical, biological, or chemical process.

Unpaved Road – Any long, narrow stretch without pavement used for traveling by motor passenger vehicles between two or more points. Unpaved roads are generally constructed of dirt, gravel, aggregate or macadam and may be improved or unimproved.

Waste - As defined in CWC Section 13050(d), “waste includes sewage and any and all other waste substances, liquid, solid, gaseous, or radioactive, associated with human habitation, or of human or animal origin, or from any producing, manufacturing, or processing operation, including waste placed within containers of whatever nature prior to, and for purposes of, disposal.”

Article 2 of CCR Title 23, Chapter 15 (Chapter 15) contains a waste classification system that applies to solid and semi-solid waste, which cannot be discharged directly or indirectly to water of the state and which therefore must be discharged to land for treatment, storage, or disposal in accordance with Chapter 15. There are four classifications of waste (listed in order of highest to lowest threat to water quality): hazardous waste, designated waste, non-hazardous solid waste, and inert waste.

Water Quality Objective - Numerical or narrative limits on constituents or characteristics of

Comment [A146]: Definition relocated to Attachment C.

Comment [A147]: Consistent with RGO definition.

water designated to protect designated beneficial uses of the water. [California Water Code Section 13050 (h)]. California's water quality objectives are established by the State and Regional Water Boards in the Water Quality Control Plans. Numeric or narrative limits for pollutants or characteristics of water designed to protect the beneficial uses of the water. In other words, a water quality objective is the maximum concentration of a pollutant that can exist in a receiving water and still generally ensure that the beneficial uses of the receiving water remain protected (i.e., not impaired). Since water quality objectives are designed specifically to protect the beneficial uses, when the objectives are violated the beneficial uses are, by definition, no longer protected and become impaired. This is a fundamental concept under the Porter Cologne Act. Equally fundamental is Porter Cologne's definition of pollution. A condition of pollution exists when the water quality needed to support designated beneficial uses has become unreasonably affected or impaired; in other words, when the water quality objectives have been violated. These underlying definitions (regarding beneficial use protection) are the reason why all waste discharge requirements implementing the federal NPDES regulations require compliance with water quality objectives. (Water quality objectives are also called water quality criteria in the CWA.)

Water Quality Standards - Water quality standards, as defined in Clean Water Act section 303(c) consist of the beneficial uses (e.g., swimming, fishing, municipal drinking water supply, etc.,) of a water body and criteria (referred to as water quality objectives in the California Water Code) necessary to protect those uses. Under the Water Code, the water boards establish beneficial uses and water quality objectives in water quality control or basin plans. Together with an anti-degradation policy, these beneficial uses and water quality objectives serve as water quality standards under the Clean Water Act. In Clean Water Act parlance, state beneficial uses are called "designated uses" and state water quality objectives are called "criteria." Throughout this Order, the relevant term is used depending on the statutory scheme.

Waters of the State - Any water, surface or underground, including saline waters within the boundaries of the State [CWC section 13050 (e)]. The definition of the Waters of the State is broader than that for the Waters of the United States in that all water in the State is considered to be a Waters of the State. ~~, regardless of circumstances or condition.~~

Comment [A148]: The intent of the definition is to cover natural water sources, and not anthropogenic structures that collect runoff to reduce volume/velocity or pollutants.

Waters of the United States - As defined in the 40 CFR 122.2, the Waters of the U.S. are defined as: "(a) All waters, which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; (b) All interstate waters, including interstate "wetlands;" (c) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, "wetlands," sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation or destruction of which would affect or could affect interstate or foreign commerce including any such waters: (1) Which are or could be used by interstate or foreign travelers for recreational or other purposes; (2) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or (3) Which are used or could be used for industrial purposes by industries in interstate commerce; (d) All impoundments of waters otherwise defined as waters of the United States under this definition: (e) Tributaries of waters identified in paragraphs (a) through (d) of this definition; (f) The territorial seas; and (g) "Wetlands" adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) through (f) of this definition. Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with the EPA."

Watershed - That geographical area which drains to a specified point on a water course, usually a confluence of streams or rivers (also known as drainage area, catchment, or river basin).

Wet Season (aka Rainy Season) –October 1 to April 30

Wet Weather – Weather is considered wet if there is a storm event of 0.1 inches and greater and the following 72 hours, unless otherwise defined by the Copermittee for the purposes of monitoring consistent with the USEPA Storm Water Sampling Guidance Document (EPA-833-B-92-001), or developed pursuant to another regulatory mechanism.

Comment [A149]: This is important as the monitoring requirements require you to sample the first 'Wet Weather' event. 0.1" of rainfall doesn't result in runoff in all watersheds. Copermittees should be able to define mobilization criteria to identify storms that are likely to produce runoff in that drainage area consistent with this EPA guidance.

LEGAL AND FACT SHEET COMMENTS ON TENTATIVE ORDER R9-2013-0001 MADE ON BEHALF OF THE RIVERSIDE COUNTY COPERMITTEES

This document provides comments on various legal issues raised by Tentative Order No. R9-2013-0001 (the "Draft Permit") and associated attachments, including Attachment F, the Fact Sheet/Technical Report ("Fact Sheet"), and are made on behalf of the Riverside County Flood Control & Water Conservation District ("District"), the County of Riverside and the Cities of Murrieta, Temecula and Wildomar (collectively, the "Riverside County Copermittees").

These legal comments are in addition to the other comments on the Draft Permit and attachments made by the Riverside County Copermittees (including the Comment Letter dated January 10, 2013 and signed by Jason E. Uhley, Chief of the District's Watershed Protection Division) and the redline attachment ("Redline"), as well as any comments or testimony which may be offered at the public hearing(s) on the Draft Permit. The Comment Letter and Redline also discuss legal issues. The Riverside County Copermittees appreciate this opportunity to comment and welcome any questions that Water Board staff may have.

These comments are submitted subject to the same reservations set forth in the Comment Letter regarding the Water Board's lack of authority, in the absence of agreement by the Riverside County Copermittees or the filing of a Report of Waste Discharge ("ROWD"), to issue a regional municipal separate storm sewer system ("MS4") permit to the Riverside County Copermittees. Submission of these comments does not waive this objection.

Request for Additional Public Comment

Before turning to comments on the Draft Permit, the Riverside County Copermittees wish to note that in view of the extensive comments made by them, as well as what we anticipate will be extensive comments by the South Orange County and San Diego County Copermittees, as well as from other stakeholders, it would greatly facilitate the permit adoption process if the Water Board were to release a revised Tentative Order for further review and comment prior to final adoption of the Permit. This will enable the Water Board staff to address the comments in a more orderly fashion and provide all parties with the opportunity to see how staff proposes to incorporate the comments in the Draft Permit.

Comments on Findings

Finding 2 and Fact Sheet Section VII.B: This finding recites that the Water Board "has the legal authority to issue a regional MS4 permit pursuant to its authority under Clean Water Act ("CWA") section 402(p)(3)(B) and 40 CFR 122.26(a)(i)(v)." Section VII.B of the Fact Sheet provides a more detailed rationale for this finding (at pages F-22-23).

The Riverside County Copermittees respectfully disagree with this finding and the analysis provided in the Fact Sheet. We do not believe that a regional MS4 permit is authorized under the CWA or the implementing regulations, absent agreement by the copermittees to be bound by such a MS4 permit (as is the case with the Bay Area MS4 permit covering discharges into the Bay).

The CWA itself does not explicitly authorize MS4 permits that, like the Draft Permit, cross county lines. CWA section 402(p)(3)(B) provides only that "[p]ermits for discharges from municipal storm sewers . . . may be issued on a system- or jurisdiction-wide basis." This language, contrary to the conclusion in Finding 2, indicates that a multi-county permit, covering several distinct non-interconnected municipal stormwater "systems" in multiple watersheds with multiple receiving waters, is not one issued on a "system-wide" basis and that an MS4 permit covering multiple jurisdictions in three different counties is not one issued on a "jurisdiction-wide basis." Because neither "system-wide" nor "jurisdiction-wide" are defined in the CWA, however, the CWA regulations must also be reviewed.

The regulatory provision cited in Finding 2, 40 CFR § 122.26(a)(1)(v), does not add clarity, since it merely repeats the "system-wide" and "jurisdiction-wide" language of the Act and the regulations define neither term. The regulations do, however, suggest that "system-wide" is not intended to cover multiple large MS4s in different jurisdictions. The regulations, at 40 CFR § 122.26(a)(1)(v) state that in making the determination to designate a system-wide or jurisdiction-wide basis" the permitting authority should consider the location of the "discharge" with respect to waters of the United States, the size of the discharge, the quantity and nature of the pollutants discharge and other relevant factors.

The Draft Permit covers multiple "discharges" into receiving waters located in three separate counties and the size, quality and nature of the discharges vary widely, due to varying hydrologic and climatic conditions in the three areas.

The Fact Sheet cites 40 CFR § 122.26(a)(3)(iv), which provides, in relevant part, that the Water Board "may issue one systemwide permit covering all, or a portion of all municipal separate storm systems in adjacent or interconnected large or medium municipal separate storm sewer systems." This provision does not, however, authorize issuance of a regional MS4 permit covering multiple counties and multiple watersheds that are not interconnected and which do not share a common receiving water. In fact, the only common fact uniting the various MS4s in the three counties under the Water Board's jurisdiction is that common jurisdiction.

First, even if the subject MS4 facilities otherwise met the criteria specified in the federal regulations (which, as noted below, they do not), the prospective permittees must apply for such a MS4 permit, as set forth in the first sentence of 40 CFR § 122.26(a)(3)(iv): "*One permit application may be submitted for all or a portion of all* municipal separate storm sewers within adjacent or interconnected large or medium municipal separate storm sewer systems." (emphasis supplied). No such application has been filed with respect to the Draft Permit. Only the San Diego County copermittees submitted a ROWD for MS4 facilities within that county.[1]

[1] Moreover, the fact that permittees have the ability to determine the geographic scope of the permit is reinforced by the language in 40 CFR § 122.26(a)(3)(iii)(B), which allows an individual municipality to submit "a distinct permit application which only covers discharges from the [MS4] for which the owner is responsible . . ." If a permittee can "opt out" of a multi-MS4 permit by submitting a individual permit application, a permitting authority such as a water board cannot impose a multi-MS4 permit on that permittee.

Second, this provision requires that the MS4s to be covered in the permit be "adjacent or interconnected." This is not true with respect to the MS4s proposed to be included within the Draft Permit. For example, the MS4 within the Santa Margarita Region of Riverside County is not "interconnected" with any other MS4s except those within that region. This is true also of the MS4s within South Orange County and San Diego County, which are not interconnected. Additionally, none of the MS4s in the three counties is "adjacent" to each other – each is separated by miles of non-urban area. In the SMR for example, the confluence of Temecula and Murrieta Creeks to form the Santa Margarita River is miles upstream of Rainbow Creek, the first discharge from San Diego County to the River. And, the confluence of Temecula and Murrieta Creeks is over 30 miles from the discharge of the Santa Margarita River to the Pacific Ocean.

The next inquiry is whether the three separate county MS4s could be considered, together, to form a single "large municipal separate storm sewer system." The federal MS4 regulations define this term as follows:

> *Large municipal separate storm sewer system* means all municipal separate storm sewers that are either:
>
> (i) Located in an incorporated place with a population of 250,000 or more . . . ."
>
> (ii) Located in the counties listed in Appendix H, except municipal separate storm sewers that are located in the incorporated places, townships or towns within such counties; or
>
> (iii) Owned or operated by a municipality other than those described [in paragraphs (i) and (ii)] . . . and that are designated by the Director as part of the large or medium municipal separate storm sewer system due to the interrelationship between the discharges of the designated storm sewer and the discharges from municipal separate storm sewers described [in paragraphs (i) and (ii)]. In making this determination the Director may consider the following factors:
>
> (A) Physical interconnections between the municipal separate storm sewers;
>
> (B) The location of discharges from the designated municipal separate storm sewer relative to discharges from municipal separate storm sewers described in [paragraph (i)];
>
> (C) The quantity and nature of pollutants discharged to waters of the United States;
>
> (D) The nature of the receiving waters; and
>
> (E) Other relevant factors, or
>
> (iv) The Director may, upon petition, designate as a large municipal separate storm sewer system, municipal separate storm sewers located within the boundaries of a region

> defined by a storm water management regional authority based on a jurisdictional, watershed, or other appropriate basis that includes one or more of the systems described [in paragraphs (i), (ii) or (iii)].

40 CFR § 122.26(b)(4).

None of paragraphs (i), (ii) or (iii) authorizes a regional MS4 permit such as that envisioned in the Draft Permit. The Draft Permit applies beyond a single incorporated place, County or municipality. Of these paragraphs, only paragraph (iv) could arguably be used to define the MS4s in the three Counties as a single MS4 and thus authorize a regional permit. The key limiting language is, however, "within the boundaries of a region **defined by a storm water management regional authority,** based on a jurisdictional, watershed, or other appropriate basis . . . ." A regional water board is not a stormwater management regional authority. This is clear from the MS4 regulations, which provide that a "**regional authority may be responsible for submitting a permit application"** under certain conditions. 40 CFR § 122.26(a)(3)(iii)(C). Clearly, a Water Board is not responsible for submitting MS4 permit applications.

U.S. EPA, in the Preamble to the final Phase I MS4 regulations (55 Fed Reg. 47990, November 16, 1990), further illuminated the meaning of the regulatory language. The Preamble indicates that commenters proposed eight different MS4 permitting options:

> Option 1 – systems owned or operated by incorporated places augmented by integrated discharges; Option 2 – systems owned or operated by incorporated places augmented with significant other municipal discharges; Option 3 – systems owned or operated by counties; Option 4 – systems owned and operated by States or State departments of transportation; Option 5 – systems within the boundaries of an incorporated place; Option 6 – systems within the boundaries of counties; Option 7 – systems in census designated urbanized areas; and Option 8 – systems defined by watershed boundaries.

55 Fed Reg. at 48039. None of these options encompasses the fact pattern presented by the Draft Permit, which covers multiple counties and multiple watersheds, are not interconnected, do not share common receiving waters and are located in separate census designated urbanized areas.

In explaining the derivation of 40 CFR 122.26(b)(4)(iv), U.S. EPA noted that it was "an outgrowth of comments on all options, especially Option 4 (State owned systems/State highways) and Option 8 (watersheds)." 55 Fed. Reg. at 48040. Thus, the Caltrans MS4 permit (which applies statewide) is authorized under paragraph (iv), since the "storm water management regional authority" defining the region to be covered is Caltrans itself. No such single authority exists for the three-county area proposed to be included in the Draft Permit, which also would encompass multiple watersheds.

Moreover, paragraph (iv) provides that the regional authority must "petition" the U.S. EPA Director to have a single MS4 designated within the boundaries of the region defined by the regional authority. Because California has been delegated NPDES permitting authority, a regional authority would presumably need to petition its Water Board to authorize such a regional permit. Since no such regional authority exists to establish the geographical basis for a three-county MS4 permit, there is no such entity to "petition" the Water Board to establish a regional permit. This is clear from the Preamble to the Phase I regulations, which indicate that "regional storm water authorities" established by "some States or counties" may "petition the Director [or its state designee] to assume a regional role. 55 Fed. Reg. at 48042. It is clear from the Preamble that it is not the Water Board that has the authority to make such a petition, but rather the "storm water authorities" (i.e., municipalities, districts and Caltrans).

It should be noted that the Bay Area Regional MS4 Permit was a joint Bay Area Water Board and copermittee effort, coordinated by the Bay Area Stormwater Agencies Management Association ("BASMAA"). It is not the case that the Bay Area Water Board imposed this regional MS4 permit. The copermittees, coordinated by BASMAA, themselves determined to develop a regional MS4 permit. Further, all of the copermittees to the Bay Area Regional MS4 Permit discharge to a common receiving water, San Francisco Bay. Also, an Alaska MS4 permit cited in a letter from the Office of Chief Counsel to county counsel for Orange and Riverside Counties was issued to several municipalities and entities within a single "borough," which is equivalent in Alaska to a county.

Additionally, neither the Riverside County Copermittees nor those in South Orange County have filed ROWDs with the San Diego Water Board, which serve as the application for an NPDES MS4 permit in California. Water Code § 13260. The current Riverside County MS4 permit for the Santa Margarita Region provides that the ROWD is not required to be filed until May 2015, 180 days prior to the November 10, 2015 expiration date of that permit. Order R9-2010-0016, Part II.K.2.c.

> This ROWD must include:
>
> (1) Proposed changes to the Copermittees' runoff management programs; (2) Proposed changes to monitoring programs; (3) Justification for proposed changes; (4) Name and mailing addresses of the Copermittees; (5) Names and titles of primary contacts of the Copermittees; (6) Any other information necessary for the reissuance of this Order and (7) Any other information required by federal regulations for permit reapplications.

Id. It should be noted that several items of this ROWD are specifically intended to assist in the formulation of a new, SMR-specific MS4 permit, including proposed changes to the runoff management and monitoring programs, as well as justification for such changes, information necessary for "reissuance" of the SMR MS4 permit and information required by the federal regulations for MS4 permit reapplications.

As a simple jurisdictional matter, the Water Board cannot issue a regional MS4 permit to MS4 dischargers that have not applied for it. Moreover, as noted above, the SMR copermittees are entitled to apply for an MS4 permit applicable to their jurisdiction. Further, each individual copermittee has the right to apply for a MS4 permit covering only its discharges, as has the City of Long Beach in the Los Angeles Region.

Finding 3, Finding 15, in Fact Sheet Section VII.A and in Multiple Locations Throughout Draft Permit: In Finding 3, the Fact Sheet and in multiple locations throughout the Draft Permit (which are identified in the redline of the Draft Permit submitted with these comments by the Riverside County Copermittees ("Redline")), it is stated that the maximum extent practicable ("MEP") applies only to "storm water" discharges from the MS4. This is not correct.[2]

In fact, the Clean Water Act does not distinguish between non-stormwater and stormwater in terms of MS4 discharges which must be controlled to the MEP standard. *See* 33 U.S.C. § 1342(p)(3)(B)(iii)(the MS4 permit "shall require controls to reduce the discharge of pollutants to the maximum extent practicable . . . ." While the heading of 33 U.S.C. § 1342(p) refers to "Municipal and industrial stormwater discharges," this is not dispositive, as 33 U.S.C. § 1342(p)(3)(B)(ii), which requires the effective prohibition of "non-stormwater discharges" into the MS4. Thus, the language of this heading does not in fact support the argument that the MEP standard applies only to pollutants in stormwater discharges.

That both non-stormwater and stormwater must be controlled to the MEP standard was made clear by U.S. EPA itself in the preamble to the final Phase I stormwater regulations. In that preamble, U.S. EPA made it clear that "MEP control measures" would be implemented to address not only pollutants in "storm water" but also from "non-storm water discharges." As the preamble states:

> "Permittees are required to develop management programs for four types of pollutant sources which discharge to large and medium municipal storm sewer systems. Discharges from [such systems] are usually expected to be composed primarily of: (1) Runoff from commercial and residential areas; (2) storm water runoff from industrial areas; (3) runoff from construction sites; and (4) *non-storm water discharges*. Part 2 of the permit application has been designed to allow [permittees] the opportunity to propose *MEP control measures for each* of these components of the discharge."

55 Fed. Reg. at 48052 (emphasis supplied).

This language sets forth USEPA's understanding of the plain language of the CWA: "pollutants" must be controlled to the MEP from any MS4 "discharge," not merely pollutants in stormwater.

Finding 11: This finding, in relevant part, states that "[h]istoric and current development makes use of natural drainage patterns and features as conveyances for runoff. Rivers, streams and creeks in developed areas used in this manner are part of the Copermittees' MS4s regardless of whether they are natural, anthropogenic, or partially modified features. In these cases, the rivers, streams and creeks in the developed areas of the Copermittees' jurisdictions are both an MS4 and receiving water." This conclusion is legally incorrect.

First, under no circumstance can a natural stream constitute an MS4. The definition of "MS4" in the CWA regulations (a definition found in Attachment C of the Draft Permit) refers to a

[2] Finding 15 also states, erroneously, that the MEP standard "is explicitly for "Municipal . . . *Stormwater Discharges* (emphasis added)" from the MS4.

"conveyance or system of conveyances" "owned or operated" by a municipality. 40 CFR §122.26(b)(8). In California, natural rivers and streams are not "owned" nor "operated" by the municipality through which they flow. Moreover, a municipality obviously cannot "operate" a natural creek or stream. In further support of the point that a MS4 is an artificial, not natural, watercourse, the types of "conveyances" identified in the regulation ("roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains") all refer to anthropogenic structures, not natural streams. 40 CFR § 122.26(b)(8).

Second, a "receiving water" cannot also be an MS4, as is plain from the CWA regulations. An MS4 is itself defined as discharging to waters of the United States. 40 C.F.R. §122.26(b)(8). An MS4 cannot, in essence, discharge to itself. Moreover, an "outfall" from an MS4 (the point at which the discharge enters a receiving water) does not, pursuant to 40 C.F.R §122.26 (b)(9), include conveyances connecting "segments of the same stream or other waters of the United States and are used to convey waters of the United States."

Moreover, U.S. EPA, in the Preamble to the initial version of the MS4 regulations (53 Fed. Reg. 49416 (Dec. 7, 1988)) expressly determined that "streams, wetlands and other water bodies that are waters of the United States are not storm sewers for the purposes of this rule" and that "stream channelization, and stream bed stabilization, which occur in waters of the United States" were not subject to National Pollutant Discharge Elimination System ("NPDES") permits under Section 402 of the CWA. 53 Fed. Reg. at 49442.

Additionally, the United States Supreme Court recently reversed the Ninth Circuit Court of Appeals and ruled that flows from sections of the Los Angeles and San Gabriel Rivers that are comprised of concrete flood control channels are not a "discharge" under the CWA, confirming that such rivers, even if improved, are "receiving waters" along with any natural portions of those rivers. *Los Angeles County Flood Control Dist. v. Natural Resources Defense Council*, 568 U.S. __(January 8, 2013) (slip op.).

The above-cited statement in the finding is incorrect and should be stricken, as recommended in the Redline.

Finding 12: This finding states, in relevant part, that "[a]s operators of the MS4s, the Copermittees cannot passively receive and discharge pollutants from third parties. By providing free and open access to an MS4 that conveys discharges to waters of the U.S., the operator essentially accepts responsibility for discharges into the MS4 that it does not prohibit or otherwise control." This statement is legally incorrect, and ignores the salient point that the "discharger" of a pollutant is primarily responsible for controlling/permitting that discharge, under both the CWA and the Porter-Cologne Act. For example, under the Porter-Cologne Act, any persons discharging or proposing to discharge "waste" into waters of the state must file a report of waste discharge and obtain a waste discharge requirement. Water Code §§ 13260, 13263. The operator of the MS4 into which that water eventually flows is not "essentially accepting" responsibility for the discharge. The responsibility of the MS4 operator is established under the CWA, and that is to effectively prohibit non-stormwater discharges into [the MS4] and to control the discharge of pollutants from the MS4 to the MEP.

Moreover, the statement ignores the fact that in California, downstream property owners (including municipalities owning and operating MS4 facilities) must accept the flow of upstream waters. In fact, for a downstream municipality to block such flow would constitute an inverse condemnation or the creation of a nuisance under California law. *See Arreola v. County of Monterey* (2002) 99 Cal.App.4th 722 (obstruction of flood waters by improperly designed highway constituted inverse condemnation and nuisance).

Finding 28 and Fact Sheet Section VI: In the Finding, it is stated that the Water Board "finds that the requirements in this permit are not more stringent than the minimum federal requirements" and that therefore "a CWC section 13241 analysis is not required." The Finding further recites that notwithstanding this fact, "the San Diego Water Board has developed an economic analysis of the requirements in this Order."

For the reasons set forth in the comments of the Riverside County Copermittees, numerous provisions in the Draft Permit are in fact more stringent than the requirements of the CWA and its implementing regulations and therefore require an adequate Water Code § 13241 analysis. Unfortunately, this analysis is not provided in the Fact Sheet.

First, the economic analysis set forth in the Fact Sheet does not meet the requirements of Section 13241, as it does not analyze the six specific factors required to be analyzed under the section. Second, the analysis uses cost data from other sources, only a few of which were from the municipalities proposed to be included under the Draft Permit. These data are also a number of years old; the most recent study referenced in the Fact Sheet, the one done for the State Board by Cal State Sacramento, was dated January 2005 and included decade-old cost data from the City of Encinitas that dated from 2002-2003.

Third, the section of the Fact Sheet discussing the benefits of water quality notes that "there have been no studies for the San Diego Region to quantify the added value that surface waters with healthy water quality can provide." Thus, the Water Board has no evidence with which to compare the costs and benefits of the programs set forth in the Draft Permit. Moreover, the discussion makes the incorrect assumption that the alternative to the programs in the Draft Permit would be no controls on pollutants in urban runoff. As the Fact Sheet correctly notes, the Draft Permit is the fifth term MS4 permit for the copermittees. The previous four permits all contained increasingly complex and expensive control requirements, both structural and non-structural, designed to improve the quality of MS4 discharges. Thus, an appropriate cost analysis must compare the incremental costs of the programs set forth in the Draft Permit and the incremental benefits attributable to that permit. This has not been done in the Fact Sheet. Finally, the analysis does not recognize that the receiving waters provided economic benefits to residents of the San Diego Region long before issuance of the first MS4 permits in 1990. It is thus illogical to suggest that these pre-existing economic benefits would be lost if the Draft Permit is not adopted.

Finding 29 and Fact Sheet Section VII.F: The finding and the supporting argument in the Fact Sheet represents an attempt by Water Board staff to address whether the requirements of the Draft Permit represent an unfunded state mandate. That attempt, however, is beyond the scope of the Water Board's powers, since the *only* agency charged by the Legislature with determining the presence of a state mandate, and whether that mandate is unfunded, is the Commission on State Mandates. Govt. Code § 17552; *Kinlaw v. State of California* (1991) 54 Cal.3d 326, 333. The Water Board has no jurisdiction to make a legal finding or discuss in the Fact Sheet that the Draft Permit, in whole or in part, does not constitute an unfunded state mandate.

Additionally fact sheets are required, under the CWA regulations, to provide the legal authority and reasons for each substantive permit provision (40 CFR § 124.8(a)(4); 40 CFR § 124.56(a)). *See also City of Rancho Cucamonga v. Regional Water Quality Control Board-Santa Ana Region* (2006), 135 Cal.App.4th 1377, 1382 (stating that fact sheets contains "the legal and factual grounds for the Water Board's recommendation to adopt the . . . permit"). Finding 29 and the discussion in Section VII.F of the Fact Sheet do not relate to any Draft Permit provision, nor provide legal authority or justification for the Draft Permit's adoption. As such, the finding and Fact Sheet discussion are surplussage and should be deleted.

The Riverside County Copermittees disagree with each of the arguments set forth in the Finding and Fact Sheet as to why the Draft Permit does not constitute an unfunded state mandate. Nevertheless, because the exclusive arena for such disagreements is the Commission on State Mandates, whose jurisdiction does not commence unless and until a test claim is filed before the Commission, the Copermittees need not and will not address those arguments.

Comments on Provisions in Draft Permit

Provision A and Fact Sheet Section VIII.A:

Lack of True Iterative Compliance Process

As set forth in the Redline and in the Comment Letter, the Riverside County Copermittees believe that to effectuate the iterative approach to compliance with water quality standards and other discharge prohibitions in the Draft Permit, the copermittees must be provided with the means to be in compliance. Based on monitoring, exceedances of water quality standards are occurring in the receiving waters subject to the Draft Permit, as set forth in Table G-14 to the latest 2011-2012 monitoring report submitted by the Riverside County Copermittees. Thus, if the copermittees are not provided an iterative means to be in compliance, which was contemplated by State Board's Order No. 2001-15, the copermittees will be issued an illegal MS4 permit, since it is a permit with which they cannot comply. This violates the intent of Congress in the CWA, which "is presumed not to have intended absurd (impossible) results." *Hughey v. JMS Development Corp.*, 78 F.3d 1523, 1529 (11th Cir. 1996); *accord, Mississippi River Revival v. City of Minneapolis*, 319 F.3d 1013, 1017-1018 (8th Cir. 2003).

With regard to the iterative process, Water Board staff has indicated numerous times during the workshop process that achievement of water quality standards is expected to take many years. The entire WQIP approach is aimed at the eventual attainment of such standards, as are the TMDLs issued to other copermittees, which have final compliance dates years into the future.

This approach is, however, put into jeopardy by the requirement, as expressed in the Fact Sheet at F-39, that the discharge prohibition and receiving water limitation provisions are "independently applicable, meaning that compliance with one provision does not provide a 'safe harbor' where there is non-compliance with another provision (i.e., compliance with Provision A.4 does not shield a Copermittee who may have violated Provision A.1.a, A.1.c, or A.2.a from an enforcement action." While the Fact Sheet appropriately notes how this process should work through Provision A.4 (which "essentially requires the Copermittees to implement additional BMPs until MS4 discharges no longer cause or contribute to a violation of water quality standards") it also states that despite this iterative process, "the San Diego Water Board retains the discretion to take other appropriate enforcement and the iterative process does not shield dischargers from citizen suits under the CWA." Fact Sheet at F-40.

The consequences of this approach cannot be overemphasized. Despite the copermittees' good faith undertaking to follow the iterative process outlined in Provision A.4, a Water Board enforcement proceeding or a citizen suit can be brought for violations of water quality standards and, if the citizen plaintiff is successful, a federal judge is empowered to use his/her injunctive powers under Section 505(a) of the CWA to throw out the WQIP, JRMP or other compliance efforts of the copermittees and require other efforts. In such a case, the time and money spent by the copermittees in trying to comply with the Draft Permit, as well as the effort spent by the copermittees and Water Board staff in developing the Draft Permit's terms, are completely wasted.

Thus, the essential conundrum of Provision A, as presently drafted, is clearly exposed. Even though a copermittee may spend significant sums and undertake significant tasks under its WQIP or JRMP, be conducting expensive monitoring and special studies, and be in *full compliance* with all of the programmatic requirements of the Draft Permit, it would still face either a Water Board enforcement action or a citizen suit under Section 505 of the CWA. And, such a suit would allege exceedances of water quality standards (some of which are hardly capable of laboratory detection, much less control) that the Water Board acknowledges cannot be achieved for years.

Provision A is not, however, required by the CWA, as held by the Ninth Circuit in *Defenders of Wildlife v. Browner*, 191 F.3d 1159 (9th Cir. 1999). The holding in *Browner* is further reflected in State Board Order WQ 2001-15 (which the Fact Sheet acknowledges incorporates an "iterative process") which states:

> [O]ur [receiving water limitation] language, similar to the U.S. EPA's permit language discussed in the Browner case, **does not require strict compliance with water quality standards.** Our language requires that **storm water management plans be designed to achieve compliance with water quality standards**. **Compliance is to be achieved over time, through an iterative approach requiring improved BMPs**. As pointed out by the Browner court, there is nothing inconsistent between this approach and the determination that the Clean Water Act does not mandate strict compliance with water quality standards.

Order WQ 2001-15 at 7 (emphasis added). Thus, Provision A is inconsistent with the State Board's own precedential order, which requires the iterative approach effectuated by the suggested Redline changes.[3]

In further support, it may be noted that the U.S. EPA-drafted MS4 permit for the District of Columbia does not contain the type of language found in Provision A, but rather requires "an iterative and an adaptive management process for pollutant reduction and for achieving applicable water quality standard and/or total maximum daily load (TMDL) compliance." DC MS4 Permit Fact Sheet, page 5 (attached as Exhibit A).

Also, despite the assertion in the Fact Sheet that the copermittees are seeking a "safe harbor" from liability, this is incorrect. Every provision of an MS4 permit is subject to enforcement; given the complexity of the Draft Permit, the failure by a copermittee to comply with any provision could lead to such enforcement.

As noted above, MS4 discharges may not be achieving compliance with strict water quality standards, as recognized by the Issue Paper released by State Board staff in preparation for a November 20, 2012 workshop on receiving water limitation issues raised by *NRDC v. County of Los Angeles*. That Issue Paper stated that as "the storm water management programs of municipalities have matured, **an increasing body of monitoring data indicates that water quality standards are in fact not being met by many MS4s.**" (State Board Issue Paper, Page 2, emphasis supplied) (*see* Exhibit B.)

Perhaps most importantly, requiring strict and immediate compliance with discharge prohibition and receiving water limitations inhibits, not supports, the philosophy of the Draft Permit, which is to encourage the copermittees to focus on the most significant problems in their watersheds and to prioritize their resources to address those problems. Provision A, by contrast, discourages innovative approaches or prioritization, since all pollutants exceeding water quality standards create liability. Moreover, as discussed above, in the event of a citizen suit being brought such as that in the *NRDC* case, a federal judge could award injunctive relief to a successful plaintiff that could completely ignore or supplant the WQIP and other permit terms.

For additional discussion of receiving water limitations issues, please see Exhibit C, a letter submitted by the District to the State Board in connection with the recent workshop held by the State Board on receiving water limitations language. The Riverside County Copermittees hereby reference and incorporate this Exhibit into these comments.

The Riverside County Copermittees support a true iterative process that requires refinement and amendment of the WQIP and associated BMPs when receiving water limitation violations are recorded. That is the essence of the iterative process; the identification of problems and the development of BMPs to attempt to address those problems.

[3] While the Fact Sheet cites as authority *Natural Resources Defense Council v. County of Los Angeles,* discussed above, the Ninth Circuit was simply responding to language in the former Los Angeles County MS4 permit, and did not determine that such non-iterative language was required by the CWA.

The Redline proposes a means to achieve compliance using the WQIPs, which are intended to bring the copermittees into compliance with the discharge prohibition and receiving water limitation provisions of the Draft Permit over time. The Redline links compliance with Provisions A.1, A.2 and A.3 to A.4, which indicates that compliance is obtained through the preparation and updating of the WQIPs.

It must be noted, however, that the Riverside County Copermittees do not agree with the approach suggested by others, that any WQIP-based compliance approach be necessarily accompanied by a "Reasonable Assurance Analysis." Such an analysis could be extremely complex, expensive and time intensive to develop. Generally, such analyses are developed in the preparation of TMDLs and take a number of years to develop and refine. Given that the Santa Margarita Watershed has no adopted TMDLs, there are no comprehensive pollutant transport or BMP models available for the suite of constituents that might be considered for prioritization within a WQIP for that watershed. In the context of a TMDL, such models would be developed by the combined resources of the Water Board, stakeholders and dischargers. Requiring such an exercise to be undertaken solely with the public resources of the residents of the SMR is beyond the Copermittees' financial ability and would shift responsibility for development of TMDLs from the Water Board to the Copermittees.

Discussion in Fact Sheet

The Fact Sheet discussion also contains a number of legal and factual errors. First, the statement on page F-34 that non-stormwater discharges from the MS4 are subject to NPDES permitting requirements is unsupported by the plain language of the CWA, which (as noted above) applies the MEP standard to *all* discharges of pollutants from the MS4, not just those in stormwater. Also, such discharges are not subject to separate requirements under the NPDES program, as suggested on F-34, and non-storm water discharges are not the same, legally, as "illicit discharges." Please see discussion below.

Similarly, the Fact Sheet's conclusion that "Regional Water Boards are not limited by the iterative MEP approach to storm water regulation in crafting appropriate regulations for non-storm water discharges" is incorrect. The Fact Sheet correctly states that MEP has not been defined in the CWA or by U.S. EPA in the CWA regulations. However, the Fact Sheet incorrectly concludes that MEP is "ultimately defined" by the Water Boards or the State Board. What constitutes "MEP" is a question of federal law under the CWA, not a matter for definition by agencies which merely have been delegated the authority to enforce the CWA in California. The only source for such a finding is a memorandum from a State Board attorney, not case authority.

Moreover, Provisions B-E of the Draft Permit, far from establishing a "minimum framework" for the copermittees to achieve the MEP standard, sets forth in many cases requirements that far exceed the plain requirements of the CWA, the implementing regulations and in some cases even state law, or which require the copermittees to undertake steps that are not "practicable." These requirements are identified in the comments of the Riverside County Copermittees. In such respects, those requirements do not represent a "minimum framework" for MEP.

Other Issues

The Riverside County Copermittees also object to the provision in A.1.a and other portions of the Draft Permit that prohibit certain discharges into “waters of the state.” The CWA regulates discharges into waters of the United States, which are surface waters. Expanding the prohibition to cover waters of the state expands the scope of the Draft Permit to protect groundwater, as a matter of state law. It should be noted that the recent Los Angeles County MS4 Permit appropriately applies this prohibition to waters of the United States.

Provision B.5: As noted in the Comment Letter, the CWA requires that illegal discharges into the MS4 be addressed by a program of steps taken to address such discharges. The Redline emphasizes that this program be guided by WQIP priorities, which is consistent with the overall intent of the Draft Program.

Provision E.2.a and E.2.a.(7): These provisions require the Copermittees to, as a part of their Illicit Discharge Detection and Elimination (IDDE) program, address all non-stormwater discharges as “illicit discharges,” thus requiring the copermittees to “reduce or eliminate non-stormwater discharges” whether or not the discharges have been identified as “illicit.”

The Fact Sheet asserts that “Provision E.2.a.(7) is consistent with the requirements of the CWA section 402(p)(3)(B)(ii) and 40CFR 122.26(d)(1)(v)(B). That assertion is not correct. Section 402(p)(3)(B)(ii) of the CWA states that MS4 permits “shall include a requirement to *effectively prohibit* non-stormwater discharges into the storm sewers” (emphasis supplied). The CWA regulations include two provisions designed to begin implementation of the “effective prohibition.” The first provision requires MS4 permittees to perform a screening analysis, intended to provide sufficient information to develop priorities for a program to detect and remove illicit discharges. 40 CFR 122.26(d)(1)(iv)(D). The second requires MS4 permittees to develop a recommended site-specific management plan to detect and remove illicit discharges (or ensure they are covered by an NPDES permit) and to control improper disposal to MS4s. 40 CFR 122.26(d)(1)(iv)(D) and 122.26(d)(2)(B). The MS4 permittees are required to identify the non-stormwater discharge as an illicit discharge prior to having an obligation to effectively prohibit it. There is not otherwise a presumption to reduce or eliminate it.

40 CFR 122.26(d)(1)(v)(B), cited in the Fact Sheet, requires “[a] description of the existing program to identify illicit connections to the municipal storm sewer system. The description should include inspection procedures and methods for detecting and preventing illicit discharges, and describe areas where this program has been implemented.”

The provision and rationale within the Fact Sheet blur the distinction between the copermittees’ need to “effectively” prohibit non-stormwater discharges and to detect and eliminate illicit discharges.

- The requirement is “effectively prohibit” non-stormwater discharges, not “reduce or eliminate” non-stormwater discharges.
- Although copermittees are required to have a program to prevent illicit discharges to the MS4, non-stormwater discharges should only be addressed as illicit discharges where

such discharges are identified as sources of pollutants that may cause or contribute to an exceedance of a water quality objective.

- The IDDE program is established to detect and eliminate “illicit discharges”, not non-stormwater discharges in general.

Please see the Redline for modifications to Provision E.2 addressing these issues.

Provision E.2.a.(3): In the Redline, the Riverside County Copermittees request that categories of irrigation runoff discharges (landscape irrigation, irrigation water and lawn watering) be considered as conditionally exempt discharges (not subject to treatment as illicit discharges).

The rationale for not including irrigation runoff discharges lacks a legal and factual basis. As noted in the Comment Letter, the only factual basis for this provision with respect to the Riverside County Copermittees is discussion in a public information informational brochure, which was itself based on a similar document from Orange County. Fact Sheet F-76. Despite assertions to the contrary in the Fact Sheet, this brochure does not represent a determination by the Riverside County Copermittees that irrigation runoff is a category of non-stormwater discharge that must be effectively prohibited. The other evidence in support of prohibiting the conditional exemption for irrigation runoff is entirely from different areas of the region, with different urban development patterns, lithology and hydrology. No specific determination has been made by the Copermittees (or the Water Board) that irrigation runoff in the Santa Margarita Region has actually been shown to be significant source of pollutants to receiving waters in the SMR.

EPA, in the preamble to the federal MS4 regulations, required that a *permittee* must make a finding that the “irrigation water” discharges must be a “source of pollutants to waters of the United States . . . .” 55 Fed. Reg. 48037. Moreover, such discharges must represent a “significant” source of pollutants to waters of the United States “under certain conditions.” U.S. EPA, *Guidance Manual for the Preparation of Part 2 of the NPDES Permit Application for Discharges from Municipal Separate Storm Sewer Systems*, November 1992 (“EPA Part 2 Guidance Manual”), at p. 6-33. These conditions require a focus not on an entire category of discharges, but rather a discharger-by-discharger examination.

In the MS4 regulatory preamble, EPA stated that “[i]n general, municipalities will not be held responsible for prohibited some specific components of discharges or flows listed below through their [MS4], even though such components may be considered non-storm water discharges, unless such discharges *are specifically identified on a case-by-case basis as needing to be addressed.”* 55 Fed. Reg. 47995 (emphasis supplied). In the Guidance Manual, EPA states:

> If an applicant knows . . . that landscape irrigation water from a ***particular site*** flows through and picks up pesticides **or *excess*** nutrients from fertilizer applications, there may be a reasonable potential for a storm water discharge to result in a water quality impact. In such an event, the applicant should contact the NPDES permitting authority to request that the authority order ***the discharger*** . . . to obtain a separate NPDES permit (or in this case, the discharge could be controlled through the storm water management program of the MS4).

EPA Part 2 Guidance Manual, p. 6-33 (emphasis added). Read in this context of this language, the Water Board has no power greater than a municipality in terms of its ability to identify non-stormwater discharges as "illicit" and thus required to be regulated, and must identify specific discharges, and not entire categories of discharges. *See* 55 Fed. Reg. 48037. This has not been done in the Fact Sheet.

Provision E.3(c): This provision requires the Copermittees to compel development projects that may not result in a hydromodification impact to the applicable receiving waters, to implement on-site or "alternative compliance" hydromodification mitigation measures and to use using "pre-development (naturally occurring)" runoff reference condition as applied to sites that are, in fact, developed.

The Riverside County Copermittees are concerned that implementing these requirements would subject the Copermittees to liability under the takings clauses of the U.S. and California Constitutions as well as under the Mitigation Fee Act because of the questionable nexus between such a project's lack of actual hydromodification impacts upon the receiving waters, and the hydromodification management measures required in the Draft Permit.

When imposing a condition on a development permit, a local government is required under the federal and state constitutions to establish that the condition bears a reasonable relationship to the impacts of the development project. This rule applies even to legislatively enacted requirements and impact fees or exactions.[4] Moreover, fees imposed on a discretionary ad hoc basis are subject to heightened scrutiny under a two-part test. First, local governments must show that there is a substantial relationship between the burden created by the impact of development and any fee or exaction.[5] Second, a development project's impacts must bear a "rough proportionality" to any development fee or exaction.[6] Under California law, the *Nollan/Dolan* heightened scrutiny test also applies to in-lieu fees.[7]

The Legislature has memorialized these requirements in the Mitigation Fee Act, which establishes procedures that local governments must follow to impose impact fees.[8] Irrespective of whether the hydromodification management requirements are implemented by legislative act or on an ad hoc basis, the copermittees' attempt to enforce them as proposed in the Draft Permit would likely result in claims by developers and property owners alleging unconstitutional takings of private property and violations of the Mitigation Fee Act. This is because a developer could argue that limiting hydromodification impacts of already developed property to its "naturally occurring" state, or requiring hydromodification mitigation measures for impacts not imposed by the project, would not have a legally sufficient nexus to the impact of the development project.

In addition, the Copermittees wish to bring the Water Board's attention to a recent case, *Virginia Dept. of Transportation v. United States Environmental Protection Agency,* Civ. Action No.

[4] *Building Indus. Ass'n v. City of Patterson* (2009)171 Cal. App. 4th 886, 898.
[5] *Nollan v. California Coastal Comm'n*, 483 U.S. 825, 837 (1987).
[6] *Dolan v. City of Tigard*, 512 U.S. 374, 391 (1994).
[7] *Ehrlich v. City of Culver City* (1996) 12 Cal. 4th 854, 876.
[8] Cal. Gov't Code §§ 66000-66025.

1:12-CV-775 (E.D. Va. January 3, 2013) (slip op.), which is attached for the Water Board's convenience as Exhibit D. In this case, a federal district judge found that the CWA did not authorize U.S. EPA to regulate stormwater itself as a pollutant. The impact of this case is not known at this time, as it will probably be appealed to the Fourth Circuit Court of Appeals. Still, any approach to hydromodification which focuses on flows *per se*, as opposed to pollutants, may not withstand legal scrutiny.

Provision E.3.c.(3)(c)(i): This provision requires the entire alternative compliance in-lieu fee to be transferred to the copermittee or an escrow account prior to construction of a Priority Development Project (PDP). This provision is problematic, as development fees (which would include the in-lieu fees) are collected at the time of building permit issuance. In large-scale projects, permits may be issued (and development fees collected) in phases. Further, for master-planned developments, fees are generally negotiated through a development agreement to be collected based on certain development milestones. Therefore, collecting and holding the entire in-lieu fee prior to construction interferes with the development practice and may violate the Mitigation Fee Act and local development ordinances. The Redline requests that in-lieu fees be collected in accordance with state and local law.

Provision E.5: In addition to other comments on this provision and others in the Draft Permit relating to retrofitting, any requirements in Draft Permit relating to the retrofitting of engineered channels and other structures employed for flood control purposes must be consistent with the judgment of the flood control districts, to which the Legislature has assigned sole authority for the protection of the lives and property of their citizens from flooding. (Please see Comment Letter and proposed new findings in Redline for further discussion). Due to the urbanization of the counties over the past 150 years, as well as the particular topography and weather conditions found in Southern California, there is a great risk of flooding and hence the need for flood control structures and channels. The flood control districts have both the expertise and the sole legal authority to determine whether retrofitting of flood control structures can be accomplished in light of their statutory obligations, and that expertise and authority must be recognized in the Draft Permit.

Provision E.8: As noted in the Redline, the first requirement under Fiscal Analysis, that each "Copermittee must secure the resources necessary to meet all the requirements of this Order" has been deleted. This requirement is not found in the CWA regulations, which require only the conduct of a fiscal analysis. Moreover, this requirement intrudes on the home rule power of cities and counties by requiring, in essence, that municipal budgets must reflect the priority of compliance with the Order over any competing obligation, including police, fire protection and public health. A key issue in complying with stormwater and MS4 obligations is the ability of municipalities to afford the increasing costs associated with those obligations. In California, of course, the ability to raise taxes to pay for such obligations has been severely curtailed through several voter-approved propositions.

The Riverside County Copermittees request that Provision E.8.a be deleted.

EXHIBIT A

NPDES Permit No. DC0000221

AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM MUNICIPAL SEPARATE STORM SEWER SYSTEM PERMIT

In compliance with the provisions of the Clean Water Act, 33 U.S.C. §§ 1251 *et seq.*

Government of the District of Columbia
The John A. Wilson Building
1350 Pennsylvania Avenue, N.W.
Washington, D.C. 20004

is authorized to discharge from all portions of the municipal separate storm sewer system owned and operated by the District of Columbia to receiving waters named:

Potomac River, Anacostia River, Rock Creek and stream segments tributary to each such water body

in accordance with the Stormwater Management Program(s) dated February 19, 2009, subsequent updates, and related reports, strategies, effluent limitations, monitoring requirements and other conditions set forth in Parts I through IX herein.

The effective issuance date of this permit is: October 7, 2011.

This permit and the authorization to discharge shall expire at midnight, on: October 7, 2016.

Signed this 30th day of September, 2011.

Jon M. Capacasa, Director
Water Protection Division
U.S. Environmental Protection Agency
Region III

1. DISCHARGES AUTHORIZED UNDER THIS PERMIT

1.1 Permit Area

This permit covers all areas within the jurisdictional boundary of the District of Columbia served by, or otherwise contributing to discharges from, the Municipal Separate Storm Sewer System (MS4) owned or operated by the District of Columbia. This permit also covers all areas served by or contributing to discharges from MS4s owned or operated by other entities within the jurisdictional boundaries of the District of Columbia unless those areas have separate NPDES MS4 permit coverage or are specifically excluded herein from authorization under the District's stormwater program. Hereinafter these areas collectively are referred to as "MS4 Permit Area".

1.2 Authorized Discharges

This permit authorizes all stormwater point source discharges to waters of the United States from the District of Columbia's MS4 that comply with the requirements of this permit. This permit also authorizes the discharge of stormwater commingled with flows contributed by process wastewater, non-process wastewater, or stormwater associated with industrial activity provided such discharges are authorized under separate NPDES permits.

This permit authorizes the following non-stormwater discharges to the MS4 when appropriate stormwater activities and controls required through this permit have been applied and which are: (1) discharges resulting from clear water flows, roof drainage, dechlorinated water line flushing, landscape irrigation, ornamental fountains, diverted stream flows, rising ground waters, uncontaminated ground water infiltration to separate storm sewers, uncontaminated pumped ground water, discharges from potable water sources, foundation drains, air conditioning condensation, irrigation waters, springs, footing drains, lawn watering, individual resident car washing, flows from riparian habitats and wetlands, dechlorinated swimming pool discharges, wash water, fire fighting activities, and similar types of activities; and (2) which are managed so that water quality is not further impaired and that the requirements of the federal Clean Water Act, 33 U.S.C. §§ 1251 *et seq.*, and EPA regulations are met.

1.3 Limitations to Coverage

1.3.1 Non-stormwater Discharges

The permittee, as defined herein, shall effectively prohibit non-stormwater discharges into the MS4, except to the extent such discharges are regulated with an NPDES permit.

1.3.2 Waivers and Exemptions

This permit does not authorize the discharge of any pollutant from the MS4 which arises from or is based on any existing waivers and exemptions that may otherwise apply and are not consistent with the Federal Clean Water Act and other pertinent guidance, policies, and regulations. This narrative prohibition on the applicability of such waivers and exemptions extends to any activity that would otherwise be authorized under District law, regulations or ordinance but which impedes the reduction or control of pollutants through the use of stormwater control measures and/or prevents compliance with the narrative /numeric effluent limits of this permit. Any such discharge not otherwise authorized may constitute a violation of this permit.

1.4 Discharge Limitations

The permittee must manage, implement and enforce a stormwater management program (SWMP) in accordance with the Clean Water Act and corresponding stormwater NPDES regulations, 40 C.F.R. Part 122, to meet the following requirements:

1.4.1. Effectively prohibit pollutants in stormwater discharges or other unauthorized discharges into the MS4 as necessary to comply with existing District of Columbia Water Quality Standards (DCWQS);

1.4.2. Attain applicable wasteload allocations (WLAs) for each established or approved Total Maximum Daily Load (TMDL) for each receiving water body, consistent with 33 U.S.C. § 1342(p)(3)(B)(iii); 40 C.F.R. § 122.44(k)(2) and (3); and

1.4.3. Comply with all other provisions and requirements contained in this permit, and in plans and schedules developed in fulfillment of this permit.

Compliance with the performance standards and provisions contained in Parts 2 through 8 of this permit shall constitute adequate progress toward compliance with DCWQS and WLAs for this permit term.

2. LEGAL AUTHORITY, RESOURCES AND STORMWATER PROGRAM ADMINSTRATION

2.1 Legal Authority

2.1.1 The permittee shall use its existing legal authority to control discharges to and from the Municipal Separate Storm Sewer System in order to prevent or reduce the discharge of pollutants to achieve water quality objectives, including but not limited to applicable water quality standards. To the extent deficiencies can be addressed through regulation or other Executive Branch action, the permittee shall remedy such deficiencies within 120 days. Deficiencies that can only be addressed through legislative action shall be remedied within 2 years of the effective date of this permit, except where otherwise stipulated, in accordance with the District's legislative process. Any changes to or deficiencies in the legal authority shall be explained in each Annual Report.

2.1.2 No later than 18 months following the effective date of this permit, the District shall update and implement Chapter 5 of Title 21 of District of Columbia Municipal Regulations (Water Quality and Pollution) ("updated DC Stormwater Regulations"), to address the control of stormwater throughout the MS4 Permit Area. Such regulations shall be consistent with this

FACT SHEET

National Pollutant Discharge Elimination System (NPDES)
Municipal Separate Storm Sewer System (MS4)
Permit No. DC0000221 (Government of the District of Columbia)

NPDES PERMIT NUMBER: DC0000221 (Reissuance)

FACILITY NAME AND MAILING ADDRESS:

Government of the District of Columbia
The John A. Wilson Building
1350 Pennsylvania Avenue, N.W.
Washington, D.C. 20004

MS4 ADMINISTRATOR NAME AND MAILING ADDRESS:

Director, District Department of the Environment
1200 First Street, N.E., 6th Floor
Washington, D.C. 20002

FACILITY LOCATION:

District of Columbia's Municipal Separate Storm Sewer System (MS4)

RECEIVING WATERS:

Potomac River, Anacostia River, Rock Creek, and Stream Segments Tributary
To Each Such Water Body

INTRODUCTION:

Today's action finalizes reissuance of the District of Columbia Municipal Separate Storm Sewer System (MS4) Permit. In the Final Permit EPA has continued to integrate the adaptive management approach with enhanced control measures to address the complex issues associated with urban stormwater runoff within the corporate boundaries of the District of Columbia, where stormwater discharges via the Municipal Separate Storm Sewer System (MS4).

Since the United States Environmental Protection Agency, Region III (EPA) issued the District of Columbia (the District) its first MS4 Permit in 2000, the Agency has responded to a number of legal challenges involving both that Permit (as well as amendments thereto) and the second-round MS4 Permit issued in 2004. For the better part of ten years, the Agency has worked with various parties in the litigation, including the District and two non-governmental organizations, Defenders of Wildlife and Friends of the Earth, to address the concerns of the various parties. The Agency has engaged in both litigation and negotiation, including formal mediation.[1] These activities ultimately led to an enhanced stormwater management strategy in the District, consisting of measurable outputs for addressing the issues raised during the litigation and mediation process.

FACILITY BACKGROUND AND DESCRIPTION:

The Government of the District of Columbia owns and operates its own MS4, which discharges stormwater from various outfall locations throughout the District into its waterways.[2]

On April 21, 2010 EPA public noticed the Draft Permit. The Draft Fact Sheet published with that Draft Permit contains more extensive permit background information, and the reader is referred to that document for the history of the District of Columbia MS4 permit.

The public comment period closed on June 4, 2010. EPA received comments from 21 individual commenters and an additional 53 form letters. The Draft Permit, Draft Fact Sheet, and comments received on those documents are all available at: http://www.epa.gov/reg3wapd/npdes/draft_permits.html. The Final Permit reflects many of the comments received. EPA is simultaneously releasing a responsiveness summary responding to these comments.

ACTION TO BE TAKEN:

EPA is today reissuing the District of Columbia NPDES MS4 Permit. The Final Permit replaces the 2004 Permit, which expired on August 18, 2009 and has been administratively extended since that time. The Final Permit incorporates concepts and approaches developed from studies and pilot projects that were planned and implemented by the District under the 2000 and 2004 MS4 permits and modifying Letters of Agreement, and implements Total Maximum Daily Loads (TMDLs) that have been finalized since the prior permit was issued, including the Chesapeake Bay TMDL. A number of applicable measurable performance standards have been incorporated into the Final Permit. These and other changes between the 2004 Permit and today's Final Permit are reflected in a Comparison Document that is part of today's Permit issuance.

WATER QUALITY IN DISTRICT RECEIVING WATERS:

The District's *2008 Integrated Report to the Environmental Protection Agency and U.S. Congress Pursuant to Sections 305(b) and 303(d) Clean Water Act*[3] documents the serious water

1 A procedural history of Permit appeals can be viewed at the EPA Environmental Appeals Board web: http://yosemite.epa.gov/oa/EAB_Web_Docket.nsf/77355bee1a56a5aa8525711400542d23/b5e5b68e89edabe98525714f00731c6f!OpenDocument&Highlight=2,municipal.

2 Portions of the District are served by a combined sanitary and storm sewer system. The discharges from the combined sewer system are not subject to the MS4 permit, but are covered under NPDES Permit No. xxxx issued to the District of Columbia Water and Sewer Authority.

3 District Department of the Environment, *The District of Columbia Water Quality Assessment, 2008 Integrated Report to the Environmental Protection Agency and U.S. Congress Pursuant to Sections 305(b) and 303(d) Clean Water Act* (hereinafter "2008 Integrated Report").

quality impairments in the surface waters in and around the District. A number of the relevant designated uses are not being met, *e.g.*, aquatic life, fish consumption, and full body contact, and there are a number of specific pollutants of concern that have been identified (for additional discussion on relevant TMDLs *see* Section 4.10 of this Final Fact Sheet).

Commenters on the Draft Permit expressed some frustration over very slow progress or even lack of progress after a decade of implementation of the MS4 program and even longer for other water quality programs. EPA appreciates this concern. Although the District's receiving waters are affected by a range of discharge sources, discharges from the MS4 are a significant contributor of pollutants and cause of stream degradation. EPA also recognizes, however, that stormwater management efforts that achieve a reversal of the ongoing degradation of water quality caused by urban stormwater discharges entail a long term, multi-faceted approach.

Consistent with the federal stormwater regulations for characterizing discharges from the MS4 (40 C.F.R. §122.26(d)(2)(iii)), the first two permit terms for the District's MS4 program required end-of-pipe monitoring to determine the type and severity of pollutants discharging via the system. The monitoring program was not designed to evaluate receiving water quality *per se*, therefore detection of trends or patterns was not reasonably possible. Today's Final Permit includes requirements for a Revised Monitoring Program, and one of the objectives for the program is to use a suite of approaches and indicators to evaluate and track water quality over the long-term (*see* discussion of Section 5.1 in this Final Fact Sheet).
There have been identified improvements in some areas. For example the *2008 Integrated Report* noted improvements in the diversity of submerged aquatic vegetation in the Potomac River, as well as improvements in fish species richness in Rock Creek. Biota metrics are often the best indicators of the integrity of any aquatic system.

EPA also notes that there are a variety of indirect measures indicative of improvement. The federal stormwater regulations foresaw the difficulty, especially in the near-term, of detecting measurable improvement in receiving waters, and relied instead on indirect measures, such as estimates of pollutant load reductions (40 C.F.R. §122.26(d)(2)(v)). The District documents these types of indirect measures in its annual reports, *e.g.*, tons of solids collected from catch basin clean-outs, amount of household hazardous waste collected, number of trees planted, square footage of green roofs installed, and many other measures of success.[4]

EPA believes that documenting trends in water quality, whether improvements, no change, or even further degradation, is an important element of a municipal water quality program. Today's Final Permit recognizes this principle, both in the types of robust measures required as well as the transition to new monitoring paradigms. EPA encourages all interested parties to provide the District with input during the development of these program elements.

THIS FACT SHEET:

(http://ddoe.dc.gov/ddoe/frames.asp?doc=/ddoe/lib/ddoe/information2/water.reg.leg/DC_IR_2008_Revised_9-9-2008.pdf

4 District MS4 Annual Reports can be found at: http://ddoe.dc.gov/ddoe/cwp/view.a,1209,q,495855.asp

This Final Fact Sheet is organized to correspond with the chronological organization and numbering in today's Final Permit. Where descriptions or discussions may be relevant to more than one element of the Final Permit the reader will be referred to the relevant section(s).

To keep today's Final Fact Sheet of readable length, many of the elements included in the fact sheet published with the Draft Permit (Draft Fact Sheet) on April 21, 2010 have not been repeated, but are referenced. Readers are referred to the Draft Fact Sheet published with the Draft Permit for additional discussion on provisions that have been finalized as proposed.[5] The Final Fact Sheet does discuss significant changes since the 2004 Permit (even if discussed in the Draft Fact Sheet). The Final Fact Sheet also contains additional explanation of the Final Permit where commenters requested additional clarification. In addition, this Final Fact Sheet explains modifications to the Final Permit where provisions were changed in response to comments.

In many cases EPA made a number of very simple modifications to the Final Permit, *e.g.*, a word, phrase, or minor reorganization, simply for purposes of clarification. These modifications were not intended to change the substance of the permit provisions, only to clarify them. Most of those types of edits are not discussed in this Final Fact Sheet, but EPA has provided a Comparison Document of the Draft and Final Permits for readers who would like that level of detail.

Many commenters noted that the Draft Permit was not logically organized. EPA agrees. The major reorganization principles include:

1) There is a new Section 3, Stormwater Management Program (SWMP) Plan consolidating the various plans, strategies and other documents developed in fulfillment of permit requirements.
2) All implementation measures, *i.e.*, those stipulating management measures and implementation policies, are included in Section 4 of today's Final Permit. This includes "Source Identification" elements (Section 3 in the Draft Permit) and "Other Applicable Provisions" elements (Section 8 in the Draft Permit), which included TMDL requirements.
3) All monitoring requirements are consolidated in Section 5 of the Final Permit.
4) All reporting requirements are consolidated in Section 6 of the Final Permit.

EPA also refers readers to the Responsiveness Summary released today along with the Final Permit and Final Fact Sheet, for responses to comments and questions received on the Draft Permit. That document contains additional detailed explanations of the rationale for changes made to the Draft Permit in the Final Permit.

Finally, EPA made significant effort to avoid appending or incorporating by reference other documents containing permit requirements into the Final Permit. In the interest of clarity

5 The Permit and Fact Sheet proposed on April 21, 2010 can be viewed at: http://www.epa.gov/reg3wapd/npdes/draft_permits.html

and transparency EPA, to the extent possible, has included all requirements directly in the permit. Thus, EPA reviewed a variety of documents with relevant implementation measures, *e.g.*, TMDL Implementation Plans and the 2008 Modified Letter of Agreement to the 2004 permit[6], and translated elements of those plans and strategies into specific permit requirements that are now contained in the Final Permit. This Fact Sheet provides an explanation of the sources of provisions that are significant and are a direct result of one of those strategies.

1. DISCHARGES AUTHORIZED UNDER THIS PERMIT

(1.2 Authorized Discharges): The Final Permit authorizes certain non-stormwater discharges, including discharges from water line flushing. One commenter noted that many of these discharges, especially from potable water systems, contain concentrations of chlorine that may exceed water quality standards. EPA agrees, and has therefore clarified that dechlorinated water line flushing is authorized to be discharged under the Final Permit.

(1.4 Discharge Limitations): Comments on the language in Part 1.4 varied widely. Some commenters did not believe it was reasonable to require discharges to meet water quality standards. Other commenters believed this to be an unambiguous requirement of the Clean Water Act.

Today's Final Permit is premised upon EPA's longstanding view that the MS4 NPDES permit program is both an iterative and an adaptive management process for pollutant reduction and for achieving applicable water quality standard and/or total maximum daily load (TMDL) compliance. *See generally,* "National Pollutant Discharge Elimination System Permit Application Regulations for Stormwater Discharges," 55 F.R. 47990 (Nov. 16, 1990).

EPA is aware that many permittees, especially those in highly urbanized areas such as the District, likely will be unable to attain all applicable water quality standards within one or more MS4 permit cycles. Rather the attainment of applicable water quality standards as an incremental process is authorized under section 402(p)(3)(B)(iii) of the Clean Water Act, 33 U.S.C. § 1342(p)(3)(B)(iii), which requires an MS4 permit "to reduce the discharge of pollutants to the maximum extent practicable" (MEP) "and such other provisions" deemed appropriate to control pollutants in municipal stormwater discharges. To be clear, the goal of EPA's stormwater program is attainment of applicable water quality standards, but Congress expected that many municipal stormwater dischargers would need several permit cycles to achieve that goal.

Specifically, the Agency expects that attainment of applicable water quality standards in waters to which the District's MS4 discharges, requires staged implementation and increasingly more stringent requirements over several permitting cycles. During each cycle, EPA will continue to review deliverables from the District to ensure that its activities constitute sufficient progress toward standards attainment. With each permit reissuance EPA will continue to increase

6 District Department of the Environment, *Modification to the Letter of Agreement dated November 27, 2007 for the NPDES Municipal Separate Storm Sewer (MS4) Permit DC0000222* (2008) http://www.epa.gov/reg3wapd/npdes/pdf/DCMS4/Letter.PDF

stringency until such time as standards are met in all receiving waters. Therefore today's Final Permit is clear that attainment of applicable water quality standards and consistency with the assumptions and requirements of any applicable WLA are requirements of the Permit, but, given the iterative nature of this requirement under CWA Section 402(p)(3)(B)(iii), the Final Permit is also clear that "compliance with all performance standards and provisions contained in the Final Permit shall constitute adequate progress toward compliance with DCWQS and WLAs for this permit term" (Section 1.4).

EPA believes that permitting authorities have the obligation to write permits with clear and enforceable provisions and thus the determination of what is the "maximum extent practicable" under a permit is one that must be made by the permitting authority and translated into provisions that are understandable and measurable. In this Final Permit EPA has carefully evaluated the maturity of the District stormwater program and the water quality status of the receiving waters, including TMDL wasteload allocations. In determining whether certain measures, actions and performance standards are practicable, EPA has also looked at other programs and measures around the country for feasibility of implementation. Therefore today's Final Permit does not qualify any provision with MEP thus leaving this determination to the discretion of the District. Instead each provision has already been determined to be the maximum extent practicable for this permit term for this discharger.

EPA modified the language in the Final Permit to provide clarity on the expectations consistent with the preceding explanation. Specifically Section 1.4.2 of the Final Permit requires that discharges 'attain' applicable wasteload allocations rather than just 'be consistent' with them, since the latter term is somewhat ambiguous.

In addition, the general discharge limitation 'no increase in pollutant loadings from discharges from the MS4 may occur to receiving waters' was removed because of the difficulty in measuring, demonstrating and enforcing this provision. Instead, consistent with EPA's belief that the Final Permit must include all of the enforceable requirements that would achieve this principle, the following discharge limitation is substituted: "comply with all other provisions and requirements contained in this permit, and in plans and schedules developed in fulfillment of this permit."

In addition, EPA made the following modifications: "Compliance with <u>the</u> performance standards and provisions contained in <u>Parts 2 through 8 of</u> this permit shall constitute adequate progress towards compliance with DCWQS <u>and WLAs for this permit term</u>" (*underlined text added*) (Section 1.4 of the Final Permit). EPA eliminated circularity with the addition of "Parts 2 through 8", clarifying that this requirement does not circle back to include the statements in 1.4.1 and 1.4.2, but rather interprets them. Also, although WLAs are a mechanism for attainment of water quality standards, EPA added the specific language "and WLAs" to make this concept explicit rather than just implicit. In addition this revised language emphasizes that the specific measures contained in the Final Permit, while appropriate for this permit term, will not necessarily constitute full compliance in subsequent permit terms. It is the expectation that with each permit reissuance, additional or enhanced requirements will be included with the objective of ensuring that MS4 discharges do not cause or contribute to an exceedance of applicable water quality standards, including attainment of relevant WLAs.

2. LEGAL AUTHORITY, RESOURCES, AND STORMWATER PROGRAM ADMINISTRATION

(2.1 Legal Authority): Several commenters pointed out that there were a number of requirements in the Draft Permit without clear compliance schedules or deadlines, or with deadlines that did not correspond well to others in the permit. In the Final Permit, EPA has made several revisions to address these comments. For example, EPA changed a requirement that deficiencies in legal authority must be remedied "as soon as possible" to a 120-day requirement for deficiencies that can be addressed through regulation, and two years for deficiencies that require legislative action (Section 2.1.1). Also, EPA increased the compliance schedule for updating the District's stormwater regulation from twelve months to eighteen months, *id.,* so that this action could be adequately coordinated with the development of the District's new offsite mitigation/payment-in-lieu program (for more discussion see Section 4.1.3 below).

(2.2 Fiscal Resources): One commenter suggested eliminating the reference to the District's Enterprise Fund since funding was likely to come from a number of different budgets within the District. EPA agrees with this comment and has removed this reference.

On the other hand, many commenters noted that the implementation costs of the District's stormwater program will be significant. EPA agrees. The federal stormwater regulations identify the importance of adequate financial resources [40 C.F.R. §122.26(d)(1)(vi) and (d)(2)(vi)]. In addition, after seeing notable differences in the caliber of stormwater programs across the country, EPA recognizes that dedicated funding is critical for implementation of effective MS4 programs.[7,8,9] In 2009 the District established, and in 2010 revised, an impervious-based surface area fee for service to provide core funding to the stormwater program[10] (understanding that stormwater-related financing may still come from other sources as they fulfill multiple purposes, *e.g.,* street and public right-of-way retrofits). In conjunction with the 2010 rule-making to revise the fee the District issued a Frequently Asked Questions document[11] that indicates the intent to restrict this fee to its original purpose, *i.e.,* dedicated funding to implement the stormwater program and comply with MS4 permit requirements. EPA believes this action is essential, and he expects that the District will maintain a dedicated source of funding for the stormwater program.

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7 National Research Council, *Urban Stormwater Management in the United States* (2009) National Academy of Sciences http://www.nap.edu/catalog.php?record_id=12465

8 National Association of Flood and Stormwater Agencies, Funded by EPA, *Guidance for Municipal Stormwater Funding* (2006) http://www.nafsma.org/Guidance%20Manual%20Version%202X.pdf

9 EPA, *Funding Stormwater Programs* (2008) http://www.epa.gov/npdes/pubs/region3_factsheet_funding.pdf

10 District of Columbia, Rule 21-566 Stormwater Fees, http://www.dcregs.dc.gov/Gateway/RuleHome.aspx?RuleID=474056

11 District of Columbia, FAQ Document *Changes to the District's Stormwater Fee* (2010) http://ddoe.dc.gov/ddoe/frames.asp?doc=/ddoe/lib/ddoe/information2/water.reg.leg/Stormwater_Fee_FAQ_10-5-10_-final.pdf

EXHIBIT B

CALIFORNIA
Water Boards

Edmund G. Brown Jr.
Governor

Matthew Rodriquez
Secretary for
Environmental Protection

State Water Resources Control Board

State Water Resources Control Board

Issue Paper
Municipal Storm Water Permit Receiving Water Limitations
Board Workshop
November 20, 2012

ISSUE:

The State Water Resources Control Board (State Water Board) has been asked, in public comments received on National Pollutant Discharge Elimination System (NPDES) permits for Municipal Separate Storm Sewer Systems (MS4s), to adopt permit provisions that create a partial or complete exemption from enforcement for violations of water quality standards while a discharger engages in an iterative process of improving controls (commonly referred to as a "safe harbor" provision). The State Water Board has scheduled a public workshop to consider the issue.

DISCUSSION:

Background:

The Clean Water Act generally requires NPDES permits to include technology-based effluent limitations and any more stringent limitations necessary to meet water quality standards. In the context of NPDES permits for MS4s, however, the Clean Water Act does not reference the requirement to meet water quality standards. MS4 discharges must meet a technology-based standard of reducing pollutants in the discharge to the Maximum Extent Practicable (MEP), but requirements to meet water quality standards are at the discretion of the permitting agency.[1] Further, under the Porter-Cologne Water Quality Control Act, waste discharge requirements must implement applicable water quality control plans, including water quality objectives; however, the Porter-Cologne Act also affords the State Water Board and regional water quality control boards (collectively, Water Boards) flexibility to consider other factors, such as economics, when establishing any NPDES permit requirements that are more stringent than required by the Clean Water Act.[2]

The State Water Board has exercised its discretion with regard to requiring compliance with water quality standards in MS4 permits by directing, in precedential orders, that MS4 permits contain provisions requiring discharges to be controlled so as not to cause or contribute to exceedances of water quality standards in receiving waters.[3] However, consistent with federal

[1] 33 U.S.C. § 1342(p); *Defenders of Wildlife v. Browner* (9th Cir. 1999) 191 F.3d 1159.

[2] Wat. Code, §§ 13241, 13263; *City of Burbank v. State Water Resources Control Bd.* (2005) 35 Cal.4th 613.

[3] SWRCB Order WQ 98-01 (*Environmental Health Coalition*), WQ 99-05 (*Environmental Health Coalition)*.

law, the State Water Board has found it appropriate to implement Best Management Practices (BMPs) in lieu of numeric water quality-based effluent limitations to meet water quality standards.[4] Additionally, in lieu of "strict compliance" with water quality standards, the State Water Board has prescribed an iterative process whereby an exceedance of a water quality standard triggers a process of BMP improvements: reporting of the violation, submission of a report describing proposed improvements to BMPs expected to better meet water quality standards, and implementation of these new BMPs.

While the Water Boards have generally directed dischargers to achieve compliance with water quality standards by improving control measures through the iterative process, the iterative process does not provide a "safe harbor" to MS4 permittees: that is, when a discharger is shown to be causing or contributing to an exceedance of water quality standards, that discharger is in violation of the relevant discharge prohibitions and receiving water limitations of the permit and potentially subject to enforcement by the Water Boards or through a citizen suit, even if the discharger is actively engaged in the iterative process. Despite the lack of a safe harbor provision, however, the Water Boards have, as a matter of practice, declined to initiate enforcement actions against MS4 permittees who have been actively engaged in the iterative process. The Water Boards' decisions to decline to include a safe harbor in MS4 permits have been upheld by courts of appeal.[5]

<u>*Need for and Purpose of Workshop:*</u>

The lack of a safe harbor in the iterative process was recently highlighted by the Ninth Circuit's decision in a citizen suit brought by the Natural Resources Defense Council (NRDC) against the County of Los Angeles and the Los Angeles County Flood Control District for violations of the receiving water limitations of their MS4 permit. The Ninth Circuit confirmed that, as the receiving water limitations of the Water Boards' MS4 permits are currently drafted, engagement in the iterative process does not excuse liability for violations of water quality standards.[6]

As the storm water management programs of municipalities have matured, an increasing body of monitoring data indicates that water quality standards are in fact not being met by many MS4s. MS4s accordingly assert that the receiving water limitations and iterative process provisions of the Water Boards' permits do not afford them with a viable path to compliance for these violations, which may take years of technical efforts to correct, especially for wet weather discharges. MS4s argue that they are increasingly vulnerable to citizen suits and/or Water Board enforcement. This concern has been raised by the California Stormwater Quality Association (CASQA) in comments on the proposed Phase II MS4 permit and by the California Department of Transportation (Caltrans) in comments on the Caltrans MS4 permit adopted

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[4] *See* SWRCB Orders WQ 91-03 (*Citizens for a Better Environment)*, WQ 98-01 (*Environmental Health Coalition*), WQ 2001-15 (*Building Industry Association of San Diego County*); *See also* 40 C.F.R. § 122.44(k); Interim Permitting Approach for Water Quality-Based Effluent Limitations In Storm Water Permits, USEPA, September 1995. In such orders and guidance, the State Water Board and Environmental Protection Agency acknowledge that the storm water program may evolve over time to incorporate stricter limitations, including improved BMPs to meet water quality standards or numeric water quality based effluent limitations.

[5] *Building Industry Assn. of San Diego County v. State Water Resources Control Bd.* (2004) 124 Cal.App.4th 866; *City of Rancho Cucamonga v. Regional Water Quality Control Bd.* (2006) 135 Cal.App.4th 1377; see also *Natural Resources Defense Council v. County of Los Angeles* (9th Cir. 2011) 673 F.3d 880, 897, n.7.

[6] *Natural Resources Defense Council v. County of Los Angeles, supra*, 673 F.3d at p. 897. On July 13, 2012, the United States Supreme Court granted review of this case on other grounds.

September 19, 2012, as well as by numerous MS4s and interested persons in comments on both permits. The issue is additionally relevant to the Phase I MS4 permits issued by the regional water quality control boards.[7]

At the same time, the environmental community has commented that the iterative process has been underutilized and ineffective to date in bringing MS4 discharges into compliance with water quality standards. Environmental parties argue that direct enforcement of water quality standards is necessary to protect water quality, especially in such second- or third-generation permits where dischargers have already had a number of years to come into compliance.

Because of the broad applicability of any policy decisions regarding the receiving water limitations and iterative process provisions, the State Water Board is holding a public workshop to consider several alternatives in addressing the issue and to seek public input on these alternatives. Following the workshop, the State Water Board may propose revisions to the receiving water limitations in the Caltrans MS4 and Phase II MS4 permits, and as necessary, re-open those permits after public review and comment, to make the revisions.

ALTERNATIVES FOR CONSIDERATION:

The State Water Board may consider the alternatives below, individually or in combination, to address concerns with the receiving water limitations in the Caltrans or Phase II MS4 permits. While the listed alternatives attempt to capture the range of alternatives before the State Water Board, the Board welcomes comments proposing other options and will not be limiting its consideration to the alternatives as listed in this issue paper.

The receiving water limitations language prescribed by State Water Board Order WQ 99-05 is attached as Attachment 1 and forms the basis of Alternative 1. CASQA has submitted specific proposed language for the Receiving Water Limitations provision of the proposed Phase II MS4 permit (CASQA Proposal). The CASQA Proposal is attached as Attachment 2 and is referenced as appropriate in the discussion of the alternatives below.

Alternative 1: Keep the status quo of no safe harbor.

This alternative makes no changes to the existing State Water Board approach or to the current language of the adopted Caltrans MS4 permit or the proposed Phase II MS4 permit. As stated previously, the current MS4 permit provisions laying out the iterative process are based on language set forth in precedential State Water Board orders. (See Attachment 1.) Alternative 1 adheres to the prescribed language. Under this alternative, the Water Boards may choose to exercise their enforcement discretion to refrain from taking action against dischargers engaged in good faith implementation of the iterative process; however, they would not be constrained from enforcing the receiving water limitations when an MS4 causes or contributes to exceedances of water quality standards. As a limitation within an NPDES permit, dischargers who cause or contribute to an exceedance of water quality standards could be subject to citizen suits.

[7] Note that the issue is not relevant to any other NPDES permits, including permits for storm water discharges associated with industrial activity, because all other NPDES permits must include technology-based effluent limitations and any more stringent limitations necessary to meet water quality standards. (33 U.S.C. § 1311(b)(1)(C).)

Alternative 2: No safe harbor, but provide greater clarity and specificity for iterative process implementation and wet weather data analysis.

Greater clarity and specificity in the MS4 permits as to the iterative process requirements may result in increased efforts to improve controls and achieve compliance. Such clarity and specificity may include:

1. Clarification on how compliance with the relevant discharge prohibitions and receiving water limitations is determined, including type and frequency of monitoring;
2. Clarification that dischargers must begin the iterative process after documentation of violations without waiting to be directed to do so by the Water Boards;
3. Specification of the minimum efforts that will constitute meaningful compliance with the iterative process;
4. Specification of the scope of any corrective action, including whether it applies only at the location where exceedances are measured or throughout the relevant watershed;
5. Specification of additional wet weather data analysis to better define and assess the impact of municipal storm water discharges on receiving waters, as well as the efficacy of specific best management practices.

As the MS4 program continues to mature and more data becomes available, this alternative may be enhanced by the development of water quality-based effluent limitations for pollutants, as appropriate, as a means of determining compliance with receiving water limitations. In addition, the enhanced wet weather data could be used to identify surrogates that could be used as a measure of protecting beneficial uses. In time, the data could be used to develop actual wet weather water quality standards or wet weather implementation provisions for existing water quality standards that could be applied consistently on a statewide basis.

Given the nature of storm water discharges and of MS4s, questions such as where and how compliance with water quality standards should be measured and how narrowly or broadly corrective actions should be applied, pose complicated technical issues that require careful study and consideration. These challenges notwithstanding, water quality improvements are more likely to be achieved as the iterative process becomes automatic and dischargers follow clear guidelines for determining and addressing non-compliance with permit terms. Such improvements may dissuade the Water Boards and the public from bringing enforcement actions/citizen suits for all except the most egregious and repeated violations.

In addition to being a stand-alone alternative, Alternative 2 may be considered in combination with Alternatives 3 through 5. The CASQA Proposal incorporates some greater specificity in the iterative process requirements as a component of its proposed receiving water limitations.

Alternative 3: Safe harbor that applies only if a discharger is in compliance with the implementation provisions of an approved TMDL.

Under Alternative 3, the receiving water limitations would be amended to provide a safe harbor for permittees that are in compliance with the implementation provisions of a TMDL. In effect, as long as the permittee is in compliance with the TMDL (including any compliance schedule) the terms of the TMDL would replace the requirement to comply with water quality standards for the pollutants that are covered by the TMDL.

The CASQA Proposal contemplates a safe harbor for dischargers in compliance with a TMDL as a component of the receiving water limitations.

Alternative 4: Safe harbor that applies if a discharger is in compliance with the implementation provisions of an approved TMDL, as in Alternative 3, and, in addition, that applies when the discharger engages in good faith compliance with the iterative process for exceedances caused by wet weather discharges.

In addition to the safe harbor for TMDL implementation, Alternative 4 would provide a safe harbor when dischargers engage in the iterative process in good faith to address violations of permit terms caused by wet weather discharges. Thus, if a storm water discharge from an MS4 is causing or contributing to an exceedance of a water quality standard in the receiving water, the exceedance would not constitute a violation of the permit as long as the discharger was engaged in good faith efforts to address the exceedance through improved controls. Alternative 4 recognizes that wet weather discharges from MS4s frequently cause or contribute to violations of water quality standards and allows the MS4s time to address these violations by improving control measures.

However, the safe harbor would not extend to dry weather discharges. Non-storm water discharges are generally prohibited in MS4 permits and only a few categories of non-storm water discharges are exempted from the prohibition, with the condition that these exempted discharges also be prohibited if they are identified as sources of pollutants to receiving waters.

Alternative 5: Full safe harbor.

This alternative would provide a full safe harbor to dischargers complying with the implementation provisions of a TMDL or engaging in the iterative process to address exceedances caused by wet or dry weather discharges.

The CASQA Proposal attached provides for a full safe harbor.

Attachments Removed

EXHIBIT C

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RIVERSIDE COUNTY FLOOD CONTROL
AND WATER CONSERVATION DISTRICT

November 13, 2012

Honorable Members of the State Water Resources Control Board
Attn: Ms. Jeanine Townsend, Clerk to the Board
State Water Resources Control Board
1001 I Street, 24th Floor
Sacramento, CA 95814

Dear Honorable Board Members and Ms. Townsend:

Re: Comment Letter – Receiving Water Limitations Language Workshop

I am writing on behalf of the Riverside County Flood Control and Water Conservation District ("District") regarding the State Water Resources Control Board's consideration of Receiving Water Limitations ("RWL") language in MS4 permits. This review was triggered by a decision of the Ninth Circuit United States Court of Appeals in *Natural Resources Defense Council v. County of Los Angeles* (9th Cir. 2011) 673 F.3d 880, *cert granted,* __ U.S. __ (June 25, 2012) ("*NRDC*"). This letter is being submitted in advance of the State Board's November 20, 2012 workshop on reform of the RWL language to be incorporated into MS4 permits as a matter of statewide policy.

The District is the Principal Permittee for <u>three</u> Phase I MS4 permits applicable to municipalities across Riverside County: Order R8-2010-0033, issued by the Santa Ana Regional Water Board to municipalities within the Santa Ana River Region of Riverside County; Order R9-2010-016, issued by the San Diego Regional Water Board to municipalities within the Santa Margarita Region of Riverside County; and Order R7-2008-0001, issued by the Colorado River Regional Water Board to municipalities within the Whitewater River Region of Riverside County. Given our unique perspective as the manager of three Phase 1 MS4 permits, the District and its staff thus, have considerable experience and expertise in developing and administering MS4 permits, and a keen understanding of the issues that the above mentioned court case creates.

The District strongly supports reform of the RWL language to make clear the State Board's often-expressed intention that MS4 Permittees' compliance with RWL be effectuated through an iterative process. However, under the Ninth Circuit's interpretation, any MS4 discharge that causes or contributes to an exceedance of a Water Quality Standard subjects the MS4 Permittee to civil penalty liability, injunctive relief and the payment of attorneys' fees in an action brought by a citizen plaintiff, even where the Permittee is fully implementing the programmatic requirements of their MS4 Permit.

The District supports the California Stormwater Quality Association's ("CASQA") efforts to obtain RWL language that ensures that the iterative process favored by the State Board is honored. The District also supports the comments of the California State Association of Counties, and believes the proposed RWL language attached to those comments is a step in the right direction.

This letter contains additional District comments about the RWL language and the iterative process. We believe that they are best expressed in terms of correcting misperceptions regarding the current RWL language, as interpreted by the Ninth Circuit.

Misperception Number One: Strict compliance with Water Quality Standards is required of MS4 Permittees by the Clean Water Act.

The Clean Water Act provides that MS4 discharges must control pollutants in discharges from the MS4 to the "Maximum Extent Practicable" (33 U.S.C. § 1342(p)(3)(B)(iii)). Unlike the case with other NPDES Permittees, the Clean Water Act does not require that municipalities strictly comply with Water Quality Standards, as determined by the Ninth Circuit in *Browner v. Defenders of Wildlife*. The State Board's own precedential Order WQ 2001-15 recognizes this fact and states that the RWL language was intended to be consistent with the *Browner* case. In that Order, which interpreted RWL language similar to that in *NRDC*, the Board stated:

> *[O]ur language, similar to the U.S. EPA's permit language discussed in the Browner case, does not require strict compliance with water quality standards. Our language requires that storm water management plans be designed to achieve compliance with water quality standards. Compliance is to be achieved over time, through an iterative approach requiring improved BMPs. As pointed out by the Browner court, there is nothing inconsistent between this approach and the determination that the Clean Water Act does not mandate strict compliance with water quality standards. [Order WQ 2001-15 at 7 (emphasis added)].*

Unfortunately, the Ninth Circuit completely disregarded this language, and the Order, in holding that strict compliance was required of MS4 Permittees.

USEPA itself has issued MS4 permits (in non-delegated states) that do not contain RWL language requiring strict compliance with Water Quality Standards. Therefore, it is clear that such compliance is not required by the Clean Water Act nor is such compliance established by USEPA policy. The most prominent example of a recent MS4 permit promulgated by USEPA is that for the District of Columbia ("DC Permit") (relevant portions of which are attached as Exhibit A), which was adopted in 2011.

Part 1.4 of the DC Permit contains the requirements relating to Water Quality Standards and provides, in relevant part: "Compliance with the performance standards and provisions contained in Parts 2 through 8 of the permit shall constitute adequate progress towards compliance with DCWQS [water quality standards] and WLAs [established under TMDLs] for this permit term." The DC Permit Fact Sheet explains the rationale for that language as follows [DC Permit Fact Sheet, Pages 5-6, emphasis added, attached as Exhibit B]:

> *Comments on the language in Part 1.4 varied widely. Some commenters did not believe it was reasonable to require discharges to meet water quality standards. Other commenters believed this to be an unambiguous requirement of the Clean Water Act.*

> *Today's Final Permit is premised upon* **EPA's longstanding view that the MS4 NPDES permit program is both an iterative and an adaptive management process for pollutant reduction and for achieving applicable water quality standard and/or total maximum daily load (TMDL) compliance.** *See generally, "National Pollutant Discharge Elimination System Permit Application Regulations for Stormwater Discharges," 55 F.R. 47990 (Nov. 16, 1990).*
>
> **EPA is aware that many Permittees, especially those in highly urbanized areas such as the District, likely will be unable to attain all applicable water quality standards within one or more MS4 permit cycles.** *Rather the attainment of applicable water quality standards* **as an incremental process** *is authorized under section 402(p)(3)(B)(iii) of the Clean Water Act, 33 U.S.C. § 1342(p)(3)(B)(iii), which requires an MS4 permit "to reduce the discharge of pollutants to the maximum extent practicable" (MEP) "and such other provisions" deemed appropriate to control pollutants in municipal stormwater discharges.* **To be clear, the goal of EPA's stormwater program is attainment of applicable water quality standards, but Congress expected that many municipal stormwater dischargers would need several permit cycles to achieve that goal.**
>
> *Specifically, the Agency expects that attainment of applicable water quality standards in waters to which the District's MS4 discharges, requires staged implementation and increasingly more stringent requirements over several permitting cycles. During each cycle, EPA will continue to review deliverables from the District to ensure that its activities constitute sufficient progress toward standards attainment. With each permit reissuance EPA will continue to increase stringency until such time as standards are met in all receiving waters.* **Therefore today's Final Permit is clear that attainment of applicable water quality standards and consistency with the assumptions and requirements of any applicable WLA are requirements of the Permit, but, given the iterative nature of this requirement under CWA Section 402(p)(3)(B)(iii), the Final Permit is also clear that "compliance with all performance standards and provisions contained in the Final Permit shall constitute adequate progress toward compliance with DCWQS and WLAs for this permit term" (Section 1.4).**

USEPA is now proposing clarifying changes to this language and to other sections of the DC Permit as the result of a settlement with various parties. However, those changes do not require strict compliance with Water Quality Standards, but rather compliance through the programs developed under the Permit.

The State Board is thus, free to adopt new RWL language that effectuates its previously expressed intent that MS4 permits not require strict compliance with Water Quality Standards with regard to contributions from discharges from MS4s.

Misperception Number Two: The MS4 Permittees are Seeking a "Safe Harbor" that would Insulate them from Responsibility Under the Clean Water Act.

While State Board staff's "Issue Paper" uses the term "safe harbor" in describing the iterative process, the District believes that this is fundamentally misleading. Even a cursory review of the terms of a typical MS4 permit in California reveals that it is full of compliance points. In the three MS4 Permits in which the District serves as Principal Permittee, literally every sentence is a separate point of compliance.

This fact is supported by the language of the Permits themselves. For example, in Order R8-2010-0033 Part XX.G provides: **"The Permittees must comply with all terms, requirements, and conditions of this Order. Any violation of this Order constitutes a violation of the CWA, its regulations and the California Water Code, and is grounds for enforcement action . . . ."** (emphasis added). Similar provisions are contained in the other two Riverside County MS4 Permits. Even without the strict Water Quality Standard language imposed under the Ninth Circuit's opinion, there is no "safe harbor" from liability under the Clean Water Act or, where applicable, the California Water Code, for any Permittee that fails to fully implement each the detailed and prescriptive requirements of its MS4 Permit.

There is a fundamental difference however, between fully complying with activities within the control and responsibility of the Permittees, such as monitoring, implementing BMPs and performing other programmatic requirements of the MS4 Permit; and being forced to guarantee that MS4 discharges will not cause or contribute to exceedances of Water Quality Standards in Receiving Waters, a guarantee that the Permittees' have no ability to make.

What the District and other MS4 Permittees seek is relief from what is essentially "guaranteed non-compliance" where a Permittee can be found in violation of their MS4 Permit even if the exceedance occurs at no fault of or failure by the Permittee, or put another way, even in circumstances where there is nothing a Permittee could have done to prevent that exceedance from occurring. In such a case, the Permittee can be held liable for potentially millions of dollars in legal costs, penalties and other expenses. We note that the City of Malibu, a city of only 13,000 residents, spent more than $2 million in defending against a citizen suit filed with respect to its MS4 Permit and more than $6 million to settle the case, including payment of $750,000 in attorney fees to plaintiffs. Given the tremendous financial challenges faced by every California municipality, including the District, the County of Riverside and the Permittee cities within the County, such a diversion of resources that otherwise would be directed at clean water programs or other vital municipal programs is a poor policy choice. And, as noted, it is not a policy choice that is required by the Clean Water Act, nor is it required by USEPA in their own Permits.

The District recognizes that regulatory enforcement actions and citizen suits are authorized by the Clean Water Act and that such suits may be an appropriate remedy where, for example, a Permittee has failed to comply with the programmatic requirements of its MS4 Permit. Where, however, the Permittees are complying with those requirements in good faith but, due to circumstances beyond their control, their MS4 discharge causes or contributes to a Water Quality Standard exceedance in Receiving Waters, a citizen suit based on those exceedances potentially throws away the work done by the Permittees and the Water Boards under the MS4 Permit, as discussed below.

Misperception Number Three: MS4 can achieve compliance with strict Water Quality Standards.

MS4 Permittees cannot guarantee that discharges from their MS4s will in fact, not cause or contribute to an exceedance of Water Quality Standards in a Receiving Water. The monitoring conducted under our MS4 Permits reflects exceedances of various Water Quality Standards in Receiving Waters, and we understand that such results are typical for MS4 discharges around the state (please see Pages 2-3 of the CASQA comment letter dated November 2, 2012). The extreme variability of stormwater quality and quantity itself (which, in Southern California, arrives infrequently and from widely varying storm sizes) combined with a multitude of potential pollutant sources beyond a Permittee's ability to truly "control", make it impossible for a municipality to ensure that no discharges from its MS4 will ever cause or contribute to exceedances of Water Quality Standards in Receiving Waters. This was recognized by the Issue Paper released by State Board staff in preparation for the November 20th workshop, which found that as "the storm water management programs of municipalities have matured, **an increasing body of monitoring data indicates that water quality standards are in fact not being met by many MS4s**" (Issue Paper, Page 2 (emphasis supplied)).

Thus, even if municipal Permittees are to be held strictly liable for the ensuring that no discharges from their MS4s cause or contribute to an exceedance of Water Quality Standards, as the Ninth Circuit has interpreted the current RWL language, those Permittees have no ability to attain those standards. The reasons are several-fold and include the following:

1) Unlike an industrial NPDES Permittee, a municipal Permittee is not typically the source of the pollutants in the MS4 discharge (whether wet or dry). The municipality can regulate sources to some degree (through, for example, the operation of structural and non-structural BMPs and implementation of an Illegal Connection/Illicit Discharge program), but the municipality cannot guarantee that pollutants will not enter the MS4 and then be discharged into the Receiving Waters.

2) Municipalities cannot control natural sources of pollutants that are discharged through the MS4. Monitoring has indicated that many pollutants are likely from natural and not anthropogenic sources.

3) While Permittees conduct extensive public education programs as part of their MS4 programs, municipalities cannot "control" human behavior, or "prevent" an individual from taking an action that might cause pollution to enter the MS4. As an example, a resident may, despite all ordinances, regulations, potential penalties or enforcement, public outreach, available BMPs, etc., choose not to pick up after their pets, and

stormwater may, through no fault of the Permittee, pick up animal waste and deposit into the MS4.

4) MS4 Permittees cannot "prevent" flows from entering their MS4. To protect the health and property of their residents, MS4 operators must allow the legitimate flows of water into their drains. This is especially true for the District, which is charged directly by the Legislature [in Water Code App. §48-9] with the task of taking necessary steps to protect the people, properties and watersheds of Riverside County from the negative impacts of flooding. The District cannot, in effect, cause flooding by preventing flows from entering their storm drain, simply because such flows may contain pollutants that cause a violation of the Receiving Waters Limitation provisions of their MS4 Permits. In fact, California law requires downstream property owners (such as MS4 operators) to accept flows from upstream property owners.

5) Further, the authorities granted to flood control districts, such as this District, by the Legislature are narrow and do not include the authority to condition or regulate the quality or nature of stormwater runoff discharged from up gradient properties. This responsibility is appropriately assigned by the Legislature to the Regional Boards.

Similarly, MS4 Permittees cannot guarantee compliance with Water Quality Standards in dry weather. "Alternative 4" in the staff's Issue Paper suggests an alternative RWL approach that would not extend the iterative approach to dry weather discharges. The District submits that this alternative does not reflect the reality of urban runoff. Monitoring conducted under the Riverside County MS4 Permits reflects exceedances of Water Quality Standards during dry weather as well as wet weather. There is no justification for imposition of strict liability for exceedances during such conditions, for the following reasons:

1) During dry weather, other NPDES-permitted discharges continue to flow into the Receiving Waters. For example, much of the flow in the Santa Ana River during dry weather conditions is from non-MS4 sources, such as publicly owned treatment works. Additionally, numerous other separate NPDES-permitted discharges will occur, potentially at concentrations of pollutants that exceed Water Quality Standards. Evidence generated during the *NRDC* case involving the County of Los Angeles, for example, indicated that NPDES permits covering hundreds of these dischargers, including POTWs allowed the discharge of pollutants at concentrations *greater* than Water Quality Standards. Because of these discharges, which are legal and authorized by the Regional Boards, the MS4 Permittees have essentially no more control over compliance with Water Quality Standards in dry weather than they would have during wet weather conditions.

2) Accidental or even intentional illicit discharges by third parties into the MS4 obviously can occur during dry weather as well as wet weather. Such discharges would potentially have an even greater impact on sampling, since they are not diluted by large volumes of stormwater. For example, a vehicular accident recently caused hundreds of gallons of

asphalt tar to enter Sandia Creek, a Receiving Water in Riverside County. While this spill was not discharged through an MS4, if the vehicular accident had occurred in another portion of the watershed, the spill could feasibly have entered into and been discharged from an MS4. Similarly in many places throughout the State, sanitary sewer systems are owned and operated by special districts that have no relation to the MS4 Permittees that own or operate the MS4 systems. Nevertheless, an overflow of such sanitary sewer systems may cause an unavoidable discharge into, and from a Permittee-owned MS4. Such accidental or illicit discharges cannot be "prevented" or "controlled" by the Permittees except to the extent that they can be cleaned up or blocked if promptly reported. However, if the discharge has reached Receiving Waters and caused a measured exceedance of Water Quality Standards, under the Ninth Circuit's interpretation, liability for civil penalties, injunctive relief and attorneys fees will attach to the MS4 Permittee.

3) Enforcing strict Water Quality Standard limits in dry or wet weather is counter-productive to the watershed planning-based MS4 Permits currently being promulgated by many regional water boards. Enforcing such limits will divert Permittee attention and resources from watershed-based, monitoring-heavy compliance programs, as will be discussed in greater detail below.

In essence, under the Ninth Circuit's interpretation of the current RWL language, the District, and potentially every other MS4 Permittee in the state, is in violation of its Permit any time that an exceedance of a Water Quality Standard is recorded and attributed to a discharge from its MS4. This means that the Regional Water Boards have issued, and continue to adopt permits that include RWL language **which cannot be complied with**. The Clean Water Act, however, does not require Permittees to achieve the impossible. *See, e.g., Hughey v. JMS Development Corp.* (11th Cir. 1996) 78 F.3d 1523, 1530 ("In interpreting the liability provisions of the CWA, we realize that Congress is presumed not to have intended absurd (impossible) results.").

Misperception Number Four: The Current RWL Language is more Protective of Receiving Water Quality.

This statement is not only untrue but maintaining the current RWL language actually **impedes** efforts to protect Receiving Water Quality.

We understand that some stakeholders believe that there should be Numeric Effluent Limitations (NELs) contained in the MS4 Permits for purposes of accountability. In response, we note that many MS4 permits now contain numeric Stormwater and Non-stormwater Action Levels ("SALs" and "NALs") or other numeric targets or goals, the exceedance of which trigger specific compliance responses by the Permittees. It is these action levels (which were advocated by the Blue Ribbon Panel established by the State Board to investigate the appropriateness of NELs in MS4 permits) which provide such "numeric" accountability. This is in addition to the numerous other compliance documentation and reporting provisions required of MS4 Permittees that also provide measures of accountability.

More importantly, the current RWL language as interpreted by the Ninth Circuit actually impedes efforts by municipalities to protect water quality. First, by requiring immediate compliance, the language undermines efforts to bring Water Quality Standard-impaired waterbodies into compliance through the Total Maximum Daily Load ("TMDL") program. TMDLs are designed with the recognition that, due to the complexity of the issues causing the waterbody to be impaired in the first place, meeting these requirements cannot be achieved immediately. Therefore, TMDL compliance plans include timelines to achieve such compliance over periods of years and sometimes decades.

Second, most MS4 permits have begun incorporating sophisticated watershed management plans, which prioritize pollutants by waterbody and attempt, through aggressive monitoring and source identification efforts, to identify and address the sources of those prioritized pollutants. Municipalities subject to strict RWL language will have no ability to prioritize pollutants, since they must address any pollutant that exceeds a Water Quality Standard, irrespective of the relative impact that that discharge may have had upon the environment or beneficial uses. Moreover, these watershed management plan approaches employ cooperative monitoring and other watershed-based approaches. Permittees faced with potential liability for any exceedance of Water Quality Standards in Receiving Waters that may be caused or contributed to by discharges of their MS4s, will not likely volunteer to cooperate on any watershed-based approach, if cooperation could subject them to additional unnecessary liability.

Third, in a citizen suit brought under the Clean Water Act, a federal judge is free to impose any appropriate injunctive relief to enforce a permit (33 U.S.C. § 1365(a)). Thus, for example, a court could ignore the provisions of a MS4 permit in ordering municipal defendants to address Water Quality Standard exceedances in Receiving Water. This means that the thousands of people-hours invested in the Permit's development, implementation and oversight by municipalities, the Regional Water Boards and other stakeholders would be wasted. In essence, under the Ninth Circuit's reading of the RWL language, all other language in an MS4 permit appears to be superfluous, since the RWL language would control all compliance efforts. This result, of course, is not required by plain language of the Clean Water Act.

Fourth, if a municipality is in unavoidable and automatic non-compliance with the requirements of its MS4 Permit, it will be unable to justify budgeting for water quality management programs and BMPs otherwise required by the Permit as the municipality will simply receive no benefit from making compliance investments. To gain public support for stormwater programs, a municipality must demonstrate to its residents that such investments will constitute compliance with the Permit.

Discussion of Alternatives

The State Board staff's Issue Paper sets forth five alternatives for consideration. Alternative 1, no change in the current RWL language, is completely unacceptable to the District (and, we believe, to other municipalities across the state) because it fails to address the "guaranteed non-compliance" problem of the current language.

Alternative 2, which proposes to maintain the language that puts the MS4 Permittees in a situation of unavoidable and potentially "guaranteed" non-compliance, but would add greater specification as to how the iterative process might be carried out, is also unacceptable as the MS4 Permittees will still have no viable means to ensure their compliance with the RWL language. While the District does not object in principle to RWL language that spells out clearly, and in achievable terms, what is required of MS4 Permittees when exceedances are recorded, such a change alone does not address the fundamental issues identified in this letter.

Alternative 3, which proposes to provide an iterative process for compliance with the RWL only for pollutants being addressed by dischargers in compliance with an approved TMDL, is better than the first two alternatives, but is still entirely insufficient. By failing to provide a viable means for compliance with the RWL language for non-TMDL pollutants, this alternative language would force Permittees into unavoidable non-compliance, and require them to redirect their efforts and resources away from the TMDL activities, to those other pollutants, due to the strict liability attached to those exceedances. This would be a poor policy choice, as pollutants that are not subject to a TMDL may have significantly less, or even no impact on beneficial uses in the Receiving Waters, as noted in the CASQA comment letter.

Alternative 4, which excludes dry weather discharges from the iterative process to comply with the RWL, is unacceptable for the reasons previously set forth regarding an MS4 Permittees inability to truly "prevent" or "control" accidental or illegal dry weather discharges.

Alternative 5, which provides viable means for compliance with the RWL, for all types of MS4 discharges, is the only viable solution among the alternatives presented by State Board staff. In an era of limited budgets, the only and best way to make progress toward improving the quality our Receiving Waters, is to provide MS4 Permittees the ability to prioritize their efforts, as required in the Watershed Management Plan provisions contained in the most recent MS4 Permits, including the Los Angeles County Permit and the proposed Regional Permit for the San Diego Regional Water Board. As previously discussed, such prioritization cannot occur in the context of strict liability for the exceedance of Water Quality Standards in the Receiving Waters. For all of the reasons set forth in this letter, no other alternative makes policy sense or is congruent with the Maximum Extent Practicable standard in the Clean Water Act.

The District would add that Alternative 5 should additionally incorporate the concept of achieving RWL compliance through watershed management plans, and requests the Board to direct staff to work with stakeholders to ensure that any revised RWL language does not force intermittent or minor exceedances of Water Quality Standards to become de-facto higher priorities than those set by the watershed stakeholders.

In summary, the District supports CASQA, the California State Association of Counties and other municipal stakeholders in advocating for a fully iterative and viable approach to compliance with RWL language in both wet and dry weather conditions. Only when such an approach is in place and endorsed by the State Board will Permittees, including the District, feel confident that they can focus fully on efforts to address pollutants in discharges into and from their MS4s, and not on preparing for costly and pointless litigation.

The District therefore, respectfully requests the State Board direct its staff to commence development of new language providing for an enforceable, iterative and viable process for MS4 Permittees to comply with the RWL language included in MS4 permits.

We wish to thank you and State Board staff for your consideration of these comments and any further comments, written or oral, that the District may make on these important issues.

Very truly yours,

Steve Thomas

for WARREN D. WILLIAMS
General Manager-Chief Engineer

CP:cw
P8/150189

EXHIBIT D

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF VIRGINIA
Alexandria Division

VIRGINIA DEPARTMENT OF TRANSPORTATION, ET AL, Plaintiffs, -v- UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, ET AL, Defendants.	Civil Action No. 1:12-CV-775

Memorandum Opinion

Before the Court is the Plaintiffs' motion for judgment on the pleadings under Federal Rule of Civil Procedure 12(c). The Defendants opposed the motion, and the Plaintiffs replied. The Court heard oral arguments on December 14, 2012 and now issues this memorandum opinion and accompanying order granting the Plaintiffs' motion.

Background

The Clean Water Act, 33 U.S.C. § 1251 et seq., establishes the basic structure for regulating discharge of pollutants into the waters of the United States, and provides certain mechanisms to improve and maintain the quality of surface waters.

One such mechanism is the requirement that states identify "designated uses" for each body of water within their borders, as well as "water quality criteria" sufficient to support those uses. 33 U.S.C. § 1313(c)(2)(A). The Environmental Protection Agency ("EPA") evaluates the uses and criteria developed by the states, and either approves them or else proposes and promulgates its own set of standards. § 1313(c)(3).

Once the standards are in place, each state is required to maintain a list—also subject to approval or modification by EPA—of its waterbodies that are "impaired" because they do not meet their respective water quality criteria. 33 U.S.C. § 1313(d)(1)(A). For each waterbody on the impaired list, the state is required to establish a set of total maximum daily loads ("TMDLs") sufficient to bring the body back into compliance with its water quality criteria. § 1313(d)(1)(C). Each TMDL establishes the maximum amount of a pollutant that may be added to the waterbody daily from all sources (runoff, point sources, etc.). EPA is required to publish a list of pollutants suitable for maximum daily load measurement, § 1314(a)(2)(D), and it has determined that *all* pollutants are suitable for TMDLs, *see* Total Maximum Daily Loads Under Clean Water Act, 43 Fed. Reg. 60,662. Therefore, any pollutant that falls within the relatively broad definition of "pollutant" set forth in § 1362(6) may be regulated via TMDL. EPA can approve or modify as it sees fit TMDLs proposed by the states. § 1313(d)(2).

Here the state in question is Virginia, and the waterbody is a 25-mile long tributary of the Potomac River, located in Fairfax County, called Accotink Creek. The creek has been the subject of litigation in the past that is not relevant to this matter except the result: EPA was required to set TMDLs for Accotink Creek once Virginia failed to do so by a certain date. Specifically, the creek had been identified as having "benthic impairments," which is to say the community of organisms that live on or near the bottom of the creek were not as numerous or healthy as they should be. EPA was to set appropriate TMDLs to improve the health of the benthic community in Accotink Creek.

On April 18, 2011, EPA established a TMDL for Accotink Creek which limited the flow rate of stormwater into Accotink Creek to 681.8 ft^3/acre-day. The TMDL was designed to regulate the amount of sediment in the Accotink, because EPA believed sediment was a primary cause of the benthic impairment. Both parties agree that sediment is a pollutant, and that stormwater is not. EPA refers to stormwater flow rate as a "surrogate" for sediment.

The Plaintiffs are now challenging the TMDL on multiple grounds, but presently before the Court is a single issue: Does the Clean Water Act authorize the EPA to regulate the level of a pollutant in Accotink Creek by establishing a TMDL for the flow of a nonpollutant into the creek?

Analysis

I. Standard of Review

Count I of the complaint, at issue here, is brought under the Administrative Procedures Act. *See* Comp. ¶ 169. The APA "confines judicial review of executive branch decisions to the administrative record of proceedings before the pertinent agency." *Shipbuilders Council of Am. V. U.S. Dept. of Homeland Sec.*, 770 F. Supp. 2d 793, 802 (E.D. Va. 2011). As such, the district court "sits as an appellate tribunal," and APA claims can be resolved equally well in the context of Rule 12 or Rule 56. *Univ. Med. Ctr. Of S. Nev. V. Shalala*, 173 F.3d 438, 441 n. 3 (D.C. Cir. 1999).

Because Count I presents a question of statutory interpretation, the Court reviews EPA's decision using the two-step analysis set forth in *Chevron, U.S.A., Inc. v. NRDC, Inc.*, 467 U.S. 837 (1984). For a given question of statutory interpretation, the first step under *Chevron* is to determine whether Congress addressed the "precise question at issue." 467 U.S. at 842. "If the intent of Congress is clear, that is the end of the matter . . . ." *Id.* If the Court cannot find that Congress has squarely addressed the question, the Court must move to Chevron's second step. In the second step of statutory construction under *Chevron*, the Court must determine whether the agency's interpretation of the statute is "permissible." *Id.* at 843. The agency's construction is permissible if it is reasonable, but it need not be what the Court considers the *best* or *most reasonable* construction. *See id.* at 845. The Court is not to simply impose its own construction on the statute, but instead it gives deference to any reasonable statutory construction by the agency. *Id.* at 843.

II. Chevron Step One

Whether statutory ambiguity exists so that the issue cannot be settled at *Chevron's* first step is for the Court to decide, and the Court "owe[s] the agency no deference on the existence of ambiguity." *Am. Bar Ass'n v. FTC*, 430 F.3d 457, 468 (D.C. Cir. 2005). The Court begins the inquiry by "employing traditional tools of statutory construction." *Chevron*, 467 U.S. at 843 n.9. As always, the analysis begins with the text of the statute. *Nat'l Elec. Mfrs. Ass'n v. U.S. Dept't of Energy*, 654 F.3d 496, 504 (4th Cir. 2011).

The text of the statute that requires states to establish their own TMDLs, 33 U.S.C. § 1313(d)(1)(C), is:

> Each State shall establish for the waters identified in paragraph (1)(A) of this subsection, and in accordance with the priority ranking, **the total maximum daily load, for those pollutants which the Administrator identifies** under section 1314(a)(2) of this title as suitable for such calculation. Such load shall be established at a level necessary to implement the applicable water quality standards with seasonal variations and a margin of safety which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality. (emphasis added)

The next subsection, § 1313(d)(2), grants EPA the authority to set TMDLs when the state has not done so adequately. "Pollutant" is a statutorily defined term. 33 U.S.C. § 1362(6).

The Court sees no ambiguity in the wording of this statute. EPA is charged with establishing TMDLs for the appropriate pollutants; that does not give them authority to regulate nonpollutants. The parties agree that sediment is a pollutant under 33 U.S.C. § 1362(6), and stormwater is not. Then how does EPA claim jurisdiction over setting TMDLs for stormwater?

EPA frames the stormwater TMDL as a surrogate. EPA's research apparently indicates that the "[sediment] load in Accotink Creek is a function of the amount of stormwater runoff generated within the watershed." Def. Opp. at 8. And EPA believes that framing the TMDL in terms of stormwater flow rate is superior to simply expressing it in terms of maximum sediment load.

The DC Circuit has considered and rejected a similar attempt by EPA to take liberties with the way Congress intended it to express its TMDLs. In *Friends of the Earth, Inc. v. Env. Protection Agency*, EPA had promulgated TMDLs for the Anacostia River that expressed the maximum load of certain pollutants in terms of annual and seasonal amounts. 446 F.3d 140, 143 (D.C. Cir. 2006). The court found that expressing a TMDL in terms of annual or seasonal maximums was not allowed, because the statute granted authority only for daily loads. *Id.* at 148. The court reached its conclusion even though EPA apparently made a strong argument that expressing TMDLs in terms of annual or seasonal loads was an effective and reasonable approach. *See id.* Presumably a daily load could have been derived by simply dividing the annual load by 365, yet the court still required expression in the terms dictated by Congress.

Here too, EPA hopes to express a TMDL in terms other than those contemplated by the statute, arguing that such an expression is the most effective method. But, as *Friends of the Earth* illustrates, EPA may not regulate something over which it has no statutorily granted power—

annual loads or nonpollutants—as a proxy for something over which it *is* granted power—daily loads or pollutants.

EPA's argument that its surrogate approach should be allowed because the statute does not specifically forbid it fails. EPA is not explicitly forbidden from establishing total maximum *annual* loads any more than they are explicitly barred from establishing TMDLs for nonpollutants. The question is whether the statute grants the agency the authority it is claiming, not whether the statute explicitly withholds that authority. And in this case, as in *Friends of the Earth*, the statute simply does not grant EPA the authority it claims.

The dicta in *Weyerhaeuser Co. v. Costle* is not as helpful to EPA's case as it would like. 590 F.2d 1011, 1022 n.6 (D.C. Cir. 1978). It is true that the court said in a footnote "[i]t is well recognized that EPA can use pollution parameters that are not harmful in themselves, but act as indicators of harm." *Id.* But in that case, the non-harmful pollution parameters the EPA sought to regulate were components of the effluent commonly discharged from paper mills, *id.* at 1022, making them effluents themselves. And power to regulate effluents is expressly granted to the EPA in the relevant statutory section. *See* 33 U.S.C. § 1314(b).

EPA would like to create the impression that Congress has given it loose rein to determine exactly what it could and could not regulate. On page 16 of its opposition to this motion, EPA points out that "Congress authorized EPA to determine which pollutants were suitable for TMDL calculation and measurement." (Internal quotes removed). While this may be true, EPA glosses over the fact that 33 U.S.C. § 1314(a)(2)(D) only gives EPA the power to regulate pollutants as that term is defined—by Congress—elsewhere in the statute. And, as discussed above, sediment is a pollutant for these purposes, but stormwater is not.

In a similar vein, EPA regulations which imply that the agency has discretion to set the

TMDL as it sees fit do not bear on the question now before the Court. EPA has promulgated a regulation allowing TMDLs to be "expressed in terms of either mass per time, toxicity, or other appropriate measure," 40 C.F.R. § 130.2(i), and another that allows TMDLs to be expressed as a "property of pollution," 50 Fed. Reg. 1774, 1776 (Jan. 11, 1985). But, EPA citing these regulations to demonstrate that the surrogate TMDL approach is permissible is mere bootstrapping. To the extent the regulations allow EPA to set TMDLs for nonpollutants, they exceed the statutory authority of EPA.

The plain language of the statute trumps all, but legislative history also supports Plaintiffs' argument. Congress's intent to limit EPA's discretion in this context is evidenced by the committee record cited by Plaintiffs, which has also been used by the Ninth Circuit, in which Senator Randolph, Chairman of the Senate committee that amended the act in 1972, explained, "We have written into law precise standards and definite guidelines on how the environment should be protected. We have done more than just provide broad directives [for] administrators to follow." Pl. Mot. 7, *citing Nw. Envtl. Def. Ctr. v. Brown*, 640 F.3d 1063, 1072 (9th Cir. 2011). Congress created a statutory scheme that included a precise definition of the word "pollutant," and then gave EPA authority to set TMDLs for those pollutants. Senator Randolph's comments strongly imply that Congress did not intend anything more or less than what is written in the statute.

The Court considers the language of 33 U.S.C. § 1313(d)(1)(C) to be unambiguous. Congress has spoken directly on the question at issue, and its answer is that EPA's authority does not extend to establishing TMDLs for nonpollutants as surrogates for pollutants. The legislative history of the CWA is consistent with this reading. Therefore, this Court finds EPA's interpretation of § 1313 and the related provisions to be impermissibly broad based on analysis under the first step of *Chevron* analysis.

III. Chevron Step Two

Because the Court considers Congress's intent to be clear and unambiguously expressed by the language of the statute, it need not move to the second step of *Chevron* analysis. But the Court notes that there is substantial reason to believe EPA's motives go beyond "permissible gap-filling."

Page 9 of EPA's opposition says, "stormwater flow rates as a surrogate would more effectively address the process by which sediment impairs aquatic life in Accontink Creek." If the sediment levels in Accotink Creek have become dangerously high, what better way to address the problem than by limiting the amount of sediment permitted in the creek? If sediment level is truly "a function of" the amount of stormwater runoff, as EPA claims, then the TMDL could just as easily be expressed in terms of sediment load.

In fact, the Board of Supervisors of Fairfax County argued at the December 14th hearing (without objection from EPA) that EPA has approved 3,700 TMDLs for sediment nationwide, and in Virginia has addressed 111 benthic impairments with TMDLs. None of them regulated the flow rate of stormwater. By comparison, EPA has tried out its novel approach of regulating sediment via flow in only four instances nationwide, and all four attempts were challenged in court. One has settled, the other three are still pending.

The Court suspects that the decision to regulate stormwater flow as a surrogate for sediment load would not constitute a permissible construction of § 1313(d)(1)(C), even given the deference due at *Chevron's* second step. This is especially likely because EPA is attempting to increase the extent of its own authority via flow TMDLs, which courts must examine carefully.

See Brown & Williamson Tobacco Corp. v. Food & Drug Admin., 153 F.3d 155, 161-62 (4th Cir. 1998). EPA's attempt to set TMDLs for nonpollutants probably goes beyond "permissible gap-filling" and is instead an impermissible construction of the statute.

Conclusion

The language of § 1313(d)(1)(C) is clear. EPA is authorized to set TMDLs to regulate pollutants, and pollutants are carefully defined. Stormwater runoff is not a pollutant, so EPA is not authorized to regulate it via TMDL. Claiming that the stormwater maximum load is a surrogate for sediment, which is a pollutant and therefore regulable, does not bring stormwater within the ambit of EPA's TMDL authority. Whatever reason EPA has for thinking that a stormwater flow rate TMDL is a better way of limiting sediment load than a sediment load TMDL, EPA cannot be allowed to exceed its clearly limited statutory authority. For these reasons, the Plaintiffs' motion for Rule 12(c) judgment on the pleadings on Count I of their complaint is granted.

January 3, 2013
Alexandria, Virginia

/s/ LOG
Liam O'Grady
United States District Judge

FILED
JAN - 3 2013
CLERK, U.S. DISTRICT COURT
ALEXANDRIA, VIRGINIA

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF VIRGINIA
Alexandria Division**

VIRGINIA DEPARTMENT OF TRANSPORTATION, ET AL, Plaintiffs, -v- UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, ET AL, Defendants.	Civil Action No. 1:12-CV-775

Order

In accordance with the memorandum opinion that accompanies this order, it is now **ORDERED**:

1. Plaintiffs' motion (Dkt. No. 29) for judgment on the pleadings as to Count I of the complaint is **GRANTED**.
2. The clerk shall enter judgment in favor of the Plaintiffs.
3. The Accotink Creek TMDL is remanded to EPA for reconsideration consistent with this order.

January 3, 2013
Alexandria, Virginia

/s/ LOG
Liam O'Grady
United States District Judge

San Diego's Voice for Binational Business

South County Economic Development Council

SAN DIEGO REGIONAL WATER QUALITY CONTROL BOARD
2013 JAN 11 A 10:55

January 10, 2013

Mr. Wayne Chiu, P.E.
California Regional Water Quality Control Board, San Diego Region
9174 Sky Park Ct Ste 100
San Diego, CA 92123-4340

Dear Mr. Chiu,

On January 8, 2013, The South County Economic Development Council (SCEDC) Board of Directors agreed to send you a letter voicing our concerns with the changes proposed to the Regional Water Quality Board's Stormwater permit. While our members noted the intent of the ordinance is admirable, the anticipated implementing of the ordinance was viewed as onerous and expensive and a detriment to economic development in South San Diego County.

The draft language of the permit includes new requirements for development. These new requirements will increase costs substantially on an already over-burdened business community. These costs are due to the measures that must be taken to comply with the new regulations. Additionally, the new liability for exceeding the water quality objectives will discourage investment in our region at a time when we should encourage businesses to invest and create more jobs. Furthermore, it was noted that many of the previous exemptions to the Stormwater regulations had been deleted in this new ordinance. The additional measures needed to comply with these regulations will make a project infeasible.

SCEDC would like to offer our services if the San Diego Regional Water Quality Control Board would like to create an implementation task force to discuss best practices and realistic methods to achieve your goals. If I may be of further assistance or provide additional information please feel free to contact me at (619)424-5143.

Sincerely,

Cindy Gompper Graves
President & Chief Executive Officer

1111 Bay Blvd. Suite E • Chula Vista, CA 91911
(619) 424.5143 • Fax (619) 424.5738
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SAN DIEGO
AMERICAN SOCIETY OF
LANDSCAPE ARCHITECTS
CHAPTER

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January 11, 2012

Re: SDASLA COMMENTS ON THE DRAFT REGIONAL MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) (Tentative Order No. R9-2013-0001)/(NPDS Case No. CAS0109266)

Dear Mr. Chiu:

The American Society of Landscape Architects (ASLA) continues to advocate across the country for economic recovery, sustainable design, quality of life issues and wise use of our natural resources including clean water. The San Diego Chapter of the American Society of Landscape Architects (SDASLA) is fully committed to these principals and respectfully submits the following comments, observations and recommendations to the draft San Diego Regional Municipal Separate Storm Sewer System at the request of the Regional Board.

The SDASLA fully supports the proposed approach to the permit that includes:

- Regional Permit / Holistic Approach
- Includes Strategic Planning
- Adaptive / Results Based Management
- Alternative Compliance / Mitigation
- Water Quality Improvement Plans (WQIP)

SDASLA understands that the proposed WQIPs in the draft permit will become powerful tools to help improve water quality within each of our ten watersheds and strongly recommends the following be added to the permit:

- Timely development of effective and enforceable WQIP(s).
- Each WQIP be developed through a process that ensures public participation such as the formation of a stakeholders advisory group.
- Stakeholder advisory groups for each watershed shall include representatives of environmental groups, business groups, community planning and /or sponsor groups, local universities and technical experts with knowledge of the watershed.
- This stakeholder advisory group should work closely with the Copermittees and a regional board staff member while the Water Quality Improvement Plans are being developed to ensure these plans aggressively pursue water quality gains.
- The stakeholder advisory process should include accountability and measureable milestones to ensure the goals of the Permit are being met.
- Appropriate BMP's should be determined for each watershed and should be reviewed by a project engineer and / or Landscape Architect to determine if they are infeasible.

April 10 and 11, 2013
Item No. 8
Supporting Document No. 5

- If project BMP's are determined to be infeasible than no other burden of proof should be required.
- To sections 3.b.(3)(c) Priority Development Exemptions (Page 77), and 3.c.(b) Alternative Compliance Project Options (Page 81), add the following option:
    - Designed and constructed to be certified under the Sustainable Sites Initiative (SITES™), a voluntary certification program through the American Society of Landscape Architects, the Lady Bird Johnson Wildflower Center at The University of Texas at Austin and the United States Botanic Garden, receiving at least credits 3.5 and 3.6. under the "Site Design - Water" category.

SDASLA supports the use of Low Impact Development (LID) BMP Requirements strategies when geologically appropriate and feasible. However, other options should be available to strengthen overall water quality such as in-lieu fees, mitigation and redevelopment of key sites to encourage smart growth and urban infill / redevelopment in the future. SDASLA encourages the required development of a priority site list by each Copermittee during the planning process for which in-lieu fees / mitigation may be applied. These sites could function as large water holding and infiltration sites and double as public open space / educational areas. However, SDASLA is concerned that not all BMPs will be effective or feasible throughout the basin. SDASLA recommends that the Copermittees be allowed to customize the application of specific BMPs on a watershed by watershed basis through the development of robust and enforceable Water Quality Improvement Plans rather than imposing a universal suite of BMPs on all watersheds regardless of their feasibility of applicability.

By taking advantage of the knowledge and resources of diverse stakeholders like municipalities, businesses and residents, environmental groups, technical experts and the academia, our region can benefit greatly from solutions that provide cleaner water more efficiently, quickly and cost effectively creating healthier communities. But this can only be achieved if these stakeholders are involved in a meaningful way during the Water Quality Improvement Plan development process.

SDASLA recognizes the challenge this permit and the proposed changes represents to our region, and would like to help by participating in the Water Quality Improvement Plan development process. SDASLA urges the Regional Board to enhance the stakeholder participation opportunities during Water Quality Improvement Plan development before approving the final permit.

Thank you for your consideration and we look forward to continuing our work with you and your staff on this draft permit.

Sincerely yours in Landscape Architecture,

Tim Jachlewski, Jr., ASLA
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Andrew S. Reese, ASLA
SDASLA Storm Water Quality Committee Chair
San Diego Chapter/ASLA
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Building Industry Association of San Diego County
Building Industry Association of Southern California
Associated General Contractors, San Diego
San Diego Regional Chamber of Commerce
Building Owners and Managers Association
San Diego Association of Realtors
Associated Builders and Contractors
San Diego Chapter of the American
Society of Landscape Architects
Business Leadership Alliance
NAIOP

January 11, 2013

VIA E-MAIL AND HAND DELIVERY

Ms. Laurie Walsh
WRC Engineer
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

Re: REVISED ADMINISTRATIVE DRAFT REGIONAL MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) Permit (Tentative Order No. R9-2013-0001)

Dear Ms. Walsh:

The following trade and professional associations, for the purposes of this communication known as, the regulated community, are responding as a Coalition. Spearheaded by the Building Industry Association of San Diego County (BIASD), Business Leadership Alliance (BLA), Associated General Contractors, San Diego (AGC), NAIOP (National Association of Industrial & Office Properties), Associated Builders & Contractors (ABC), the San Diego Regional Chamber of Commerce (SDRRC), the San Diego Association of Realtors® (SDAR), and the Building Owners & Managers Association (BOMA), the San Diego Chapter of the American Society of Landscape Architects and the members thereof, we appreciate the opportunity to provide comments on the Draft of the San Diego County Regional MS4 Permit (Draft Permit or Order). We submit these comments in addition to and in support of comments made by our affiliate the Building Industry Association of Southern California and its coalition partners. This Coalition employs over 210,000 San Diegans and generates in excess of $ 3 billion dollars of economic activity in the San Diego region.

At the request of the Regional Board, the Coalition submits the following observations, recommendation for revisions to the permit language and the rationale supporting those recommendations in the following areas:

1. Recent Legal Opinions and Legislation
2. Water Quality Improvement Plans,
3. Illicit Discharge Detection and Elimination Requirements,
4. Permanent BMP Performance and Sizing Requirements,
5. Sediment Supply Requirements.
6. Streambed Restoration
7. Vague and Conflicting Definitions
8. Hyrdomodification Management BMP Requirements
9. Alternative Compliance to Onsite Structural BMP Performance Requirements

Recent Legal Opinions and Legislation

On January 8, 2013, The United States Supreme Court rendered its opinion in *Los Angeles Flood Control District v. Natural Resources Defense Council, Inc., Et Al.* 568 U.S. ____ (2-13). In overturning the 9th Circuit, the Supreme Court held that "the flow of water from an improved portion of a navigable waterway into an unimproved portion of the very same waterway does not qualify as a discharge of pollutants under the CWA". The holding appears to be in direct conflict with Findings 1, 3, 6, 7, 8, 10, 11, 15, 28, and 32 of the Order as well as many of the permit provision. The Coalition requests that the San Diego Regional Water Quality Control Board (SDRWQCB) remand the Order to staff so that the Order may be revised in conformity with the Supreme Court's opinion.

On January 3, 2013 the United States District Court for the Eastern District of Virginia published its opinion in *Virginia Department of Transportation, Et Al., v United States Environmental Protection Agency* 213 U.S. Dist. LEXIS 981. While not precedential, the district court conducted a detailed analysis and well reasoned analysis of the use of surrogates for Total Daily Mass Loads ("TMDL")and concluded that [the State's] authority does not extend to establishing TMDLs for non-pollutants as surrogates for pollutants." In light of this well reasoned opinion, the Coalition requests that the SDRWQCB remand the Order to staff so that the TMDL provisions of the permit may be revised in conformity with the Court's opinion.

The Rainwater Capture Act of 2012 (AB 1750) took effect January 1, 2013. The act declares that use of rainwater collected from rooftops does not require a water right permit from the State Water Board. However, the law does not expand property owners' authority to collect and retain water from other impervious areas such as parking lots and driveways that would otherwise be available to other individuals holding appropriative water rights. In fact the law clearly states that it does not alter or impair any existing rights or change existing water rights law. Thus, requiring property owners to retain water that would otherwise be subject to appropriation may in fact, be a violation of the Act. The Coalition requests that the SDRWQCB refrain from enforcing any onsite retention requirements for impervious surfaces other than roofs until it has sought and obtained declivity relief concerning the authority of property owners to do so.

Water Quality Improvement Plans

The Coalition supports the RWQCB staff's efforts to develop a Tentative Order, the goal of which is to achieve improved water quality throughout the region. The Coalition further supports the staff's proposal to develop and implement Water Quality Improvement Plans (WQIP) for each of the ten watersheds in the basin as recommended by the Little Hoover Commission.[1] We believe that WQIPs provide the opportunity to solve water quality problems through an iterative and accountable process while balancing the resources required to implement WQIPs with other public and environmental programs.

For this reason we have joined the Copermittees and various environmental groups in requesting that the Regional Board focus on improving water quality through the development and implementation of WQIPs. Accordingly, we ask that the Tentative Order focus on the timely development of effective and enforceable WQIPs, that each WQIP be developed through a process that insures public participation and that each WQIP be reviewed and approved by the Board through a public hearing process. We further ask that the designation of appropriate Best Management Practices in each watershed be determined through the WQIP process. To these ends we suggest the following revisions to WQIP language in the permit.

Regional Board Staff has suggested that Copermittees will be permitted to "fail early and often" in their attempts to achieve compliance with discharge prohibitions and receiving water limitations as part of their development and implementation of WQIPs. The Coalition appreciates the sentiment behind these statements, in that it will encourage an innovative and iterative process through which much will be learned. However, it creates a dilemma for the Copermittees and the property owners within their jurisdictions. Based on the 9th Circuit's opinion in *NRDC v. Los Angeles County* 636 F.3d 1235 (9th Cir. 2011), Provisions A.1. and A.2. create strict liability numeric effluent limits, which are enforceable both under the Clean Water Act and California Water Code.

The Clean Water Act provides for enforcement of a NPDES permit violation by State and Federal Agencies as well as private citizens. Violators may be subject to civil penalties up to $34,500 per day. Given the potential for citizen enforcement, jurisdiction cannot afford to fail. California Water Codes Section 13385 also requires the San Diego Regional Water Quality Control Board (SDRWQCB) to impose a mandatory minimum penalty of $3,000 for each

[1] See Generally: Clearer Structure, Cleaner Water: Improving Performance and Outcomes, Little Hoover Commission, January 2009 a copy of which is attached hereto and incorporated by reference herein.

violation of a waste discharge requirement effluent limitation in excess of three violations within any six month period. As currently written, the Order appears to **require** that the SDRWQCB impose these penalties on Copermittees for each failure in excess of three exceedances within any six month period.

Obviously, elected officials are concerned about the budget implications of these legal liabilities. Moreover, private property owners are concerned as they realize that the cost of the penalties will ultimately be passed on to them in the form of higher taxes without any measurable benefit.

In order to address this problem, and to encourage Copermittees to find the necessary resources to develop and implement WQIPs, the Coalition proposes the following language.

Provision A.4. -- Compliance with Discharge Prohibitions and Receiving Water Limitations
Each Copermittee must achieve compliance with Provisions A.1.a, A.1.c and A.2.a of this Order through timely implementation of control measures and other actions as specified in Provisions B and E of this Order, including any modifications. The Water Quality Improvement Plans required under Provision B must be designed and adapted to ultimately achieve compliance with Provisions A.1.a, A.1.c and A.2.a. Compliance with approved Water Quality Improvement Plans will be deemed to constitute compliance with the remaining Provisions of this Order.

The Coalition believes that the Copermittees and the public should have a free hand in the development of the WQIPs. These groups have the best understanding of the problems and needs of each watershed. Therefore, the Coalition recommends that the process of reducing and eliminating non-storm water discharges be left to the consideration of the Copermittees based on the specific information for each watershed. The Coalition notes that the SDRWQCB has discretion to reject or modify any WQIP that it believes does not adequately address water quality objectives. The Coalition therefore recommends the following changes to Provisions B.3. and B.3.a.

Provision B.3. -- Water Quality Improvement Strategies and Schedules
The Copermittees must develop specific water quality improvement strategies to address the highest priority water quality conditions identified within a Watershed Management Area. The water quality improvement strategies must address the highest priority water quality conditions by reducing non-storm water discharges to and from the MS4, reducing pollutants in storm water discharges from the MS4 to the MEP, and restoring and/or protecting the water quality standards of receiving waters.

Provision B.3.a. -- WATER QUALITY IMPROVEMENT STRATEGIES
The Copermittees must identify and prioritize water quality improvement strategies based on their likely effectiveness and efficiency, and implement strategies to effectively reduce non-storm water discharges to the MS4, reduce pollutants in storm water discharges from the MS4 to the MEP, improve the physical, chemical, and biological receiving water conditions, and achieve the interim and final numeric goals in accordance with the schedules required for Provision B.2.e.(3). The following water quality improvement strategies must be included and described in the Water Quality Improvement Plan:

Once again, the Copermittees, in conjunction with the general public should have a free hand in developing the WQIPs. The inclusion of additional mandatory requirements both stifles creativity and prevents Copermittees and the public from tailoring the WQIPs to the specific needs of each watershed. The Coalition proposes that the WQIPs be reviewed and approved by the SDRWQCB after public notice and hearing. This process provides a failsafe and mitigates the need for additional mandatory requirements, which may not be applicable to a specific watershed. The Coalition, therefore recommends the following modifications to Provisions E.3., E.4. and E.5.

Provision E.3. Development Planning
Each Copermittee must utilize their land use and planning authorities to implement a development planning program in accordance with the strategies identified in the Water Quality Improvement Plan, which may include the following requirements:

Provision E.4. Construction Management
Each Copermittee must implement a construction management program in accordance with the strategies identified in the Water Quality Improvement Plan and which may include the following requirements:

Provision E.5. Existing Development Management
Each Copermittee must implement an existing development management program in accordance with the strategies identified in the Water Quality Improvement Plan, which may include the following requirements:

Given the discretionary nature of Alternative Compliance Water Quality Credit Systems, and the public interest therein, the Coalition believe that approval for these systems must remain vested with the SDRWQCB and not its Executive Officer. The Coalition suggest that Provision E.3.(d). be modified accordingly.

Provision E.3. (d) -- Alternative Compliance Water Quality Credit System Option
The Copermittee may develop and implement an alternative compliance water quality credit system option, individually or with other Copermittees and/or entities, provided that such a credit system clearly exhibits that it will not allow discharges from Priority Development Projects to cause or contribute to a net impact over and above the impact caused by projects meeting the onsite structural BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2). Any credit system that a Copermittee chooses to implement must be part of a Water Quality Improvement Plan approved by the SDRWQCB.

The Coalition believes that the timing and procedures for the development of the WQIPs are procedurally and technically infeasible. The simultaneous preparation of ten WQIPs assumes that there are sufficient experts available to take on these tasks simultaneously. The Coalition disagrees. Attempting to prepare ten plans contemporaneously within the time lines proposed can only result in ten poorly developed plans. Moreover, at least two of the watersheds require input from Orange County and Riverside County Copermittees who will not be subject to the provisions of the permit for some time.

The Coalition believes that the better approach is to allow the Copermittees to prepare a suggested schedule for review and approval by the SDRWQCB as provided by the suggested revisions to Provision F.1.a.(1).(c). If these revisions are adopted Provisions F.1.a.(1)(c), F.1.a.(1)(d), F.1.a.(2).(b), F.1.a.(1).(d), F.1.a.(2).(b), F.1.a.(2).(c.) and portions of F.1.b. are no longer required.

Provision F.1.a.(1).(c)
Within 90 days after the commencement of coverage under this order, the Copermittees must develop and submit a Water Quality Improvement Plan schedule to the SDRWQCB for consideration and approval or amendment and approval. Said schedule will be based on the level of complexity and water quality of each watershed. Copermittees may propose either serial or concurrent preparation of the Water Quality Improvement Plans based on criteria to be established by the Copermittees. Copermittees must develop and submit the Water Quality Improvement Plan requirements of Provision B to the SDRWQCB. The SDRWQCB will issue a public notice and solicit public comments on the Water Quality Improvement Plan for a minimum of 60 days. After a public hearing the San Diego Water Board may either adopt or amend and adopt the Water Quality Improvement Plans as enforceable time scheduled orders. In the alternative, the San Diego Water Board may remand the Draft Water Quality Improvement Plans to the Copermittees for further modification. The Copermittees must revise the priority water quality conditions and numeric goals based on comments received and/or recommendations or direction from the San Diego Water Board. Until a Water Quality Improvement Plan is adopted by the San Diego Water Board, the watershed shall be subject to Provisions A.1.a, A.1.c and A.2.a of this order.

Provision F.1.a.(1).(d)

Provision F.1.a.(2).(b)

Provision F.1.a.(2).(c)

Provision F.1.b. -- WATER QUALITY IMPROVEMENT PLAN SUBMITTAL

(4) The Water Quality Improvement Plan must be made available on the Regional Clearinghouse required pursuant to Provision F.4 within 30 days of acceptance by the San Diego Water Board.

Finally the Coalition suggests that the procedures for the approval of WQIP Updates mirror the approval process for initial adoption. Accordingly the Coalition suggests the following revisions to Provision F.2.c.

Provision F.2.c. WATER QUALITY IMPROVEMENT PLAN UPDATES
The Water Quality Improvement Plans must be updated in accordance with the following process:

(1) The Copermittees must implement a public participation process to solicit data and information to be utilized in updating the Water Quality Improvement Plan.

(2) The Copermittees are encouraged to involve the public and key stakeholders as early and often as possible during the updates to the Water Quality Improvement Plan.

(3) The Copermittees for each Watershed Management Area must submit requested updates to the Water Quality Improvement Plan, with the public input received and the rationale for the requested updates, either in the Annual Reports required pursuant to Provision F.3.b, or as part of the Report of Waste Discharge required pursuant to Provision F.5.b. After a public hearing the SDRWQCB may either adopt or amend and adopt the Water Quality Improvement Plans Updates as an amendment to an enforceable time scheduled order. In the alternative, the SDRWQCB may remand the Draft Water Quality Improvement Plan Update to the Copermittees for further modification.

(4) The Copermittees must revise the requested updates as directed by the SDRWQCB .

(5) Updated Water Quality Improvement Plans must be made available on the Regional Clearinghouse required pursuant to Provision F.4 within 30 days of acceptance of the requested updates by the San Diego Water Board.

Illicit Discharge Detection and Elimination

The Coalition is concerned about the unanticipated consequences associated with the Permit's definition of "illicit discharges ""Persistent Flows" and the application of that definition to discharges of perched water through subsurface drains. The permit defines an "illicit discharge" as "Any discharge to the MS4 that is not composed entirely of storm water except discharges pursuant to a NPDES permit and discharges resulting from firefighting activities [40 CFR 122.26(b)(2)]." The permit goes on to define a non-storm water discharge as "All discharges to and from a MS4 that do not originate from precipitation events (i.e., all discharges from a MS4 other than storm water). Non-storm water includes illicit discharges and NPDES permitted discharges." For the reasons described below, this interpretation is neither enforceable nor technically feasible.

The proposed permit requires development and redevelopment projects to retain the 85th percentile storm event on the project site and either use on site storage for reuse, infiltration or evapotranspiration of that water. [Citation] The available area where soil is conducive to infiltration within the County of San Diego is extremely limited. These available areas include soil adjacent to river or stream beds, coastal sandy deposits, and valleys (e.g. along San Luis Rey River, beaches, and Mission Valley) and are a small fraction of the County area. Therefore, the parameters in the permit cannot be met on most projects. About 90 percent of the area of San Diego County belonging to Region 9 is likely deemed geotechnically infeasible for infiltration (soils Type C and D, see California Geological Survey - Preliminary Surface Geological Materials Map attached hereto).

Normally, these areas where infiltration can be performed are protected for environmental purposes (i.e. canyon drainages where the existing vegetation protects animal and waterway environments) However, in those areas where the native soils are permeable and development or redevelopment are permitted, building ordinances and design specifications require compacted fill at grade for higher density projects. The compacted fill has a reduced void structure and therefore does not facilitate water infiltration. Thus, this infiltration requirement as written pits the goal of minimizing urban sprawl though high density development with an attempt to infiltrate precipitation.

Because of the soil conditions in the geographic area regulated by this permit, much of the infiltrated water does not reach ground water aquifers but rather becomes perched water which tends to collect around subsurface utility lines, engineered fill soils, foundations and other structures. Unless the perched water can be allowed to escape, there is an almost certain probability of damage to critical infrastructure such as roads and utilities necessary to protect the health, safety and welfare of the community, as well as buildings, driveways, parking lots, etc. . There are necessary persistent flows of perched water, necessary for the safety of existing and future utilities, roads and structures, that the Copermittees should not be required to address unless the Copermittees or Board identify those discharges as a source of pollutants to the receiving waters.

The Permit offers the alternative of retention and reuse of water on site. As discussed at the Permit workshops, this alternative is both impractical and likely in violation of California law. First, because of the unique rain patterns in Southern California the scale of any retention structures would be enormous and costly well beyond any benefit to water quality particularly as applied to critical infrastructure projects such as roads and airports. Second, assuming that it is technically feasible to capture the runoff, doing so is likely to contravene other state laws and policies such as protection of wetland habitats[2], and previously granted water rights.[3]

The permit impermissibly assumes that any water flowing in a storm drain seventy two hours after an arbitrary 0.1 inch storm event during three consecutive monitoring and/or inspection events is

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[2] By capturing all events smaller or equal than the 85th percentile rain event, the runoff volumes are likely to be less than they were in the predevelopment condition, thereby drying up streams and valuable wetland habitat. The use of a universally accepted rainfall-runoff methodology such as the NRCS Method proves that events smaller than the 85th percentile rainfall event may generate a significant percentage of their volume as a runoff, depending on the soil type, antecedent conditions and vegetation type.

[3] If the amount of water being retained on site exceeds the amount of water retained in pre development condition, the additional water being retained will likely violate the prior appropriation rights and pueblo rights of others.

Persistent Flow, and therefore should be eliminated "through targeted programmatic actions and source investigations" (Section D Monitoring and Assessment Program Requirements(4)(b)(1)(c)(ii). First, the natural drainage from even an undeveloped site can take more than seventy two hours in many cases and could presumably be present during three consecutive monitoring and/or inspection events. As a matter of fact, a simple review of USGS precipitation and runoff records in a natural watershed in the area, such a San Mateo Creek, proves without a doubt that wet periods may take more than a month to fully drain natural runoff especially in wet years even for relatively small watersheds. Second, natural precipitation which is infiltrated on site is likely to emerge as perched water and enter the storm drain system day, weeks or months after was originally infiltrated. Third, hydromodification BMPs may take much more than 72 hours to drain, especially for those BMPs were a significant volume of detention occurs under amended soil and the drainage is constrained by a very small orifice. Thus, the Persistent Flow ~~seventy two hour~~ definition ~~after a 0.1 inch storm event~~ lacks any scientific basis and is, therefore, both arbitrary and capricious. Forth, many consecutive smaller events smaller than 0.1 inches may generate more runoff than an isolated 0.1 inch or larger rainfall event and the permit will consider as non-storm water the runoff from the many small storm water events but not from the later event, even if runoff from the multiple smaller events is higher[4]. Thus, the seventy two hour definition after a 0.1 inch storm event lacks any scientific bases and is, therefore, both arbitrary and capricious.

For the reasons stated above, the Coalition recommends that the Permit language be modified as follows:

ILLICIT DISCHARGE DETECTION AND ELIMINATION -- NON-STORM WATER DISCHARGES

Section 2.a.1

(1) Discharges of non-storm water to the MS4 from the following categories must be addressed as illicit discharges unless the discharge has coverage under NPDES Permit No. CAG919001 (Order No. R9-2007-0034, or subsequent order) for discharges to San Diego Bay, or NPDES Permit No. CAG919002 (Order No. R9-2008-0002, or subsequent order) for discharges to surface waters other than San Diego Bay:

(a) Uncontaminated pumped ground water; and

[4] As an example, in San Diego Lindbergh, an isolated 0.13" event occurred on 10/29/1948, after 10 days without rain. The potential runoff for such event would be considered as stormwater discharge by the new permit. However, at the same place, there were 6 consecutives but separate events (using the CASQA criteria of a 6 hour threshold) all smaller than 0.1 inch: 0.08" on 2/2/1949; 0.05" on the morning of 2/3/1949; 0.04" on the late afternoon of 2/3/1949; 0.04" on 2/4/1949; 0.02" on the morning of 2/5/1949 and 0.07" on the night of 2/5/1949 for a total of 0.30 inches of rainfall in 96 hours (0:00 2/2/1949 to 0:00 2/6/1949). Any runoff observed during those 96 hours would be incorrectly considered as non-stormwater runoff by the new permit, as no event larger than 0.1" occurred since 06:00 of 1/25/1949. This example is also valid with a conservative threshold of 12 hours to separate the storms. Hundreds of examples like this can be found in Southern California rainfall records in different locations, and shows the capricious nature of the definition of non-stormwater runoff, unrelated to the natural occurrence of precipitation in our region.

Water from crawl space pumps. (2) Discharges of non-storm water from water line flushing and water main breaks to the MS4 must be addressed as illicit discharges unless the discharge has coverage under NPDES Permit No. CAG 679001 (Order No. R9-2010-0003, or subsequent order). This includes water line flushing and water main break discharges from water purveyors issued a water supply permit by the California Department of Public Health or federal military installations. Discharges from recycled or reclaimed water lines to the MS4 must be addressed as illicit discharges, unless the discharges have coverage under a separate NPDES permit.

(3) Discharges of non-storm water, including persistent flows, to the MS4 from the following categories must be addressed by the Copermittee as illicit discharges only if the Copermittee or the SDRWQCB identifies the discharge as a source of pollutants to receiving waters:

(a) Diverted stream flows;

(b) Rising ground waters;

(c) Uncontaminated ground water infiltration to MS4s;

(d) Springs;

(e) Flows from riparian habitats and wetlands;

(f) Discharges from potable water sources;

(g) Perched water discharges from foundation and footing drains

(h) Water from crawl space or basement pumps

(i) Perched water discharges from hillside/canyon drains

(6) If the Copermittee or SDRWQCB identifies any category of non-storm water discharges listed under Provisions E.2.a.(1)-(4) as a source of pollutants to receiving waters, the category must be prohibited through ordinance, order, or similar means and addressed as an illicit discharge.

~~(7) Each Copermittee must, where feasible, reduce or eliminate non-storm water discharges listed under Provisions E.2.a.(1)-(4) into its MS4 whether or not the non-storm water discharge has been identified as an illicit discharge, unless a non-storm water discharge authorized by a separate NPDES permit~~

Add to Appendix C – Definitions:

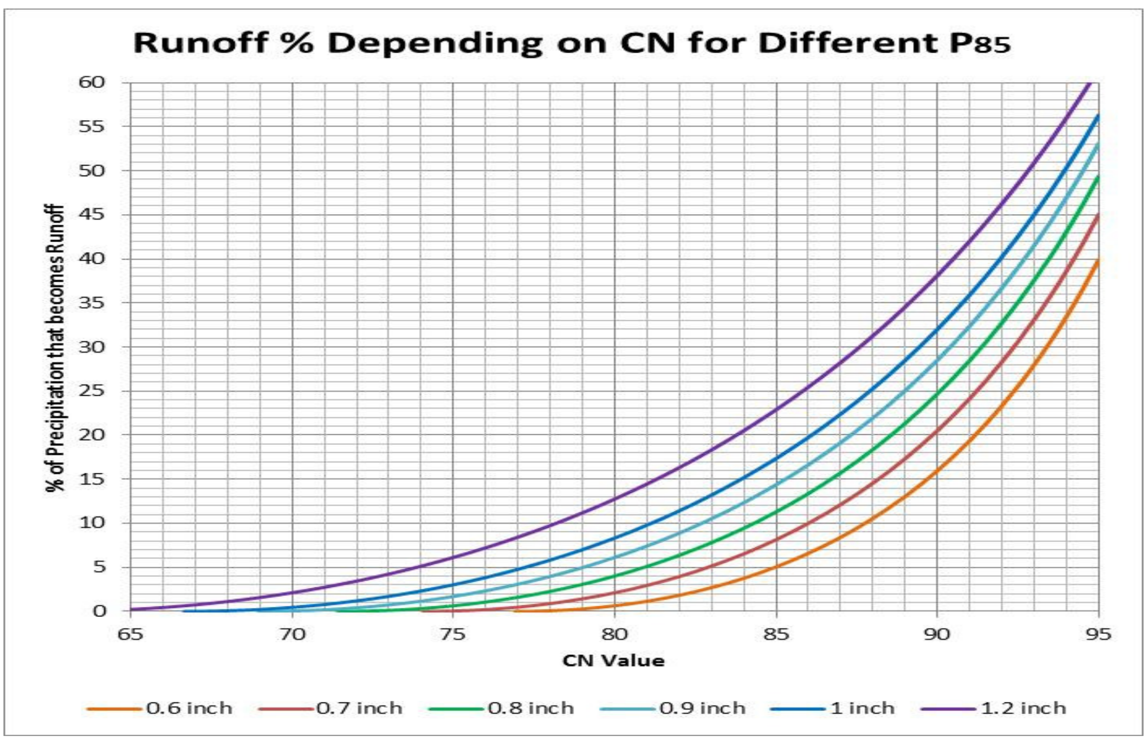
Groundwater – water that occurs beneath the water table in soil and geologic formation that are fully saturated as evaluated by a licensed geotechnical engineer/consultant or geologist.

Perched Water – water that occurs above the water table in soil and geologic formation as evaluated by a licensed geotechnical engineer/consultant or geologist.

Structural BMP Performance Requirements

The Coalition is concerned about the unintended consequences associated with the Permit's definition of LID implementation. We propose a more detailed and clear definition of the volume required for LID, as runoff should not be reduced below the expected runoff produced by the 24 hour – 85th percentile storm in natural conditions (nor the runoff produced by smaller storms in those cases where they indeed generate runoff). In natural conditions, runoff is not only a function of the precipitation event (the main variable) but also a function of the soil type, the natural vegetation type, and the Antecedent Moisture Condition (AMC) before the storm event (i.e., the degree of saturation of the soil at the beginning of the storm event). The current definition also lacks clarity in terms of the intent of the infiltration/retention LID: it is not clear if the volume retained is associated with the first storms of the season, or if it is associated with all storms smaller or equal to the 24 hour – 85th percentile storm event.

In San Diego County, the 24 hour - 85th percentile precipitation event (P_{85}) generates runoff in natural conditions, as impervious soils (Type D) are predominant in the County and poor or fair natural vegetation is common in many areas. The Coalition has prepared a figure that illustrates the percentage of runoff as a function of the Curve Number value (a well-known parameter for hydrologists and engineers to determine runoff via NRCS (SCS) method, which is a function of soil type, vegetation, and AMC), for different values of P_{85}. It is clear that runoff as a percentage of the precipitation can be as small as 0% or as large as 60% depending on the conditions of the natural terrain and the size of P_{85}.



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Removal of naturally occurring flows generated by storms similar to the 24 hour – 85th percentile storm for those natural environments where such flows do occur may have negative impacts to existing habitats, as excessive retention may alter the natural water balance. Additionally, excessive retention in soils that have a naturally limited capacity for infiltration increases the risks of failure of vital infrastructure due to lateral water migration.

Also, the intent of the permit to retain the seasonal first flush only (and not all runoff from all events smaller than or equal to the 24 hour – 85th percentile event) is not clear in the current language. It is clear in the technical literature (see for example CALTRANS CTSW-RT-05-73-02.6) that first flush treatment has a justification based on the fact that most of the time, in Southern California, treating the first storm of the season may remove built up contamination. Additionally, the first 20% - 40% of the storm volume may remove 50% - 70% of the total contaminant load (excluding sediments and trash). Finally, first flush treatment is justified by the theory of diminishing returns, because BMPs have a better efficiency removing higher loads, and the cost of treatment is more dependent on the volume of water than on the concentration of contaminants.

For the reasons stated above, the Coalition recommends that the Permit language be modified as follows:

Section E.3.c.(2)(b)

Each Priority Development Project must be required to implement LID BMPs that are sized and designed to retain the volume equivalent to the runoff volume produced from a 24-hour 85th percentile storm event after the development less the volume produced in natural conditions under the same storm. 26 ("design capture volume");

Footnote 26~~: This volume is not a single volume to be applied to all areas covered by this Order. The size of the 85th percentile storm event is different for various parts of the San Diego Region. The Copermittees are encouraged to calculate the 85th percentile storm event for each of its jurisdictions using local rain data pertinent to its particular jurisdiction. In addition, isopluvial maps may be used to extrapolate rainfall data to areas where insufficient data exists in order to determine the volume of the local 85th percentile storm event in such areas. Where the Copermittees will use isopluvial maps to determine the 85th percentile storm event in areas lacking rain data, the Copermittees must describe their method for using isopluvial maps in its BMP Design Manuals.~~ Runoff volumes must be calculated using the NRCS Method applying average AMC-II conditions, natural NRCS soil types, and the corresponding natural vegetation that exist or existed prior to development; a different hydrologic method could be approved by the Copermittees. LID is not intended to retain the runoff of all events that generate a runoff volume equal to or smaller than the runoff produced by the 24 hour - 85th percentile storm event; rather to retain the first flush up to the 85th percentile runoff difference. The 85th percentile runoff in natural conditions could be 0 or larger depending on the original natural vegetation and soil type. The time needed to use the totality of volume retained must be compatible with current regulations and water usage in the area. Proper vector control will be required in the retention facility if usage and infiltration of the retained water is expected to exceed 96 hours.

Sediment Supply Requirements

The requirement to address sediment balance is briefly mentioned in the new permit in the form of compensation of the potential sediment supply loss due to the proposal of a priority project. The sediment balance within a watershed (or the establishment of new sediment equilibrium as a consequence of many years of development in multiple watersheds) is an extremely complex issue. The Coalition is therefore very concerned about the lack of direction regarding this issue, the myriad of factors affecting a highly variable phenomena and the possibility of wasting valuable resources preparing a useless Sediment Management Plan for Priority Projects. Such plans lack direction, proper design equations, and basic understanding of the sediment transport phenomena in Mediterranean climates.

Sediment yield and sediment transport are functions of the geology of the terrain, the topography of the watershed and the slope of the main channels, the grain size distribution of the sediments existing in the network of channels, the vegetation, the annual precipitation and its distribution, the state of the vegetation prior to the rainfall (burned, dry, stable), the geometry of the main creeks and channels, the Antecedent Moisture Condition of the soil, the equilibrium conditions of slopes and of the sediments already in the network of channels in terms of stability, the existence of reservoirs or dams and the frequency and duration of their discharges in extreme events, and many other factors.

Trying to accommodate such complex factors into a one-size-fits-all solution is a recipe for disaster. Also, trying to deal with the sediment problem in a typical pre-formatted Sediment Management Plan is not only impractical, but also ineffective and resource-consuming. Sediment transport analysis made in the Tijuana River with 73 years of daily runoff data has proven, for example, that more than 70% of the sediment transport occurs less than 0.15% of the time; sediment analysis in the Santa Clara watershed has generated very similar results, with the added complication of hyperpycnal flow transport (flows with density higher than the salt water due to high sediment content), generating significant geomorphological changes in the watershed. [Warrick and Milliman: "Hyperpycnal Sediment Discharge for Semi-arid southern California Rivers: Implications for Coastal Sediment Budgets" Geology, September 2003, v-31, p. 781-784].

In addition to the complexity of the problem, many proposed solutions (such as the use of the Lane Relationship) denote the lack of understanding of sediment transport theory, as the Lane Relationship is not a quantitative equation that can be used for design, but a qualitative relation that only can be used for the purposes of discussion about the main factors affecting sediment equilibrium. [Ponce: "The Lane Relation Revisited". http://lane.sdsu.edu].

An added difficulty is related to the compensation process. It is evident that, even if sediment supply loss can be proven for a given project, adding artificial sediments to a natural creek triggers so many permits and environmental and water quality constraints, that such an alternative is infeasible. Even if the sediment addition is allowed, it is not clear what amount, size distribution, and time-variable sediment injection is required to mimic a naturally variable sediment production and transport condition that is not clearly measured nor understood.

For the above stated reason, the Coalition recommends that the permit language be modified as follows:

Section E.3.C(2)(b)

First option:

Eliminate the language until a more comprehensive and reasonable approach is developed to deal with restoration/rehabilitation projects and measurement of loss of sediment supply:

(~~b)~~ ~~Post-project runoff flow rates and durations must compensate for the loss of sediment supply due to the development project, should loss of sediment supply occur as a result of the development project.~~

Second option:

Incorporate rehabilitation/restoration projects and/or protection of clearly identifiable sediment producing areas as the only feasible alternative to deal with sediment supply:

(b) Post-project runoff flow rates and durations must compensate for the loss of sediment supply due to the development project, should loss of sediment supply occur as a result of the development project. Redevelopment projects that increase pervious areas from pre-development conditions are not subject to such compensation. Compensation should be tied to restoration/rehabilitation projects for downstream creeks and/or funding for protection of identified sediment-supply areas in the watershed. WQIPs of each watershed must establish the mechanisms of restoration/rehabilitation and/or protection of sediment-supply areas.

Streambed Restoration

Currently the Tentative Order prohibits construction of any treatment control BMP within waters of the United States or waters of the state. This is appropriate for new development or redevelopment projects, which can and should be expected to treat storm water runoff prior to discharge to receiving waters. With respect to existing development, existing pollution, and efforts to improve water quality throughout the region via retrofit projects or channel, stream, and/or habitat rehabilitation, there may be situations when retrofit or rehabilitation of waters of the United States or waters of the state should incorporate structural treatment control BMPs to treat pollutants already in the water from existing development. The permit language should be modified to allow construction of pollutant removal devices within waters of the United States or waters of the state to address pollutants already existing or being conveyed in such waters. We recommend the following clarifications in the permit so that retrofit or rehabilitation projects will not be stymied by language applicable to new development or redevelopment projects:

Finding 7

7. In-Stream Treatment Systems. Pursuant to federal regulations (40 CFR 131.10(a)), in no case shall a state adopt waste transport or waste assimilation as a designated use for any waters of the U.S. Except where appropriate to treat existing pollution through retrofit or rehabilitation, authorizing the construction of a runoff treatment facility within a water of the U.S., or using the water body itself as a treatment system or for conveyance to a treatment system, would be tantamount to accepting waste assimilation as an appropriate use for that water body. Treatment of storm water runoff from new development and redevelopment projects must occur prior to the discharge of runoff into receiving waters. Treatment control best management practices (BMPs) for new development or redevelopment projects must not be constructed in waters of the U.S. Construction, operation, and maintenance of a pollution control facility in a water body can

negatively impact the physical, chemical, and biological integrity, as well as the beneficial uses, of the water body.

Section E.3.a.(1)(b)

(b) Structural BMPs for new development or redevelopment projects must not be constructed within a waters of the U.S. or waters of the state.

Vague and Conflicting Definitions

Finally, the Coalition has significant concerns about what appears to be vague, ambiguous, and conflicting definitions of "flows" in the Order. The permit appears to identify at least six types of flows subject to regulation.

1. Wet weather flow: only mentioned three times, page A-5, page C-9 and page F-8
2. Dry weather flow: mentioned 4 times in page 43 (persistent dry weather flows, transient dry weather flows, no dry weather flows and unknown dry weather flows); in page 58 (persistent dry weather flow); in page A-5 and A-7 (e.g. dry weather flows); in page C-9 at the definition of runoff; in page F-63 three times (… as having persistent dry weather flows, transient dry weather flows, or no dry weather flows); in page F-64 (… of weather the MS4 produces persistent flow, transient flow, or no dry weather flow); twice in page F-75 (dry weather flow is the transport medium for bacteria… . Landscape irrigation is a major contributor to dry weather flow); and twice in page F-77 (are also likely sources of dry weather flow…. Examples of habitat changes from the dry weather flows);
3. No dry weather flow: page 45 and F-63
4. Transient flow : transient dry weather flow (page 43); transient non-storm water flows in page F-62; transient dry weather flow in page F-63; only as transient flows many times (pages 43, 45 three times, 57 twice, C-8, F-63, F-64 three times, and F-65).
5. Persistent flow: persistent dry weather flow (page 43, page 58); non-storm water persistent flow (page 49 in many titles, page 50 and 51); and many more times from page 49 to page 58; page 69; page F-62 to F-65. Persistent flow is many times mentioned as a non-storm water persistent flow, and sometimes as only persistent flow.
6. Combinations of all of the above.

The permit then provides the definitions or non-definitions for only three of these terms and then adds additional confusing definitions for terms that are not part of the order:

1. Persistent flow: "The presence of flowing, pooled, or pounded water more than 72 hours after a measurable rainfall event of 0.1 inch or greater during three consecutive monitoring and/or inspection events".
2. Transient flow: "All other flowing, pooled, or pounded water" The definition does not seem to comport with the definitions of Persistent Flow and Wet Weather Flow. Further clarification is required.

3. Wet weather flow: mentioned in the definition of runoff but never fully defined.

4. Runoff: All flows in a storm water conveyance system that consists of the following components: (1) storm water (wet weather flows) and (2) non-storm water including dry weather flows. This definition includes the undefined term "non-storm water" and fails to address Persistent flows and Transient flows.

Moreover, these definitions seem to be applied inconsistently throughout the Order. By way of example:

1. Wet weather runoff: mentioned in F-11: "… and a distinction between storm water (wet weather) runoff and non-storm water (dry weather) runoff was emphasized."

2. Wet weather discharges: they are mentioned in F-37: "Non-storm water (dry weather) discharges from the MS4 are not considered storm water (wet weather) discharges and therefore are not subject to the MEP standard".

The Coalition respectfully requests that the SDRWQCB direct its staff to redraft the permit using consistent and intelligible terms and definitions.

Hydromodification Management BMP Requirements

The Coalition requests the following text be added to Provision E.3.c.(2)(d):

(d) Exemptions

Each Copermittee has the discretion to exempt a Priority Development Project from the hydromodification management BMP performance requirements of Provisions E.3.c.(2)(a)-(b) where the project:

(i) Discharges storm water runoff into existing underground storm drains discharging directly to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean;

(ii) Is a redevelopment Priority Development Project that meets the alternative compliance requirements of Provision E.3.c.(3)(b)(ii);

(iii) Discharges storm water runoff into other areas identified by the San Diego Water Board as exempt from the requirements of Provisions E.3.c.(2)(a)-(b); or

(iv) Discharges storm water runoff to areas that are defined as exempt from hydromodification management as determined by approved Water Quality Improvement Plans.

Alternative Compliance to Onsite Structural BMP Performance Requirements

In light of the issues and suggested changes discussed above, the Coalition believe that Provision E.3. needs to be revised as noted below. The intent of the revisions is to remove unnecessary obstacles to alternative compliance options that would otherwise provide significantly more benefits to receiving water quality than onsite LID BMPs. For example, (3)(a)(iv) below would effectively prohibit storm water, treated onsite for pollutants, from being discharged into a reach of receiving water with low susceptibility, but with an alternative compliance option downstream.

(3) Alternative Compliance to Onsite Structural BMP Performance Requirements

(a) Applicability

At the discretion of each Copermittee, Priority Development Projects may be allowed to utilize an alternative option to comply with the onsite structural BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2) under the following conditions:

(i) The Copermittee must determine that implementation of the alternative compliance option will have a greater overall water quality benefit for the Watershed Management Area than fully complying with the performance requirements of Provisions E.3.c.(1) and E.3.c.(2) onsite;

(ii) The alternative compliance options must be designed by a registered professional engineer, geologist, architect, or landscape architect;

(iii) The alternative compliance options must be implemented within the same hydrologic unit as the Priority Development Project, and preferably within the same hydrologic subarea;

(iv) The pollutants in storm water runoff from the Priority Development Project must be treated to the MEP prior to being discharged to receiving waters;

(v) Unless otherwise allowed by Provision E.3.c.(3)(b), the alternative compliance options must have a net result of at least the same level of pollutant removal as would have been achieved if the Priority Development Project had fully complied with the storm water pollutant control BMP performance requirements of Provision E.3.c.(1) onsite;

(vi) Unless otherwise allowed by Provision E.3.c.(3)(b), the alternative compliance options must have a net result of at least the same level of protection from potential downstream erosion in the receiving water as would have been achieved if the Priority Development Project had fully complied with the hydromodification management BMP performance requirements of Provision E.3.c.(2) onsite; and

(vii) The alternative compliance options utilized by the Priority Development Project to comply with the performance requirements of

Provisions E.3.c.(1) and E.3.c.(2) must have reliable sources of funding for operation and maintenance.

(b) Alternative Compliance Project Options

The Copermittee may allow implementation of one or more of the following project options as part of an alternative approach to complying with the onsite structural BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2):

(i) *Onsite LID Biofiltration Treatment Control BMPs*

The Copermittee may allow Priority Development Projects to utilize onsite LID biofiltration treatment control BMPs to comply with the storm water pollutant control BMP performance requirements of Provision E.3.c.(1). Onsite LID biofiltration treatment control BMPs must be sized and designed to:

[a] Remove pollutants from storm water to the MEP; AND
[b] Have an appropriate surface loading rate to prevent erosion, scour and channeling within the BMP; AND
[c] Biofilter at least 1.5 times the design capture volume that is not reliably retained onsite, or biofilter an equivalent volume that demonstrates at least the same contaminant load reduction that would occur if a retention LID volume is in place; OR
[d] Biofilter up to the design capture volume that is not reliably retained onsite, AND 1) treat the remaining portion of the design capture volume not retained onsite with conventional treatment control BMPs in accordance with Provision E.3.c.(1)(c), and 2) if necessary, mitigate for the portion of the pollutant load in the design capture volume not retained onsite through one or more alternative compliance project, in-lieu fee and/or water quality credit system options below.

(ii) *LEED Certified Redevelopment Projects*

The Copermittee may allow redevelopment Priority Development Projects to comply with the hydromodification management BMP performance requirements of Provision E.3.c.(2) where the project is designed and constructed to be certified under the USGCB LEED for New Construction and Major Renovations green building certification program. The Priority Development Project must receive at least one (1) Site Design credit and two (2) Stormwater Design credits under the Sustainable Sites category.27

(iii) *Watershed-Based Planned Development Projects*

The Copermittee may allow Priority Development Projects greater than 100 acres in total project size (or smaller than 100 acres in size yet part of a larger common plan of development that is over 100 acres) to comply with the onsite structural BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2). The Priority Development Project must comply with the following conditions:

[a] The Priority Development Project was planned utilizing watershed and/or subwatershed based water quality, hydrologic, and fluvial geomorphologic planning principles that implement regional LID BMPs in accordance with the performance and location criteria of this Order and acceptable to the San Diego Water Board;

[b]

(iv) *Offsite Regional BMPs*

re volume that is not reliably retained onsite.

[a] The Copermittee may allow Priority Development Projects to utilize offsite regional BMPs to comply with the hydromodification management BMP performance requirements of Provision E.3.c.(2) if the offsite regional BMPs have the capacity to manage the storm water flows rates and durations from the site such that the receiving waters are protected from the potential for increased erosion that would be caused if the unmanaged portion of the runoff was discharged from the site.

(v) *Offsite Retrofitting Projects*

The Copermittee may allow Priority Development Projects to utilize offsite retrofitting projects to comply with the storm water pollutant control and hydromodification management BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2) if the retrofitting projects have been identified within the strategies included in the Water Quality Improvement Plan, or identified as potential retrofitting projects by the Copermittee pursuant to Provision E.5.

(vi) *Offsite Channel, Stream, or Habitat Rehabilitation Projects*

The Copermittee may allow Priority Development Projects to utilize offsite channel, stream, or habitat rehabilitation projects to comply with the hydromodification management BMP performance requirements of Provision E.3.c.(2) if the rehabilitation projects have been identified within the strategies included in the Water Quality Improvement Plan, or identified as potential channel rehabilitation projects by the Copermittee pursuant to Provision E.5. The channel, stream, or habitat rehabilitation project cannot be utilized for pollutant treatment except where artificial wetlands are constructed and located upstream of receiving waters.

(vii) *Offsite Regional Water Supply Augmentation Projects*

The Copermittee may allow Priority Development Projects to utilize offsite regional water supply augmentation projects (i.e. groundwater recharge, recycled water, storm water harvesting) to comply with the storm water pollutant control and hydromodification management BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2) if the projects have been identified within the strategies included in the Water Quality Improvement Plan.

(viii) *Project Applicant Proposed Alternative Compliance Projects*

The Copermittee may allow one or more Priority Development Project applicant(s) to propose and implement alternative compliance projects to comply with the storm water pollutant control and hydromodification management BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2) if the alternative compliance projects are consistent with, and will address the highest water quality priorities of the Water Quality Improvement Plan, and comply with the requirements of Provision E.3.c.(3)(a).

(c) Alternative Compliance In-Lieu Fee Option

The Copermittee may develop and implement an alternative compliance in-lieu fee option, individually or with other Copermittees and/or entities, as a means for designing, developing, constructing, operating and maintaining offsite alternative compliance projects under Provision E.3.c.(3)(b). Priority Development Projects allowed to utilize the alternative compliance in-lieu fee option must comply with the following conditions:

(i) The in-lieu fee must be transferred to the Copermittee (for public projects) or an escrow account (for private projects) prior to prior to the issuance of the certificate of occupancy for the Priority Development Project is initiated.

(ii) If the in-lieu fee is applied to the development, design and construction of offsite alternative compliance projects, the following conditions must be met:

[a] The offsite alternative compliance projects must allow the Priority Development Project to comply with the onsite BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2);

[b] The offsite alternative compliance projects must be constructed by the Copermittee or its agent as soon as possible, but no later than 4 years after the certificate of occupancy is granted for the first Priority Development Project that contributed funds toward the construction of the offsite alternative compliance projects, unless a longer period of time is authorized by the San Diego Water Board

Executive Officer provided, however, that the project proponent's sole responsibility shall be the payment of the in-lieu fee;

[c]

[d] The in-lieu fee must also include the cost to operate and maintain the offsite alternative compliance projects.

(iii) If the in-lieu fee is applied to the operation and maintenance of offsite alternative compliance projects that have already been constructed, the offsite alternative compliance projects must allow the Priority Development Project to comply with the onsite structural BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2).

(d) Alternative Compliance Water Quality Credit System Option

The Copermittee may develop and implement an alternative compliance water quality credit system option, individually or with other Copermittees and/or entities, provided that such a credit system clearly exhibits that it will not allow discharges from Priority Development Projects to cause or contribute to a net impact over and above the impact caused by projects meeting the onsite structural BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2). Any credit system that a Copermittee chooses to implement must be submitted to SDRWQCB for review and acceptance as part of the Water Quality Improvement Plan.

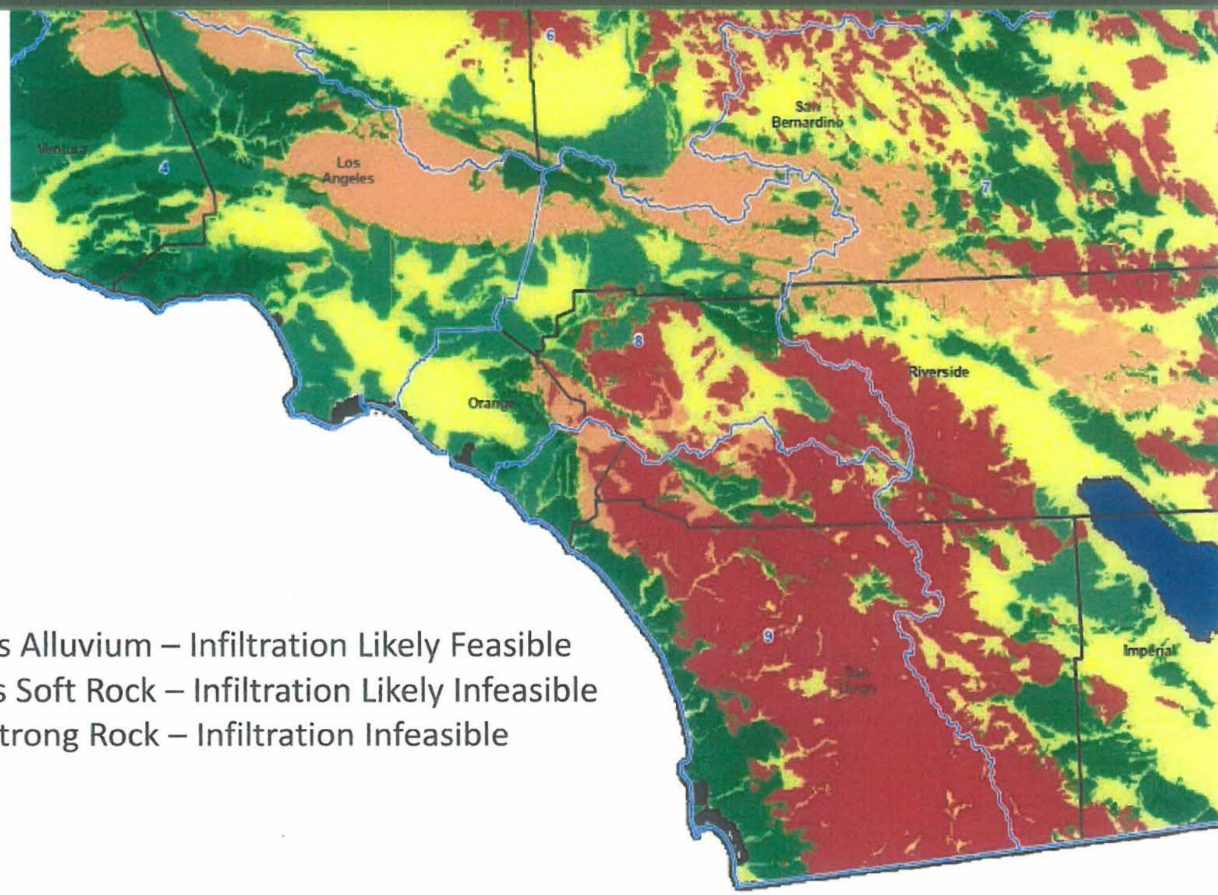
Thank you for consideration of the Coalition's comments on the Administrative Draft of the Permit. We look forward to working with the Regional Quality Control Board and its staff on improving the final draft with a goal toward achieving improved water quality in harmony with the Regional Board's Basin Plan.

Very truly yours,

Borre Winckel
President & CEO of the BIASD
On behalf of the Coalition

GEOCON

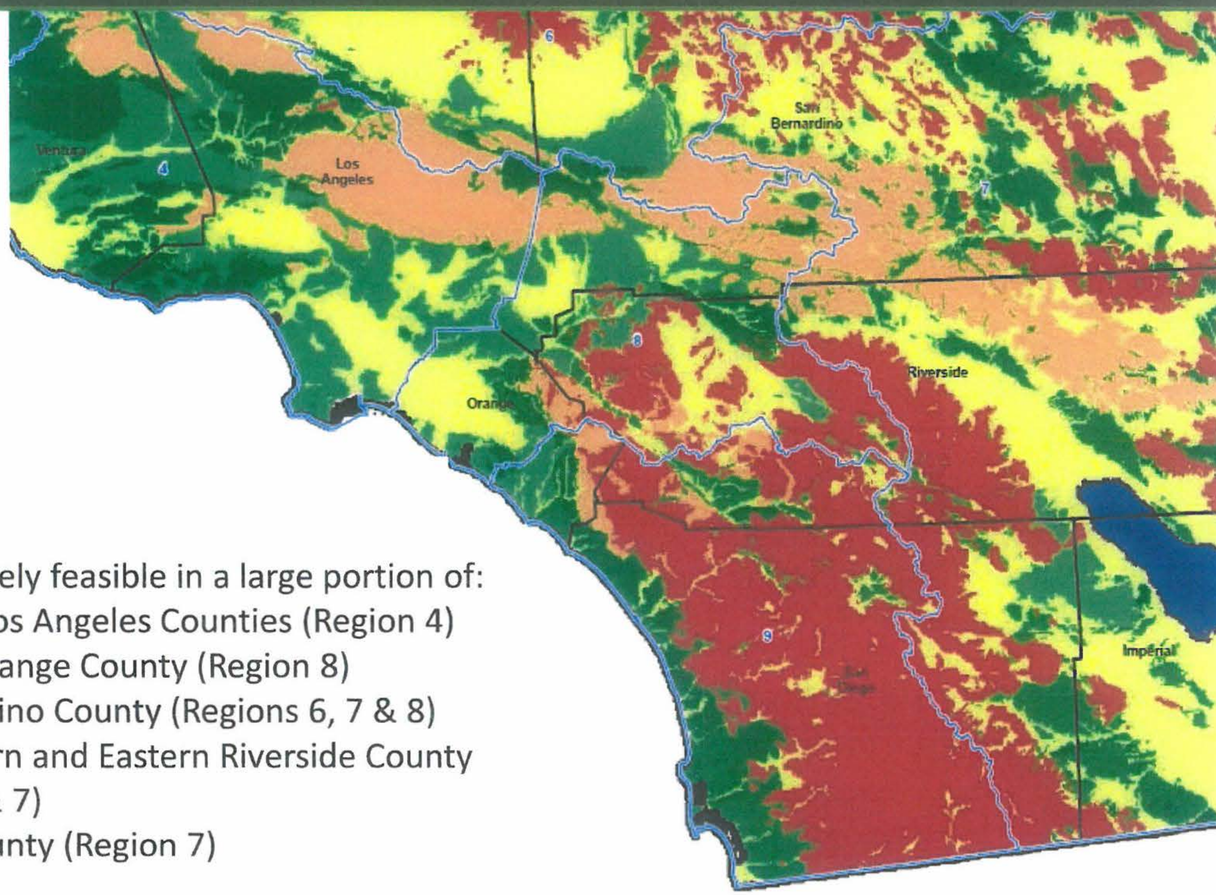
Technical Infeasibility



Yellow Indicates Alluvium – Infiltration Likely Feasible
Green Indicates Soft Rock – Infiltration Likely Infeasible
Red Indicates Strong Rock – Infiltration Infeasible

GEOCON

Technical Infeasibility

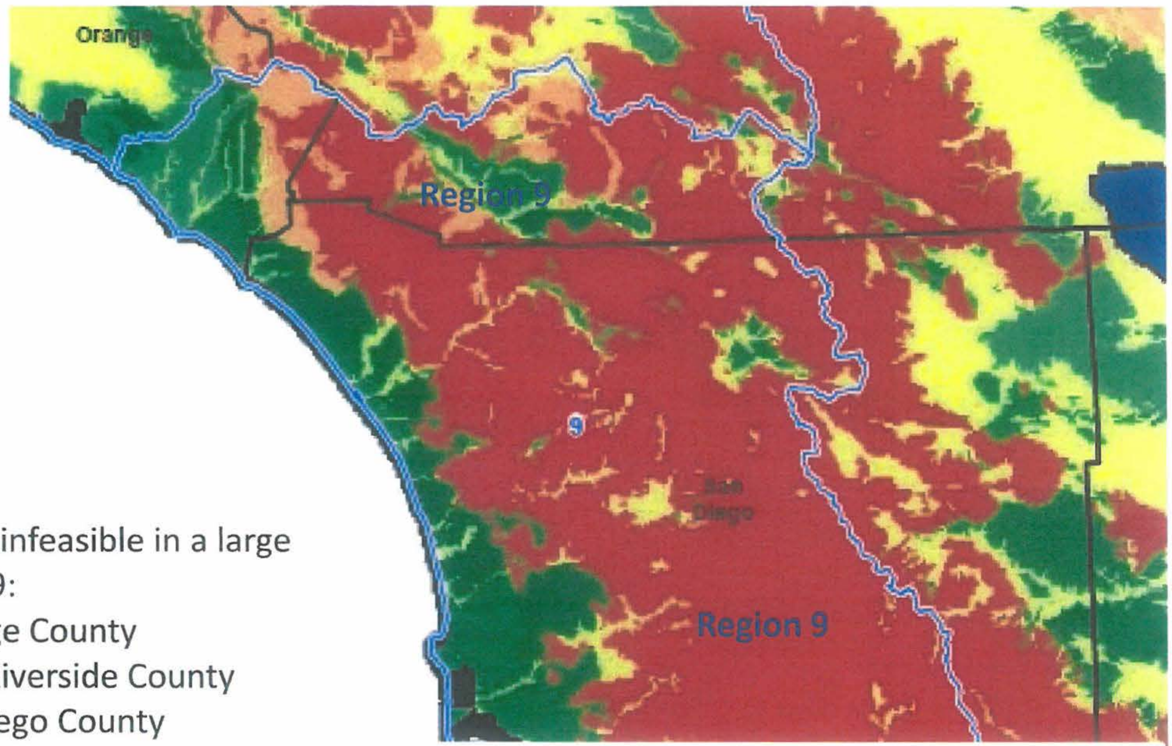


Infiltration is likely feasible in a large portion of:

- Ventura & Los Angeles Counties (Region 4)
- Northern Orange County (Region 8)
- San Bernardino County (Regions 6, 7 & 8)
- Northwestern and Eastern Riverside County (Regions 8 & 7)
- Imperial County (Region 7)

GEOCON

Technical Infeasibility



Infiltration is likely infeasible in a large portion of Region 9:

- Southern Orange County
- Southwestern Riverside County
- Western San Diego County

April 10 and 11, 2013
Item No. 8
Supporting Document No. 5

Clearer Structure, Cleaner Water:

Improving Performance and Outcomes at the State Water Boards

Little Hoover Commission

January 2009

April 10 and 11, 2013
Item No. 8
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State of California

LITTLE HOOVER COMMISSION

January 22, 2009

The Honorable Arnold Schwarzenegger
Governor of California

The Honorable Darrell Steinberg
President pro Tempore of the Senate
and members of the Senate

The Honorable Dave Cogdill
Senate Minority Leader

The Honorable Karen Bass
Speaker of the Assembly
and members of the Assembly

The Honorable Michael Villines
Assembly Minority Leader

Dear Governor and Members of the Legislature:

Clean water is a cornerstone of California's economic and environmental well-being.

As the state's lead water quality guardians, the State Water Resources Control Board and the nine Regional Water Quality Control Boards play a critical role in the state's health. Their job is to protect and improve the state's aquifers, rivers, lakes and shoreline.

For that job, however, the boards today must rely on regulatory tools that are not adequate to address modern threats to water quality, resulting in a system that has lost the confidence of the very people it needs to ensure clean water. The governor and Legislature must exercise their leadership to reform the current system into one that assures transparency, consistency and accountability, and demonstrates that it is improving water quality.

The boards face a daunting task. For decades, the boards' actions, supported by substantial federal investment – have led to a dramatic decrease in water pollution from wastewater treatment plants and other so-called "point sources," which discharge into water or the ground from a pipe. The current threats to the state's water quality, however, are far more difficult to solve, even as demand for clean water increases from a growing population and an economically important agricultural industry.

Stormwater pollution, caused when rains pummel the impervious surfaces that dominate cities and suburbs and sweep debris and contaminants into the state's waters, is one of the biggest water quality problems facing the state and country. Local governments, homebuilders and many industries face expensive fixes to limit and capture stormwater, and water boards are struggling with how to best regulate a diffuse pollution source. Other non-point sources, including agricultural runoff and decades-old legacy pollutants, also present challenges.

California relies on a system created nearly four decades ago, with a state board and nine separate regional boards that enjoy enormous autonomy. While regional decision-making remains essential to solutions that fit local conditions, the current structure places too little emphasis on accountability and outcomes. No one is holding regional boards truly accountable for protecting and improving water quality. Regional boards, in turn, are overwhelmed by their tasks. The inability of the state board to implement statewide policies, practices and standards leads to inconsistencies and inefficiencies in how regional boards operate, creating the perception by water users, environmentalists, local governments and others that the boards' actions often are arbitrary and unfair.

The boards' continuing struggles with information technology, data and science lead to conflict over information, instead of policy. This complicates the ability for the public and policy-makers to get an accurate reading on the state of the state's water quality, and to determine which regulatory programs are effective in improving water quality.

California's current system for ensuring water quality does not rank the biggest threats to water quality and systematically match its finite resources to address the most serious of them using the tools of scientific and economic analysis. In this report, the Commission recommends the state board make better use of data to identify the biggest threats to water quality. The Commission recommends making greater use of science in determining the cause and remedies to water contamination as well as economic analysis to inform which options offer the greatest improvement within the available resources.

The Commission recommends reducing the size of the regional boards to seven members, all appointed by the governor, and making the regional chair a full-time position. The state board should be expanded to nine members, with five members, also appointed by the governor, representing a statewide perspective. The remaining four would be regional chairs serving staggered, two-year terms. Regional boards should focus on setting policy, not issuing permits.

While this review focuses on the water boards' duties to regulate water quality, the Commission is hopeful that it can become part of a broader conversation the state needs to engage in about its overall governance strategy for water. With a crashing Sacramento-San Joaquin River Delta, declining fish species, and continuing questions about how best to deliver water from north to south, California policy-makers must use 2009 to create an overall governance structure that can produce thoughtful responses that acknowledge the intertwined issues of water quality, water rights and water supply.

Facing increasing demand for water and the likelihood of diminishing supply, California undoubtedly will have to rely on cleaner local water supplies to meet future needs. The water boards will play a key role in this as they carry out their mission to protect and improve water quality. Reforming those boards is a first step, and one that is urgently needed.

Sincerely,

Daniel W. Hancock
Chairman

CLEARER STRUCTURE, CLEANER WATER:

IMPROVING PERFORMANCE AND OUTCOMES AT THE STATE WATER BOARDS

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Executive Summary

California is attempting to solve modern water pollution problems with an antiquated system.

Nearly four decades after the Legislature created the legal foundation to police water quality in the state, the governance structure surrounding the State Water Resources Control Board and the nine Regional Water Quality Control Boards is showing its age. The boards are overwhelmed and under-achieving, and have lost the confidence of a diverse array of water stakeholders.

The decentralized regulatory and permitting structure – with largely autonomous regional boards issuing permits, conducting enforcement and carrying out a wide array of other duties – has created a system that lacks consistency, accountability and transparency, and is unable to match resources to priorities. In fact, lack of prioritization is a fundamental weakness in state water quality regulation. The water boards' broad and ambitious mandate – to protect all waters at all times – set by state and federal law, makes it difficult to set priorities. This mandate, coupled with a state board that does not exercise enough authority over regional boards and the boards' failure to consistently consider the costs and benefits of various clean water solutions, leaves California's water quality system with dozens of priorities and, in effect, no clear, statewide priorities.

The state needs a smarter strategy to support the boards' critically important mission: protecting and improving the state's 7,800 square miles of surface water, as well as its ground water aquifers. Demand for water will grow in a state expecting a population boom. And as Governor Arnold Schwarzenegger's drought declaration in summer 2008 underscored, water is a scarce resource. The boards' work will have a profound impact on California's future: Clean water is essential to the environment, the economy and the state's well-being.

Despite the importance of water, there are ominous signs of water quality problems throughout the state. The ecological health of the Sacramento-San Joaquin River Delta, the country's largest estuary and the key cog to the state's daily efforts to deliver water from water-rich Northern California to parched Southern California, is deteriorating, partially due to water quality problems. Fish that rely on the Bay Delta, from the Delta Smelt to the Chinook Salmon, are disappearing, due to a combination of factors, including water pollution. Beaches are closed due to water quality issues, and groundwater in parts of the Central Valley is tainted with contaminants.

As these problems indicate, the state and regional water boards face enormous challenges as they attempt to find and lessen the sources of pollution.

Urban stormwater is one of the biggest challenges the state faces. Stormwater pollution is essentially caused by modern city life, as rainwater sweeps metals, lawn fertilizer and other pollutants from city and suburban streets into nearby streams, lakes and the ocean. These sources of pollution are diffuse and difficult to control. For example, the San Francisco Bay regional board has been working for a decade to determine ways to reduce copper pollution in the Bay. The answer may lie in changing the composition of brake pads in cars, which leave copper residue on roads that is pushed into the Bay during storms.

No topic dominated the Commission's study like stormwater regulation. It is the area in which the boards' patchwork of permits has an effect on virtually everyone in California. More than 30,000 stormwater discharges are subject to permits (compared to about 2,200 permits for wastewater treatment) that regulate the behavior of large and small cities, construction sites and industry. A diverse group of water users – the military, small and large businesses, home builders, local governments and more – face enormous costs as they try and control and limit stormwater pollution. Regional boards issue many of the permits, and boards have differing philosophies and policies toward stormwater regulation in the absence of statewide policies and scientific consensus on causes and solutions. As a result, stormwater discharges are subject to significantly different levels of regulation depending upon the region. The costs of cleaning up stormwater are enormous, fueling the debate about who should pay. The costs of stormwater pollution, however, are far greater, as beach closures impact the state's economy and environmental damage threatens to impair wildlife.

Other problems are equally difficult. Agricultural runoff contaminates water throughout the Central Valley and other regions, and efforts are just getting underway to address it. Many regions are seeking to lower levels of salinity in water, which limits its use for drinking supplies or irrigation. So-called legacy pollutants, which settled into waterways years, decades or even a century ago, remain harmful today. Mercury used to aid gold mining in the Sierra Nevada in the 1800s continues to pollute many northern California water bodies.

And while implementation of the federal Clean Water Act and the state's Porter-Cologne Water Quality Control Act, the two key laws governing water quality, have made profound improvements in wastewater treatment discharges, wastewater remains a critical statewide problem. Local governments, representing small, poor communities as well as larger, richer urban areas, are struggling to pay for upgrades needed to protect the state's waters and ensure they are safe to swim in, fish in or drink. An EPA report noted that California would need to spend more than $18 billion to properly upgrade and expand wastewater treatment.

In its study of California's water boards, the Commission focused on the boards' role in water quality regulation, by design excluding the state water board's administration of water rights. Quality and supply and the rights to that supply are profoundly intertwined and worthy of broader analysis and discussion. The Commission urges the state to use this report as a guide to improving water quality regulation, as well as a starting point for the important discussion on the much larger water issues facing the state, a discussion that must embrace water rights, water supply and restoration of the Sacramento-San Joaquin River Delta. Clean water is essential to the state's water future, but clean water is an unattainable goal without clear policies on the state's other pressing water issues.

Through public hearings, meetings of two Commission-created advisory committees, extensive interviews with stakeholders and a review of available research, the Commission identified the following critical problems with California's efforts to regulate and improve water quality:

- ***The relationship between the state and regional boards is not well-defined, leading to inconsistencies and inefficiencies among boards, an inability to set statewide priorities and a lack of focus on holding regional boards accountable for clean water outcomes.*** In statute, the state board has significant authority to steer regional board policies and provide statewide leadership. In practice, however, the state board does not provide enough oversight and regional boards have dramatically different approaches to similar problems, statewide priorities are unclear and there is not enough effort to understand which regional boards are the most effective at implementing clean water laws.

- ***The state and regional boards lack mechanisms to collect and analyze data properly, use scientific research and cost-effectiveness reviews to drive decision-making and provide useful information to the public, policy-makers and other researchers.*** Regional boards acknowledge they do not always have sufficient data to make decisions, determine whether programs are effective, or analyze whether the costs of regulation are worth the incremental benefits to our water supplies. The state has struggled to implement an information technology system and coordinate scientific research so that it is applied in regulatory processes. Basin plans, the key regulatory document dictating most regional board processes, are out of date in most regions.
- ***An antiquated regional board structure limits candidates for regional boards, hinders transparent decision-making and asks volunteer board members to do too much.*** Regional boards face complex decisions that require water expertise that some board members do not have. Compounding that difficulty are ex parte rules that limit board members' ability to communicate with stakeholders, who in turn feel they are not able to work with boards in a collaborative manner. Federal and state conflict-of-interest provisions dramatically limit the pool of potential qualified candidates.
- ***The appeals process is broken.*** Few stakeholders expressed confidence in the appeals process, arguing it was unclear why the state board decided to hear an appeal or not, and that the state board often appeared unwilling to overturn regional board decisions. In addition, because of their role as an appellate, the state board is reluctant to intervene in regional board matters that could benefit from a state board perspective before appeals are needed.
- ***The state – both water boards and other state agencies – is struggling to adapt appropriate strategies to address non-point source pollution.*** Non-point source pollution provides enormous challenges to the state and will require multi-agency responses, but the state has no structures in place to address water quality problems that stem from land use, centuries-old pollution and air pollution. Urban stormwater is a vexing problem with costly solutions, yet the state has not developed an adequate system for assessing and prioritizing this problem and other non-point source pollution problems.

Inherent to the water boards' inability to achieve better results is the governance structure. Regional decision-making is a cornerstone of California water quality regulation, and it remains a sound structure, due to differing local conditions. But the boards have become too autonomous, and despite efforts by the state board to close the gulf between the boards, the structure creates in appearance and practice 10 different agencies instead of one. State board members, as co-equal gubernatorial appointees with regional board members, have been unable or unwilling to exercise authority over the regional boards. Examples abound of differing policies and processes at different regional boards that are incompatible with the goal of a coherent and cohesive state policy on water quality. Regional boards have had dramatically different policies on water recycling, a key statewide issue, for example. And boards have different methods of defining impaired water bodies, unduly complicating efforts to compare problems in different regions.

In part due to this autonomous structure, there is little focus on clean water outcomes or accountability. Regional boards admit they have difficulty in analyzing watersheds to determine whether their programs are protecting and improving water quality – the boards' focus on issuing permits and determining whether dischargers abide by permits leaves too few resources dedicated to analysis of whether anything is actually working. In addition, the state board has made little effort to understand why regional boards have dramatically different enforcement statistics, even accounting for size. While the state board does have the authority to set statewide policies, set budgets and hear appeals of regional decisions, a disconnect remains between the state board and the nine regional boards.

The boards also acknowledge they have difficulty prioritizing water quality problems. Seventy-four separate revenue streams, most of which must be spent on specific purposes, prevent the boards from shifting resources toward planning or enforcement, for example. During these dire economic times, it is unlikely that the boards will receive more state funding. But they should have more flexibility to match existing resources with priorities.

In addition to the difficulty in pointing resources toward the most pressing problems, the boards fail to use any type of cost-benefit analysis to help determine priorities. While full-scale cost-benefit analysis is costly and may not be warranted in many regulatory proceedings, the boards could do a better job of considering costs to find the quickest, cheapest solutions to improve and protect water quality. Simply ignoring the costs of compliance means that, too often, the price is not worth the prize when the boards set tough standards.

Underlying many of the conflicts facing the boards is a lack of data and scientific research as well as poor information technology systems. This has led to continual conflict among boards and stakeholders over information, before even beginning the discussion on proper policy.

Data collection remains a key problem. Water quality monitoring is sporadic throughout the state, leaving water boards to regulate on the basis of incomplete information. A 2004 report noted that as much as 75 percent of the state's rivers, streams, lakes and reservoirs were unmonitored. The boards struggle to organize what data they do have, however. One analysis of the water boards' program to protect and enhance wetlands was hampered because more than 40 percent of the files for the program could not be located.

The state board has struggled to implement a new IT system, making it difficult for the public, policy-makers and even board staff to conduct basic analysis. Incredibly, many board programs still rely on paper records, rather than computerized data. Environmental groups, such as the California Coastkeeper Alliance and Heal the Bay, are much better at using water board data to provide valuable information to the public than the boards can themselves.

And while the boards conduct and fund scientific research, the state has thus far done a poor job of coordinating or consolidating that research or working to infuse it into regulatory programs. Much more research is needed – the boards face a difficult challenge in regulating non-point sources such as stormwater, as there remains a lack of knowledge regarding the best, most cost-effective methods for reducing this kind of pollution – but the boards have failed to use science available to them in an efficient, effective manner.

The lack of data and science mean that the core regulatory document for each region – the basin plan – often is decades out of date. As basin plans guide virtually all regulations in each region, this undermines the legitimacy of the state's regulatory efforts. Basin plans list the uses of water bodies and the limits on contaminants in each of the water bodies to support those uses. Despite this, the state has not committed the resources to update them: Less than 3 percent of the boards' nearly 1,600 employees are dedicated to updating basin plans. The boards' funding structure, which relies mostly on fees to support specific permitting programs and almost no General Fund dollars, leaves little money available for this critical task. The state must give this task higher priority, commensurate with the role the plans play in ensuring and protecting water quality.

In addition to such basic information problems, the boards' appeals process undermines confidence in the board system. The state board is the appellate body, and acts when petitions are filed protesting a regional board action. The state board rarely overturns regional board decisions, however, and the state board does a poor job of explaining to stakeholders how it considers appeals and why appeals are denied. In addition, the appellate role prohibits the state board from taking a more active approach to regional board issues before conflicts lead to appeals and later, costly litigation. Stakeholders suggested there is a reluctance to launch an appeals process, for fear of reprisal.

Regional board members face an increasingly difficult job, particularly for a position that is essentially a volunteer post. Permits and other issues facing board members involve complex issues that are difficult for many board members who lack technical water backgrounds to understand.

Adding to the difficulty of the job are outdated ex parte rules that often prohibit board members from interacting with stakeholders outside of time-constrained public meetings. This works against the kind of communication between stakeholders and board members required for problem solving, and leaves water users and others in the water community with no avenue to discuss complex issues with board members.

A federal and state eligibility/conflict-of-interest rule, dubbed the 10 Percent Rule, eliminates many potential board members from consideration for an appointment, making it difficult for governors to fill 81 regional board positions. Five of the nine regional boards had one-third of their board positions unfilled during periods of the Commission's study. This high vacancy rate impairs boards' abilities to establish quorums and conduct important business.

Even the smoothest-running government agency, however, would struggle with the challenges facing the water boards. Modern water pollution problems are increasingly difficult and increasingly outside of the typical regulatory purview of the boards. Some studies, for example, suggest that mercury contamination in waters along the California coastline is caused by coal-burning power plants in China.

The state must understand that water pollution is a critical problem that will require creative, multi-agency responses. Aerial deposition, for example, creates water pollution, and will require a joint response from water and air regulators. Land-use planning has a profound impact on water quality, requiring more thought from the state and local governments on how to slow and capture fast-moving stormwater that collects pollutants and deposits them in our waters.

All of these problems require important structural and procedural changes.

Toward a Reformed State Agency

A new, ideal system should include the following characteristics:

- ***A unified state water quality agency.*** Completely distinct regional boards may have been appropriate in past decades, but current common problems – urban stormwater, for example, or impairments caused by the same contaminants – call for a more centralized regulatory approach unified by a common vision and common processes. A unified state agency can better identify key problems and priorities in the state and align resources to address those problems. Efficiencies gained by a stronger bond between the state and regions will lead to clean water outcomes faster and cheaper.
- ***Local input.*** The need for local input on water quality objectives remains important, as water bodies are unique, with their own problems and solutions. Water quality objectives should continue to be set at the regional level, with vigorous debate and discussion among local stakeholders, while still subject to state oversight.
- ***A focus on accountability and outcomes.*** The public, and policy-makers, have a right to clearer information from the boards as to the state of the state's waters, and to which programs are effective – and which are not. Additionally, the boards must re-focus their mission, from ensuring that dischargers are abiding by their permits to this fundamental question: Are the state's programs protecting and improving water quality?
- ***Integrated science, accessible data.*** As water pollution problems increase in complexity, there is a need for a stronger scientific presence within board programs. The state board needs scientific advisors to help guide and coordinate research and utilize that research in regulation. In addition, the boards' dearth of water quality data must be rectified, and it can be: There are numerous federal, state and local agencies, as well as other groups, collecting information. The state must pull that information into an integrated system that allows the boards and others to access and use the information that already has been gathered.

To increase efficiency, improve cohesiveness between the state and regional boards and to better develop statewide priorities, the state board and regional boards must be reformed. The Commission proposes creating a 9-member state board, with five of the board members representing statewide perspectives. The remaining four members would be chairpersons of regional boards, serving staggered, two-year terms on a rotating basis. Regional board chairs, as well as the five state board members would be full-time, appointed by the governor and confirmed by the Senate.

Regional boards should be reduced in size from nine to seven members, with the six part-time members – aside from the chairperson – paid a per diem. The six part-time regional board members should represent various constituencies, including local government, industry, agriculture and nongovernmental organizations, as well as one spot reserved for a scientist or engineer with a background in water issues. Regional boards' missions should focus on broad policy issues, such as updating basin plans and setting regional priorities.

Regional executive officers, and the executive director of the state board, would have expanded authority to issue permits, allowing the boards to focus on quasi-legislative actions such as developing up-to-date basin plans. Permits would continue to be issued in public hearings conducted by executive officers or the executive director. Regional executive officers would report to the executive director of the state water board.

This new model would allow a stronger tie between the state and regional boards, create a "strong chair" model at the regional boards that would create new board leadership in the regions and at the state level and focus the state regional boards on policy, not permits. The state board would have better understanding of regional issues, and vice versa. The model retains the idea of regional decision-making, however, allowing regional input on setting water quality standards and beneficial uses. By reducing the regional board size, governors should have an easier time filling all board positions.

Other changes also are needed.

Ex parte rules must be reformed to allow more communication between decision-makers and stakeholders. The regulated community should have greater opportunity to talk with board members who have such significant power to influence their activities. The boards should adopt rules similar to those used by other state regulatory boards such as the Integrated Waste

Management Board, which allow communication between regulators and the regulated as long as it is disclosed at public meetings. These new rules should extend to executive officers if they are issuing permits.

A separate appeals board, comprised of water experts and appointed by the governor, should be created to hear appeals of state and regional decisions. This would restore confidence in the appeals process and allow the state board to become more active in regional board decisions before they are made.

To increase regional board accountability and provide better information to the public, the state should create easy-to-understand report cards for major water bodies throughout the state. Modeled after the report card issued by the environmental group Heal the Bay for state beaches, the report cards would provide the public with clear information about whether waters were safe to use, and whether board regulatory programs were effective. The state would need to conduct a thorough, inclusive process to determine the criteria for issuing grades, and report cards could be produced by either the state board or an outside entity, such as a water research institute like the Southern California Coastal Water Research Project or the University of California.

The boards must improve their use of science and data. The state should create a water science advisory board to help the state board determine needed areas of research, coordinate various research projects going on across the state and help the water boards incorporate research into regulatory programs. No new bureaucracy is needed – the board would consist of experts in water science who would provide advice to the state water board during regular meetings staffed by the state board.

Along with creating these new avenues to increase the use of science at the boards, the state is in desperate need of a water quality data library. The state should create an independent water data institute that would serve as a link to various federal, state and local agencies, as well as other groups, that gather water quality data. An independent institute would provide a clearinghouse where the public and policy-makers could find and compare water data. This would help the state leverage all of the water data that is gathered by various entities around the state but is currently not organized and analyzed.

Of critical importance to the water boards' effectiveness is updating basin plans in every region. The boards' reliance on out-of-date basin plans, of which many are simply unresponsive to the current, non-point water pollution issues the boards face, hinders many of their programs. The boards should emulate the model created by the Santa Ana Regional Water Quality Control Board, which created a stakeholder task force that led to robust research, consensus-building and a largely re-written basin plan in 2004. Stakeholders – not the cash-strapped state – funded the basin plan update. Authorizing regional board executive officers to issue permits and take other quasi-judicial actions will free up the board members to focus on modernizing basin plans.

The water boards, and other state agencies, must focus on solving water quality problems in creative and collaborative ways. The water boards must increase the use of public education programs, and stakeholder task forces to confront current and complex issues, as well as improving their use of regional monitoring to determine the overall effectiveness of problems and spot new trends. The boards should find ways to examine watersheds and develop solutions that increase watershed health. Water quality regulators and air quality regulators must work together to address air pollution's effects on water, and discussion must occur among state leaders regarding land use decisions that impact water quality.

Finally, the water boards should incorporate cost-effectiveness tests into their analysis of programs to help them prioritize and find the most cost-effective solutions to water quality problems. The goal is not simply to eliminate costly fixes, but to help the regulated and regulators find ways to improve water quality in the most cost-efficient manner possible and meet statutory requirements to balance water quality needs with other factors, such as economics.

Throughout its review of the water boards, the Commission met many board members and staff who were professional, dedicated and tireless in their mission of protecting water quality. Many were aware of the criticisms of the boards' structures and processes and working diligently to improve the boards. Efforts are underway at the state board to improve the information technology system, for example, and to adopt more statewide policies that provide direction to regional boards. The problems the Commission found were not due to a lack of passion or professionalism by board personnel, but rather structural and systemic issues that can be and must be changed. This gives the Commission confidence that the water boards can improve their performance in the coming years.

Recommendation 1: To move toward a more consistent, transparent and accountable governance structure that allows for both statewide policy and regional flexibility, reform the State Water Resources Control Board and the Regional Water Quality Control Boards by strengthening ties between the boards, refocusing the boards on broad policy-making and restoring confidence in the appeals process. Specifically, the state should:

- Restructure the State Water Resources Control Board as a full-time, 9-member board charged with creating state policy, setting priorities and overseeing regional board activities. Members of the board should be appointed by the governor and confirmed by the state Senate. Five members of the state board would serve solely as state board members, including one person who would be chairperson of the state board, as named by the governor. These members should have the following backgrounds: One in engineering, one in water rights law, one in water quality, one in water-related science or resource economics, and another would represent the public. The position of regional chairperson would become full-time. Four regional chairpersons would serve on the state board for staggered, two-year terms, with membership rotating among all nine regional board chairpersons.
- Reconstitute the nine Regional Water Quality Control Boards as seven-member boards with six part-time members and a full-time chairperson, all appointed by the governor. The chairperson would be charged with monitoring statewide policies that are implemented at the regional level. Boards would continue to be stakeholder-boards, with six part-time members with the following backgrounds: experience in water supply, conservation or production; irrigated agriculture; industrial water use; local government; water science or engineering; and experience with a nongovernmental organization associated with recreation, fish or wildlife. Regional boards would focus on updating basin plans, adopting Total Maximum Daily Loads and other quasi-legislative functions.
- Empower the executive officers of each Regional Water Quality Control Board and the executive director of the State Water Resources Control Board to issue permits, allowing the boards to focus on updating basin plans, setting broad policy and focusing on upcoming water quality challenges. Executive officers would become Career Executive Assignment positions and report to the executive director of the State Water Resources Control Board. Regional boards would conduct an

annual evaluation of the executive officer that would be taken under advisement by the executive director.

- Exempt state and regional board members, regional board executive officers and the state board executive director from ex parte rules within the state Administrative Procedure Act that prohibit interaction with regulated entities. Instead, require board members and permit-issuing executives to disclose their contacts with regulated entities at public meetings, as is currently done by other boards such as the Integrated Waste Management Board.

- Create a new appeals board that would address appeals of quasi-adjudicative functions such as permits and enforcement actions. Removing the appeals process from state board jurisdiction would restore confidence in the process and allow the state board to take a more proactive approach in regional board issues. The members should have backgrounds in water issues and would be appointed by the governor to hear appeals. The board would follow Administrative Procedure Act policies in conducting hearings.

Recommendation 2: The state must improve and increase its use of data, scientific research and planning to better inform the public, respond to current and future water quality problems and focus more on accountability. Specifically, the state should:

- Create a Water Science Advisory Board for the State Water Resources Control Board. Members, appointed by the state board, should have backgrounds in environmental science and engineering. The board would help both the state and regional water boards and other state water agencies coordinate research, propose needed research, advise the boards on how to incorporate research into regulatory processes and increase the effectiveness of scientific peer review.

- Create an independent Water Data Institute that would act as a state library for water quality and supply data. The institute would pool information from various state agencies and other water monitoring groups to provide accessible information to the public, regulators and researchers.

- Develop report cards. Report cards for each major water body should allow the public easy access to information they can use and could act as a way to hold regional boards accountable for their effectiveness. The report cards should be developed and published by regional science institutes or an independent entity, such as the University of California.

- Launch a statewide effort to ensure that all regions have up-to-date basin plans. Regional boards should propose stakeholder-financed efforts similar to the one conducted by the Santa Ana Regional Water Quality Control Board.

Recommendation 3: The state must increase focus on clean water outcomes and emphasize collaboration, creativity and problem-solving to address current water quality problems. Specifically, the state should:

- Collaborate with other government agencies. Because land use, automobile emissions and other factors outside the traditional purview of the water boards are major contributors to non-point source pollution of water, the water boards must work with other government agencies on solutions. The state water and air boards should routinely meet to develop regulatory strategies to address air pollution's effects on water. The state should revive the Environmental Protection Council, which already exists in statute and consists of the heads of each of the boards and departments within Cal/EPA.
- Emphasize a watershed approach. To increase focus on outcomes and solving complex problems, the water boards should develop more processes aimed at watershed health.
- Use stakeholder task forces. As the Santa Ana Regional Water Quality Control Board has done, other regional boards should increase the use of stakeholder task forces to work through difficult regulatory issues.

Recommendation 4: The water boards must develop standardized economic analysis procedures to help set priorities and determine the most effective and efficient means to improve water quality.

- To fully implement Porter-Cologne's demand that water quality regulations be reasonable, given other economic and social factors, the boards must institute the use of economic analysis into decision-making. Cost-effectiveness analysis also would increase transparency of board decision-making and help the boards set priorities.

Background

As the state's lead water regulators, California's state and regional water boards are water cops with vast influence on the environment, economy and urban planning.

The boards' mission is as complex as the state is diverse, protecting water quality everywhere from the rain-soaked North Coast and the San Francisco Bay Delta to the Mojave Desert and the concrete streambeds of Los Angeles.

Collectively, their jurisdiction includes 10,000 lakes, 200,000 miles of rivers and 3,000 miles of coastline.[1] The boards police more than 100 contaminants, ranging from the mercury that has polluted water since the Gold Rush to the trash generated by modern city life. They issue more than 50,000 discharge permits to the biggest cities and the smallest wastewater treatment plants.[2]

Today, the state and the boards face enormous pressures on water, one of California's most valuable assets. Continued population growth strains publicly-owned systems designed to treat and dispense wastewater. Pollution caused by everything from automobile brake pads to lawn fertilizer surge from city streets into streams, rivers and the ocean when it rains. In rural California, pesticides and animal waste, produced by an agricultural industry that is a key driver of the economy, pose continuing threats to community drinking water. Throughout the state, the use of water for agriculture, wastewater treatment and other necessary functions increases salinity in water, complicating its re-use.

Adding to the boards' difficulties is this: Only a fraction of the state's waters are monitored and assessed. We truly cannot answer the most basic questions concerning the state of the state's waters: Is California water safe to drink, safe to swim in, safe to fish in or safe for aquatic life? For a majority of the state's waters, we do not know.

Amid these challenges, the need for clean water has never been greater. The state Department of Finance projects California will grow to 48 million people by 2030, with much of the growth occurring in water-poor Southern California.[3] While the state currently meets most of its agricultural, municipal and industrial water needs most years, demand is growing. Water conservation practices have been effective – cities use about the same amount of water today as they did in the mid-1990s, despite adding 3.5 million more people.[4] Water use in urban areas, however, is expected to grow to 11.4 million acre-feet in 2020 from 8.8 million acre-feet in 2003, a 77 percent increase.[5] On top of this growing demand, experts believe global climate change will reduce the state's snow pack, which is a key source of water; increase sea levels; and, otherwise alter the state's hydrologic conditions.

Water quality is a key factor in the state's ongoing discussion on water supply. In short, water quality is water supply. Clean water is needed for drinking water, to help fish and to help farmers. Recycling both wastewater and urban stormwater are clearly needed to handle inevitable growing demand. Thus, as water quality is critical to the state's future, so too are the state and regional water boards.

The Commission took up the study of California's state and regional water boards to determine whether their structure and duties, and their relationship to each other, were adequate and appropriate for the challenges they face today. The boards and their staff members work hard and face complex problems. The issues regularly are contentious. The stakes are immense for Californians today and tomorrow.

From 'The Big Stench' to Porter-Cologne

The beginning of water quality regulation in its present form dates to the Dickey Water Pollution Act of 1949, which created nine regional boards and the State Water Pollution Control Board. At the time the new law was passed, California's post-war population was swelling, raw sewage was dumped directly into the ocean and Central Valley steams were inundated with industrial waste.[6] The Berkeley shoreline of San Francisco Bay was referred to as "The Big Stench" in the 1940s because of the pollution – human, industrial and other – draining through the city to the bay.[7] Prior to the Dickey Act, the official response to the outbreaks of water-borne disease and major degradation of state waters was a confusing and ineffective jumble of local and state governmental jurisdiction over water quality policy.

The Dickey Act marked the first major effort to implement state oversight of water quality. The nine-member state board and five-member regional boards created through the act were invested with the authority to impose requirements on discharges into water. It also created a regional approach to water quality regulation that continues today. "Water pollution is largely a local or regional problem," members of the Assembly Committee on Water Pollution, who drafted the act, concluded.[8]

While the structure created by the Dickey Act remains, many of its philosophical and practical underpinnings since have been discarded. The Dickey Act, for example, considered waste disposal a beneficial use of water; that is not the case today. The Dickey Act also did not give the state the authority to require dischargers to clean up discharges that were in violation of requirements.[9]

In part because of these issues, California lawmakers and regulators called for an update of the Dickey Act in the late 1960s.

That overhaul was unveiled in 1969 as the Porter-Cologne Water Quality Control Act, ushering in the modern era of water quality regulation. Named for Assemblyman Carly V. Porter and Senator Gordon Cologne, the law was described as the toughest water quality act in the nation.[10]

Porter-Cologne outlined concepts that continue to be the cornerstone of state water quality policy today:

- ***Discharge is a privilege, not a right.*** Porter-Cologne's preamble states that "the quality of all the waters of the state shall be protected for use and enjoyment by the people of the state," and the act allowed the state to permit all discharges to surface water and ground water, and prohibit discharges entirely – a broad and powerful mandate.
- ***Reasonableness is required.*** Despite that broad authority, however, the law requires regulators to balance environmental protection with other factors. The "waters of the state shall be regulated to attain the highest water quality which is reasonable, considering all demands being made and to be made on those waters and the total values involved, beneficial and detrimental, economic and social, tangible and intangible," according to the statute.[11]
- ***Basin plans as the underlying regulation.*** Regional boards were required to develop water quality control plans, which would set the uses of each water body in the region, the water quality objectives needed to meet those uses and a program to ensure implementation of those objectives. These so-called "basin plans" remain the core regulatory document for each region today.

Levels of Wastewater Treatment

There are three levels of wastewater treatment. The Clean Water Act requires secondary treatment for most wastewater treatment plants in the United States:

- ***Primary.*** Mechanical methods, such as filters and scrapers, are used to remove pollutants. This process removes solid materials.
- ***Secondary.*** Biological methods, which reduce organic matter through bacterial metabolism, are used to remove pollutants.
- ***Tertiary.*** Mechanical, biological and chemical methods, which remove nutrients or other pollutants that resist other treatments.

California's enactment of Porter-Cologne was part of a burgeoning environmental movement in the state and around the country sparked in part by dramatic examples of water pollution, most notably a spectacular fire on the pollutant-soaked Cuyahoga River in Cleveland and a massive oil spill that marred the Santa Barbara coastline.

Following Porter-Cologne, the United States Congress enacted the Federal Water Pollution Control Act Amendments of 1972, now commonly referred to as the Clean Water Act. The act emulated many aspects of California's groundbreaking law.

State, Federal Acts Provide Broad Mandate

Both Porter-Cologne and the Clean Water Act are remarkable for their broad ambition. Porter-Cologne demands the "quality of all the waters of the state shall be protected." The Clean Water Act goes even further, stating that a national goal for the discharge of pollutants into the navigable waters to be eliminated by 1985, with an interim goal that "water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water be achieved by July 1, 1983."[12]

Critics of these lofty goals note two problems. By calling for the protection of all waters, Porter-Cologne makes it difficult for the state's water regulators to set priorities. In addition, few could argue that Congress or the California Legislature have ever funded the environmental agencies charged with carrying out these laws to the level needed to accomplish their enormous tasks.

UC Berkeley Professor of Law John Dwyer included the Clean Water Act as an example in his 1990 paper titled "The Pathology of Symbolic Legislation," in which he argued that Congress approves unrealistic environmental legislation to score political points, while leaving regulatory agencies, and, often the courts, to turn symbolic goals into reasonable standards and programs.[13]

The Clean Water Act, still the central federal law governing water quality, sought to protect the country's surface waters in two key ways. Water quality standards must be set for specific water bodies, and permits are issued requiring dischargers to use the best available technology to meet those standards. The permit program is called the National Pollutant Discharge Elimination System (NPDES). The

NPDES program required minimum standards based on the best available technology, and thus most municipal wastewater treatment plants upgraded to what is referred to as secondary treatment.

For the first decade of the Clean Water Act, regulators focused on implementing technology-based standards on point source discharges – contaminants that came out of the end of a pipe.

That focus began to shift in the mid 1980s and early 1990s, however, to the Clean Water Act's second approach to protect water quality, one that emphasized outcomes as measured by the condition of water bodies. This part of the act requires states to assess water quality, determine which water bodies are unhealthy and then take steps to improve those "impaired" water bodies. Each state is required to produce a list of impaired water bodies, referred to as the 303(d) list. Once a water body is listed as impaired, the state is required to prepare a total maximum daily load (TMDL), which determines the amount of pollutants that can be safely discharged into the water. This determination, essentially a pollution budget for each water body, then is used as a basis for assigning discharge limits to each discharger into the impaired water body.

Though both were original components of the Clean Water Act, the impaired water bodies list and the creation of total maximum daily loads largely were ignored by the United States Environmental Protection Agency (US EPA) and states until environmental groups, through successful litigation, forced regulators to comply. In California, lawsuits have led to consent decrees requiring water boards to develop TMDLs in three areas of the state in adherence with timelines developed in court.[14]

The strict new requirements served as a stick to improve water quality. Historically, the Clean Water Act also provided a carrot: federal money. The act's generous Federal Construction Grant Program initially covered 75 percent of project costs for wastewater treatment plants and upgrades and launched the largest nonmilitary public works program since the Interstate Highway System.[15] Since 1972, the federal government has contributed more than $76 billion to construct and improve plants around the country.[16] Federal funding amounted to $1.2 billion between 1972 and 1987 in the San Francisco Bay Area alone.[17]

The federal act gave water quality regulatory power to US EPA, but also allowed US EPA to delegate permitting and other duties to the states. California became the first state to assume Clean Water Act responsibilities soon after the act was approved by Congress.[18]

Despite this delegation, US EPA wields significant clout over states. In California, US EPA has final say over numerous programs, and the state and regional boards spend considerable time working with the EPA to ensure they are in compliance with federal regulations. As an example of US EPA's prominence in state and regional board matters, the San Diego Regional Water Quality Control Board declined to approve a stormwater permit for southern Orange County in February 2008 after an US EPA representative spoke out against the permit during a public hearing.[19] The permit is being revised to address the US EPA's concerns.

While Porter-Cologne was amended in 1972 to include language aimed at increasing consistency between state law and the Clean Water Act, there are differences. Among the differences:

- The Clean Water Act does not regulate discharges to ground water, for example, while Porter-Cologne does.
- The Clean Water Act exempts agriculture from regulation; Porter-Cologne does not.
- The Clean Water Act requires water quality standards to be set to the level that protects water, while Porter-Cologne allows regulators to consider other issues, such as economic considerations and past, present and probable beneficial uses of the water body.[20]

Regional Boards: The Frontline for Water Quality

Both of the state's major water quality regulation laws, the Dickey Act and Porter-Cologne, embraced the concept of nine powerful regional boards comprised of representatives of industry, local government and other stakeholders impacted by board decisions. Porter-Cologne expanded the regional board from five members to nine members, as it remains today. The nine members are appointed by the governor, confirmed by the state Senate and must reside or have a business in the region in which they serve.

Source: Adapted from the State Water Resources Control Board. "Regional Boards." http://www.swrcb.ca.gov/regions.html. Accessed March 4, 2008.

The Importance of Basin Plans

Basin plans are the key regulatory document in any region. "The basic purpose of the state's basin planning effort is to determine the future direction of water quality control for protection of California's waters," according to the introduction in the North Coast Regional Water Quality Control Board's basin plan.

Basin plans, called water quality control plans in the Porter-Cologne Water Quality Control Act, fulfill requirements outlined in both federal and state law. Porter-Cologne requires regional boards to develop basin plans that outline the following:

Beneficial uses. There are 23 beneficial uses defined by the state water board, ranging from drinking water to agricultural supply to recreational uses such as swimming. In addition, some regional boards have adopted unique beneficial uses, such as a "cultural" designation signifying water used for cultural purposes such as Native American subsistence fishing in the North Coast region. Basin plans typically list hydrologic units in the basin and the beneficial uses attributed to each segment.

Water quality objectives. Porter-Cologne calls on regional boards to assign water quality objectives that "in the Regional Water Board's judgment, are necessary for the reasonable protection of the beneficial uses and for the prevention of nuisance." In developing water quality objectives, regional boards are required to analyze the following factors:

- Past, present and probable future beneficial uses of water.
- Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto.
- Water quality considerations that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area.
- Economic considerations.
- The need for developing housing within the region.
- The need to develop and use recycled water.

Within basin plans, water quality objectives can be numeric limits, in which the amount of a contaminant must be less than the regional board requires, or narrative limits, such as the Central Valley Regional Water Quality Board's description of limits on floating material in water, which states, "Water shall not contain floating material in amounts that cause nuisance or adversely affect beneficial uses." While some water quality objectives for specific contaminants are applicable across the basin, there are also site-specific objectives. Water quality objectives become the basis of permits issued by the board.

Implementation plan. Each basin plan includes a discussion of how the board will carry out the protection of water quality, including where discharges are prohibited, action plans for specific water bodies and other policies, such as total maximum daily loads.

Surveillance and monitoring. Basin plans also include descriptions of various monitoring programs within the region.

Basin plans are amended after public hearings, and amendments must be approved by the regional board, the state board, the Office of Administrative Law and US EPA. While the federal Clean Water Act requires states to update water quality standards every three years, regional boards typically only address a handful of issues in basin plans every three years due to staffing shortages. Thus, the last statewide initiative to conduct a major basin plan update was done in the mid-1990s.

Sources: North Coast Regional Water Quality Control Board. January 2007. "Water Quality Control Plan for the North Coast Region." Central Valley Regional Water Quality Control Board. October 2007. "The Water Quality Control Plan for the California Regional Water Quality Control Board Central Valley Region. The Sacramento River Basin and the San Joaquin River Basin." The Porter-Cologne Water Quality Control Act. Ken Harris, Assistant Director, Office of Information Management and Analysis. October 16, 2008. Personal communication with Commission.

The regional boards' main duties are to:

- ***Create and update basin plans.*** Basin plans are the key regulatory document for each region, listing uses for specific water bodies, standards needed to protect those uses and plans to implement those standards.
- ***Issue permits or waivers.*** Dischargers – be it companies, local governments or even individuals – must receive permission from the regional boards to discharge. Discharges to surface water are issued a permit through the federal NPDES. Discharges to the ground are issued a permit through the state Waste Discharge Requirement (WDR) process. In addition, the boards can issue a general permit for an entire industry, requiring each discharger within the category to file notice with the boards that they are complying with general permit rules. Finally, boards can issue a waiver to a category of dischargers, which typically requires dischargers to pay a fee and participate in water quality monitoring but does not include other requirements. Permits are typically reviewed, updated and renewed every five years.
- ***List, respond to impaired water bodies.*** Regional boards develop biannual lists of impaired water bodies as required by the federal Clean Water Act. To remedy a given impairment, the Clean Water Act requires states to develop total maximum daily loads for each water body, which limit the amount of contaminants allowed into a water body. Each discharger is given a limit through the TMDL, which also includes an implementation schedule.
- ***Monitor discharges and compliance with permits.*** Regional boards require dischargers to monitor their discharges and provide reports to the boards. Some regions also require dischargers to contribute to regional monitoring programs that assess overall water quality in a watershed. As part of their oversight role, regional boards also inspect wastewater treatment facilities and other dischargers.
- ***Enforce regulations.*** Regional boards take enforcement actions, including issuing fines, against dischargers who are violating terms of their permits. Money from fines is placed in the Clean Up and Abatement Account, a fund managed by the state board. Regional boards can request money from the fund for a project, though distribution is controlled by the state board. Regional boards also can enter into an agreement that

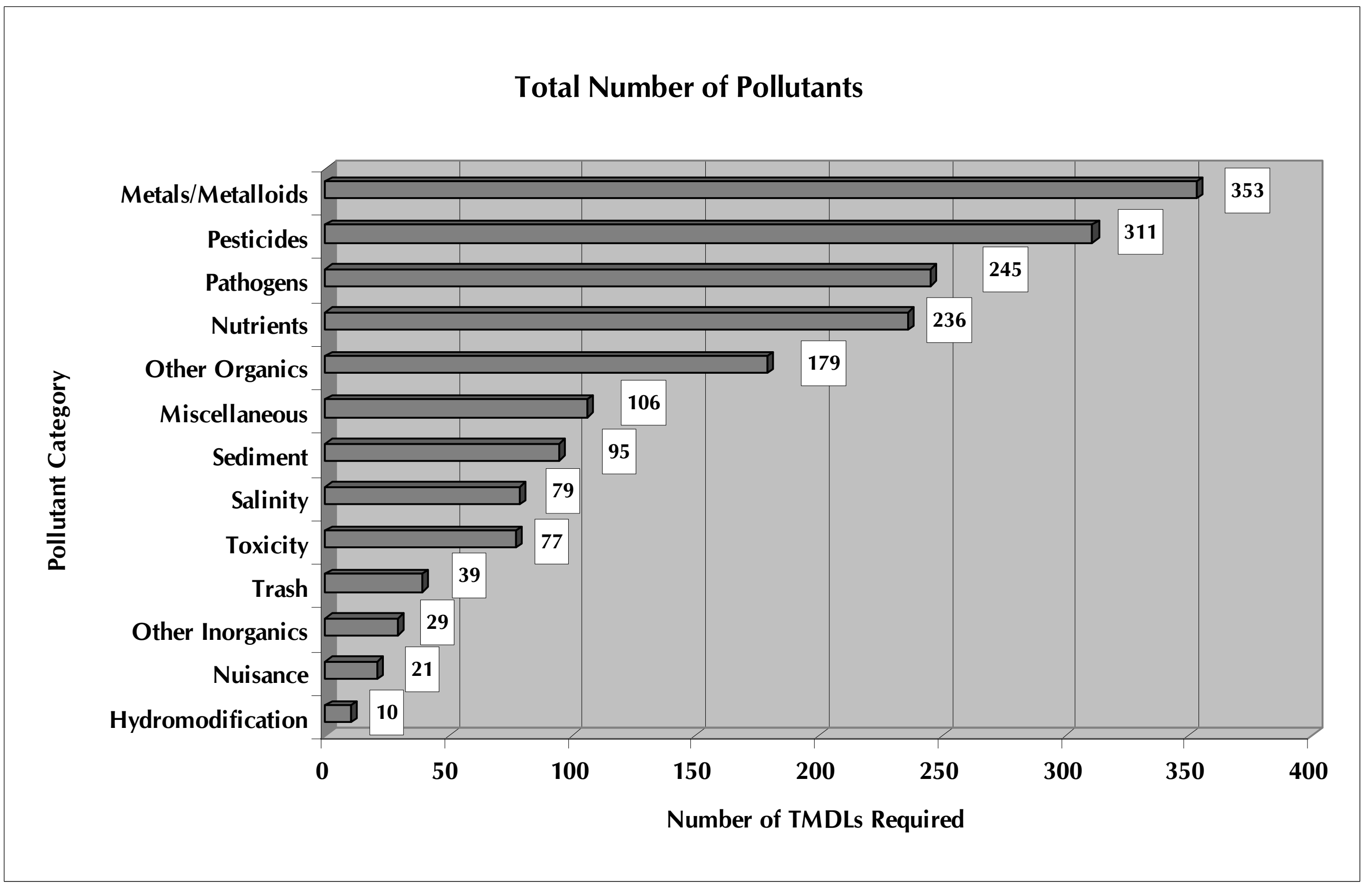
Water Board Statistics

Individual National Pollutant Discharge Elimination System permits cover 639 facilities in the state. Another 1,765 facilities are regulated through a general NPDES permit. About 6,800 facilities are regulated through a WDR permit. In 2006, California had 2,237 impaired water body-pollutant lists. (Water bodies are listed by segment; therefore, the same river or lake can be listed more than once for differing contaminants based on different portions of that water body.) Currently, the state is addressing 1,001 water body-pollutant lists through 134 TMDL plans, though it has considerable work ahead, with 1,780 TMDLs still to be developed.

Sources: State Water Resources Control Board. April 30, 2008. "Water Boards Baseline Enforcement Report, Fiscal Year 2006-07." Pages 18, 25. Also, State Water Resources Control Board and Water Education Foundation. April 21, 2008. "Water Education Workshop for Board Members." Section 3: TMDLs.

can reduce fines in exchange for the discharger performing a supplemental environmental project, or SEP, such as increased monitoring, habitat restoration or public awareness campaigns.

Regional boards typically hold monthly public meetings, in which they vote to adopt permits, take enforcement actions, implement TMDLs and conduct other business.



The chart shows the types of contaminants causing impairments to California waters that require the state to adopt total maximum daily loads or otherwise reduce the amount of the contaminant in water. Pesticides and metals are the leading causes of impairment in the state.

Source: State Water Resources Control Board. "California 2006 303(d) List. Total Number Pollutants Listed by Pollutant Category." http://www.waterboards.ca.gov/water_issues/programs/tmdl/docs/303dlists2006/epa/stats_2006_303dlist.xls. Accessed September 12, 2008.

State Board: Designed to Set Policy, Provide Oversight

In contrast to the regional boards, the State Water Resources Control Board is comprised of full-time board members. Each of the five members is appointed by the governor and confirmed by the Senate. All but one member must represent a specific expertise, including a civil engineer, a professional engineer, an attorney with water rights experience and someone with experience in water quality issues. The governor appoints the chair.

Porter-Cologne's framers intended decision-making largely to be conducted at the regional level, while the state board was to provide oversight and direction for the regional boards. In a presentation to regional board members in April 2008, Third Circuit Court of Appeal Associate Justice Ronald Robie, who years earlier helped draft Porter-Cologne, noted that the act enhanced the role of the state board and renamed the regional boards "California Regional Water Quality Control Boards" to emphasize that they were part of one state agency, not separate, local agencies.[21]

The state board's most important duties are:

- ***Setting state policy.*** Where it sees the need for statewide consistency on an issue, the state board can adopt a statewide policy to guide regional boards. The board currently has 16 statewide policies, on issues ranging from enforcement to implementing toxics standards.

State Water Policies

The State Water Resources Control Board can set statewide policies to help guide regional board policy. Statewide policies are intended to decrease inconsistency among the boards and address important statewide issues. The board has adopted 15 policies, and has amended some of those policies. Here those policies and the dates they were adopted or last amended by the board:

- Policy for Compliance Schedules in National Pollutant Discharge Elimination System Permits (April 15, 2008)
- Water Quality Control Policy for Addressing Impaired Waters: Regulatory Structure and Options (May 16, 2005)
- Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List (September 30, 2004)
- Policy for Implementation and Enforcement of the Nonpoint Source Pollution Control Program (May 20, 2004)
- Water Quality Enforcement Policy (February 19, 2002)
- Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (February 24, 2005)
- Water Quality Control Policy for Guidance on Development of Regional Toxic Hot Spot Cleanup Plans (September 2, 1998)
- Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304 October 2, 1996)
- Water Quality Control Policy for the Enclosed Bays and Estuaries of California (November 16, 1995)
- Policy for Regulation of Discharges of Municipal Solid Waste (July 21, 2005)
- Pollutant Policy Document for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (July 21, 2005)
- Sources of Drinking Water Policy (February 1, 2006)
- Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Powerplant Cooling (June 19, 1975)
- Policy Regarding Water Reclamation (January 6, 1977)
- Maintaining High Quality Water/Antidegradation Policy Implementation for NPDES Permitting (October 24, 1968)

Fees, not General Fund, Drive Boards' Budget

Beginning with the 2002-03 budget, the water boards have increasingly relied less on the general fund and more on fees from permit holders, federal funding and other special funds to sustain their activities. The General Fund contributed more than $101 million to the boards in the 2001-02 budget year, for example, but only accounts for $38.7 million in the 2008-09 budget year. In 2008-09, the General Fund comprises only about 5 percent of the boards' $733 million budget.

Board activities are funded by 74 separate revenue streams in the 2008-09 budget year, with most of the streams funding specific programs.

Thus, as the boards' duties have grown, along with the economy and population, the state has contributed less and less to their mission. The boards have the authority to raise fees every year, but that funding level is set by the Legislature and governor during the budget process.

- ***Reviewing regional board activity.*** The state board reviews and approves or denies some regional board actions, including basin plan amendments and TMDLs. The state board also has authority to set the regional boards' annual budgets.
- ***Issuing statewide permits.*** The state board also issues some statewide permits, such as stormwater permits for urban areas under 100,000 people, industrial uses, construction and the state Department of Transportation.
- ***Providing financial assistance.*** The state board oversees the distribution of federal and state dollars to help improve water quality. Funds administered by the board include the Clean Water State Revolving Fund Program, which provides about $400 million annually in loans to help improve wastewater treatment facilities and other improvements and the Clean Beach Initiative, which uses voter-approved bond borrowing to improve water quality along the state's coastline.
- ***Hearing appeals.*** The state board acts as an appellate for many regional boards quasi-adjudicatory decisions. Actions taken by regional boards, such as permitting and enforcement, can be petitioned to the state board. The state board determines whether to hear the petition and can then uphold the regional boards' action, remand the action back to the regional board with instructions on changes the state board desires, or take some other action, such as making changes to a permit or enforcement action on its own.
- ***Monitoring.*** The state board operates statewide monitoring programs, such as the Surface Water Ambient Monitoring Program (SWAMP), or Ground water Ambient Monitoring and Assessment (GAMA), with the goal of providing statewide water quality information and trends. The board also staffs the new California Water Quality Monitoring Council, which was created through legislation in 2006 and is charged with working to coordinate various monitoring efforts throughout the state to provide better water quality information to the public.
- ***Water rights.*** The state board has broad power to determine who can use surface water in the state. The board issues water rights permits, approves changes in water right permits,

and enforces permits. The Commission did not review the board's administration of water rights.

The State-Regional Relationship

The history and structure of the regional water quality control boards have important implications for implementing statewide water policies and establishing common standards. Just as all of the members of the state board are appointed by the governor, so too are all the members of each of the nine regional boards, making them semi-autonomous units. In addition, basin plans crafted in each region can set different limits on the same contaminants in different water bodies based on local conditions.

Despite language in Porter-Cologne stating that the state and regional boards "shall, at all times, coordinate their respective activities so as to achieve a unified and effective water quality control program in this state," California's approach to safeguarding and improving water quality relies on an inherently inconsistent system.[22]

In her testimony to the Commission, state board chairwoman Tam Doduc described the state boards' formal oversight of regional board activity as hearing petitions of regional board decisions, setting state policies, approving basin plan amendments and setting the budgets of regional boards.

Attorneys for both the state and regional boards are located together in Sacramento to ensure that legal advice provided to the boards is consistent.

There are other avenues to increase consistency among boards, which has been an issue championed by chairwoman Doduc during her tenure. Executive officers of the regional boards meet monthly with the state board executive director. All state and regional board members meet occasionally as the Water Quality Coordinating Committee. The committee met in San Diego in April 2008, for example, for a two-day seminar for regional board members on the water boards' history and current challenges, and again in October 2008 for a two-day seminar that included discussion of innovative practices at different regional boards.

Though statutory language requires consistent policies and procedures, critics of the current system say the relationship between the state and regional boards is ill-defined. Several reform efforts in the past five years have sought to alter the relationship between the boards, arguing that a different structure would better focus the state's strategy and use its resources more efficiently. Those efforts, all of which failed, include:

- ***2003: Abolishing the boards.*** Governor Schwarzenegger's California Performance Review (CPR), launched soon after he took office in 2003, sought to abolish both the state and regional boards as part of a major overhaul of the California Environmental Protection Agency (Cal/EPA). The overhaul would have shifted many environmental regulation duties from the quasi-independent boards to state departments. The CPR called for a new division within Cal/EPA, called the Division of Water Quality that would have issued discharge permits, developed basin plans and performed most duties of the boards. Backers of the idea suggested that placing a state department in charge of water regulation would increase consistency and efficiency throughout the state. Opponents attacked the plan in part because it could limit the public's ability to shape policy.
- ***2005: Giving the state board more authority over regional staff.*** AB 1727 (Aghazarian) would have allowed the state board to appoint the executive officer of each regional board. As the top staff person in each region, executive officers have tremendous power to set staff priorities and shape policy. Currently, executive officers are exempt positions in state government and are hired and fired by the regional boards. The 2005 proposal, sponsored by the Schwarzenegger administration, sought to give executive officers more power to issue permits and, by giving hiring authority of executive officers to the state board, give more control over daily policy to the state board.
- ***2007: Revising the composition of the regional boards and giving the state board more authority to usurp regional boards.*** SB 1001 (Perata) sought to reduce the number of regional board members to seven from nine and broaden qualifications for board members to allow anyone with a "demonstrated interest and proven ability in the field of water quality" to be eligible for a regional board position.[23] A component of this legislation allowed the state board to assume the duties of a regional board if the state board determined the regional board was not complying with state and federal water quality laws.

Water Quality Regulation Has Improved State's Waters

Porter-Cologne and the Clean Water Act as well as the work of water regulators have significantly improved the quality of California's waters over the past three decades. Most discharges are regulated, leading to a sharp decline in point source contamination.

Billions of dollars of federal and state assistance has helped cities and communities build and improve wastewater treatment plants, dramatically reducing the amount of fecal matter in rivers and bays. Federal expenditures on municipal sewage treatment led to a jump in the number of Americans being served by wastewater treatment from 42 percent in 1970 to 74 percent in 1985.[24]

In California, one analysis showed that between 1971 and 2000, discharge volume and contaminant emissions into the Southern California coastal waters from large municipal-owned wastewater treatment plants fell 90 percent, despite substantial population growth.[25] A wastewater treatment facility built after the Clean Water Act's passage by the East Bay Municipal Utility District in the San Francisco Bay Area reduced the amount of metals in treatment discharge by 70 percent.[26]

The Bay Area's "Big Stench" is no more.

California has marked other clean water successes in recent years.

Efforts to control contaminant runoff from abandoned mines have reduced water pollution in the Central Valley. A cleanup effort in summer 2007 at Abbott and Turkey Run mines stabilized 20,000 pounds of mercury that would have run into Cache Creek, and the construction of a lime neutralization treatment plant at Iron Mountain Mine reduced the amount of metals running from the mine into the Sacramento River by 95 percent.[27]

A 2006 evaluation of projects funded by the Clean Beach Initiative, which has used voter-approved bond funds to improve water quality along the state's coastline, showed that five of eight projects designed to divert stormwater runoff into sanitary sewer systems reduced bacteria at beaches. While the evaluation also found that some of the projects were not successful, it noted that millions of gallons of contaminated runoff had been removed from state beaches and that lessons learned from the projects could improve water quality in the future.[28]

Stormwater Permits

The state and regional boards both issues stormwater permits in California. Most permits are broken into four categories:

- ***Municipal program.*** For medium (100,000 to 250,000 people) and large (more than 250,000) areas, regional boards issue a permit to municipal separate storm sewer systems (MS4). Most of these permits are issued to a group of co-permittees. For example, the Los Angeles Regional Water Quality Control Board issues one stormwater permit for all of Los Angeles County, with the permit including all of the cities within the county. There are 85 co-permittees for that permit. In all, there are 26 permits issued in the state for medium- and large-sized urban areas that regulate discharges from about 300 cities, counties and special districts. For small communities, the state board has adopted one general permit that covers about 190 cities, counties and special districts.
- ***Construction program.*** The state board adopted a general permit for construction in the state that disturbs one acre or more of land. There were about 20,000 such construction sites in the state in spring 2008. Generally, the permit requires construction sites to develop Storm Water Pollution Prevention Plans and reduce pollutants using available technologies.
- ***Industrial program.*** The state board adopted a general permit that covers runoff from about 9,500 industrial facilities. Like the construction permit, industry is required to develop Storm Water Pollution Prevention Plans and reduce pollutants using available technologies.
- ***Caltrans program.*** The state board issued a statewide permit for the California Department of Transportation (Caltrans), which designs, constructs and maintains the state highway system, including bridges and tunnels. The permit requires Caltrans to develop a Storm Water Management Plan.

Sources: State Water Resources Control Board and Water Education Foundation. April 21, 2008. "Water Education Workshop for Board Members." Section 5 "Regulating construction storm water discharges." Also, State Water Resources Control Board and Water Education Foundation. April 21, 2008. "Water Education Workshop for Board Members." Section 5 "Regulating industrial storm water discharges." Also, State Water Resources Control Board. "Storm Water Program – Caltrans Program." www.waterboards.ca.gov/water_issues/programs/stormwater/caltrans.shtml.

The San Diego Regional Water Quality Control Board led an effort in early 2000 to revitalize the San Diego Marina area by removing gasoline and diesel fuel from soil and ground water. The last of five Cleanup and Abatement Orders was lifted in 2005.[29]

Current Threats

Despite these successes, the state is clearly not meeting the lofty goals of the Clean Water Act and Porter-Cologne. Examples of water quality problems abound: Several recent studies show rapidly declining numbers of pelagic fish species in the Sacramento-San Joaquin River Delta, including the endangered Delta Smelt, in part due to water quality.[30] A 2006 study of 181 private wells in Tulare County showed that more than 40 percent had higher-than-allowed levels of nitrates.[31] In one day in 2005, volunteers collected 61,117 discarded bottle caps along California's coastline.[32]

Nearly four decades after California and the federal government sought to eliminate water pollution, the state's waters still face enormous threats.

Wastewater remains a problem. Improvements in wastewater treatment are the most important legacy of water quality regulation in the country and in California, yet wastewater continues to contaminate the state's waters. Some treatment plants have chronic problems, landing them on the EPA's quarterly "Watch List" of the most troubled discharge facilities in the state. Included on the EPA's April 2008 list were 10 publicly-owned plants that have been violating conditions of their permits continually for more than two years.[33]

"There are lots of really badly maintained, undercapitalized, undermanaged systems, even in affluent areas," Alexis Strauss, director of the water quality division for US EPA Region 9, told the Commission.[34]

Underscoring her point, the EPA in April 2008 ordered seven sanitary districts in Marin County – one of the wealthiest counties in the United States – to make changes to their systems due to repeated sewage spills caused by deteriorating sewer pipes. According to the order, the Mill Valley system recorded 110 sewage spills between December 2004 and February 2008.[35]

State of the State's Waters

How clean – or dirty – are the state's waters? A dearth of water quality monitoring and the state's failure to create an accessible site for available information depicting water quality in California makes answering this question difficult. Here are three separate reports depicting the state of the state's waters:

Clean Water Act Section 305b Report. The Clean Water Act's Section 305b requires each state to assess the condition of its waters and submit the results to US EPA every two years. Using information gathered through US EPA's Environmental Monitoring and Assessment Program, the 2006 report, the most recent, focuses on assessments of two types of water in the state: coastal bays and estuaries and wade-able, perennial streams. Results included:

- The report suggests most of the state's coastal waters are in "fair" or "good" condition, based on US EPA criteria. High phosphorous levels were found in much of San Francisco Bay, while Southern California ports reported sediment chemical contamination.
- Analysis focused on the number of benthic macroinvertebrates, such as crayfish, dragonflies and snails, living in streams versus the number that would be expected to live there based on models. Overall, the report suggests 67 to 78 percent of wade-able perennial streams in California are in "good" condition.

California Water Plan. In the 2005 update of the California Water Plan, water quality conditions were reviewed by focusing on four areas: surface water; ground water; drinking water; and, environmental water, defined as the water that serves as habitat for fish, birds and other animals. The plan outlines current issues within each area:

- ***Surface water.*** Thirteen percent of the total miles of the state's rivers and streams were listed as impaired by at least one contaminant. About 15 percent of the state's lake acreage is impaired.
- ***Ground water.*** Sixty-two percent of the state's wells met standards for contaminants. In each of the state's hydrologic regions, however, 24 to 49 percent of public water supply wells exceeded acceptable levels for one or more contaminants.
- ***Drinking water.*** Public water systems in the state collect water from about 15,000 ground water and 1,000 surface water sources. About one-quarter of these sources have at least one contaminant at higher-than-allowable levels.
- ***Environmental water.*** While providing no specific measurements describing the extent of water quality impairment on riparian and aquatic habitats, the Water Plan noted that habitats can be affected by "legacy" pollutants, such as mercury.

Heal the Bay report card. The Southern California environmental group Heal the Bay has graded water quality at beaches for 18 years. The group assigns letter grades to beaches, based on monitoring data collected by local governments and dischargers on fecal indicator bacteria, considered to be the best indicator of whether beach water is safe for swimming.

In its annual report card published in May 2008, 87 percent of 379 beach locations received an A or a B. Los Angeles County recorded the lowest grades in the state, with 71 percent As and Bs. Avalon Harbor Beach on Catalina Island, ranked last, received an F.

Sources: State Water Resources Control Board. October 2006. "Water Quality Assessment of the Condition of California Coastal Waters and Wadeable Streams." Also, California Department of Water Resources. February 14, 2006. "California Water Plan Update 2005: A Framework for Action." Volume 2, Chapter 13. Also, Heal the Bay. May 21, 2008. "18th Annual Beach Report Card."

According to a 2008 US EPA estimate, California would need to spend $18.2 billion to upgrade its wastewater treatment infrastructure to meet all water quality and public health needs.[36]

Despite these needs, federal funding for improvements is waning. The initial funding program enacted with the Clean Water Act now provides far less money than it once did. In the 1970s, federal dollars paid for 75 percent of projects. Congress stopped providing grants in 1987, launching in their place a revolving loan program, which provides low-interest loans for wastewater treatment plant upgrades. Federal contributions to the State Revolving Fund have shrunk to $48 million in 2008 from $144 million in 1996, while upgrade costs have increased.[37]

Non-point sources the biggest threat. A much bigger and broader threat comes in the form of so-called "non-point sources" of water pollution, such as urban stormwater runoff, agricultural runoff and legacy pollutants, all of which are diffuse and have no single pipe or source to control. Non-point source pollution is responsible for 76 percent of California water impairment.[38]

Non-point sources were largely ignored as a source of pollution in need of regulation during the first decades of the Clean Water Act and Porter-Cologne. But as point source pollution diminished and many water bodies remained impaired, attention turned to non-point sources. The Clean Water Act was amended in 1987 to include non-point sources in the NPDES permitting program.

Non-point sources are much more difficult to regulate for obvious reasons. The pollution is diffuse and difficult to trace to its sources. Its episodic nature makes non-point sources of water pollution even more difficult to monitor and assess.

Water quality experts note that non-point source regulation, unlike point source regulation, is still a relatively new process and that effective programs, funding sources and scientific understanding have not been fully developed.

Stormwater. Rain storms sweep debris and pollutants from roads, parking lots and other impervious surfaces that dominate city landscapes into waterways, creating pollution in creeks, rivers, lakes and the ocean.

In essence, modern life is the source of stormwater pollution. Urbanization has led to more paved, impervious land and more complex water pollution problems with unusual and hard-to-regulate sources. Land use decisions that increase the amount of non-permeable surfaces in a city, for example, lead to more runoff. Studies conducted in the San Francisco Bay have found that copper from automobile brake pads, which falls from brakes onto streets and then is washed into storm drains during rain events, is a major source of pollution in the Bay.[39]

Many of the most complicated and contentious issues facing water boards and the entities they regulate involve urban stormwater. Stormwater permits affect an enormous percentage of the population: More than 30,000 stormwater discharges are subject to permits, covering every populous area of the state, compared to only 2,200 wastewater permits.[40]

Financially-strapped local governments complain that stormwater requirements eat up money that could be spent on police protection, social services and other local priorities. One study found that stormwater programs cost local governments between $18 and $46 per household annually.[41]

Despite these difficulties, it is clear that stormwater pollution must be dealt with. One recent study noted that metals from stormwater increased from 6 percent to 34 percent of the total metals pollution in water along the Southern California coastline between 1971 and 2000.[42]

Modern water regulators face this central dilemma: Urban development for decades has focused on collecting stormwater and conveying it quickly away from homes and other buildings to prevent flooding. The concrete channels throughout the Los Angeles County basin direct 500,000 acre-feet of stormwater into the ocean every year, for example.

Stormwater managers must develop strategies that in many ways run counter to those designed to prevent flooding. To protect the ocean and other water bodies from the lawn fertilizers, pet waste, pesticide, oil, grease and trash that is flushed from city streets by rain, a key solution is to retain stormwater so that the soil catches contaminates as the water percolates into the ground. Other strategies to address stormwater pollution include, cleaning streets, changing individual behaviors such as over-fertilizing lawns, or treating stormwater in a similar manner to treating wastewater. The state and regional water boards, through their permitting process, seek to require cities, industries, construction activities and the state's highway system to change practices to limit runoff and prevent contaminants from reaching streams, rivers and bays.

For much of the short history of stormwater regulation, rules have emphasized effort over outcomes. The Clean Water Act's 1987 amendment regarding stormwater requires cities and other regulated entities to reduce stormwater pollution to the "maximum extent possible," but Congress never defined that term. Typical stormwater permits have required cities to develop and submit plans explaining their efforts. The vagueness surrounding the regulation is in contrast to wastewater regulation, which typically provides treatment plants with numerical limits for certain contaminants.

Some water users noted the differences in the way Congress treated point sources and non-point sources: When the Clean Water Act was approved in 1972, Congress gave states specific direction to require numeric limits in permits, and the federal government provided significant funding through a grant program to improve wastewater treatment facilities. Through the 1987 amendment, the grant program became a loan program, and Congress did not require numeric limits in permits regulating cities.

"With point sources, Congress provided both a carrot and a stick," Mark Gold, president of Heal the Bay, said. "With non-point sources, there is neither a carrot nor a stick."[43]

Disagreements now abound over many stormwater programs. It is more difficult to monitor, and more difficult to determine whether specific programs are effective. A blue ribbon panel of experts convened by the State Water Resources Control Board noted in a 2006 report that both regulated entities and environmental groups complained that stormwater permitting "has become overly complex, and that it is extremely difficult, if not impossible to objectively determine if a facility, operation or municipality is in compliance with permit requirements."[44]

During the Commission's study process, the National Research Council published a lengthy and damning report on national stormwater policy, essentially declaring it a failure. "EPA's current approach to regulating stormwater is unlikely to produce an accurate or complete picture of the extent of the problem, nor is it likely to adequately control stormwater's contribution to water body impairment," the report strongly states.[45]

To improve effectiveness, California's water boards are attempting to place more numeric limits or measurable requirements into stormwater permits, which is creating conflict with many stakeholders. Regulated entities complained to the Commission that the boards were using standards adapted for point sources in their efforts to better regulate stormwater.

This dilemma must be addressed by the state as it works toward improving water quality and water supplies in the future. Many argue that stormwater should not be treated as a problem, but as a resource. Captured and treated stormwater could be reused. The state's water future – in which recycled water must play a larger role – may in part depend on improving stormwater strategies.

Irrigated agriculture and dairies. In rural areas, runoff from agriculture and dairies plays a role in water pollution. Studies show that nitrates, often linked to farming practices, are affecting drinking water in parts of the Central Valley. A 2007 report issued by the Central Valley Regional Water Quality Control Board summarized more than two years of monitoring and found, among other things, toxicity to algal species throughout the valley that is generally associated with herbicides and metals, such as copper, and sediment toxicity throughout the valley likely due to certain types of pesticides.[46]

In part due to legislation enacted in 1999, regional water boards have begun to increase regulatory authority over irrigated agriculture, which is exempt from the Clean Water Act. The two regions with the most agricultural activity both have adopted conditional waivers of waste discharge requirements in the past five years that affect agricultural practices. Farmers are required to agree to the conditions of the waiver or face an individual waste discharge requirement.

The Central Valley Regional Water Quality Control Board oversees about 7 million acres of cropland, while the Central Coast Regional Water Quality Control Board regulates a much smaller area – about 600,000 acres.[47] The two boards take somewhat different approaches to regulating water quality in their districts, based in part on their sizes.

The Central Coast board requires farmers to participate in water quality education classes, participate in monitoring efforts and file regular reports with the board detailing activities geared toward improving water quality. The Central Valley board requires farmers to participate in – and fund – coalitions that perform monitoring. Based on that monitoring, the coalitions prepare management plans to address problem areas. Individual farmers are not required to submit reports as they are in the Central Coast region. The Central Valley board has found some difficulty in ensuring that all agricultural operations required to join a coalition do so – they have issued more than 1,400 enforcement orders requiring non-participating landowners to do so.[48]

While the Central Coast's irrigated agriculture program includes operators that discharge into ground water, the Central Valley program only includes those who discharge to surface water.[49]

In May 2007, the Central Valley Regional Water Quality Board issued a Waste Discharge Requirement covering all dairies in the region in existence since October 2005 – about 1,600 operations. Most of the dairies that operate in California are located in the Central Valley region, and before the new requirements, most had not been regulated. This had led to problems – a study of 425 wells at 88 dairies found that 63 percent of dairies' water was contaminated by nitrates.[50] The new order requires dairies to prepare reports on how they handle animal waste and other potential contaminants and monitor ground water quality. Dairy operators must enroll in a class designed to teach them how to comply with the new regulations.

Dairy representatives estimate the new regulations will cost each dairy $30,000 to $36,000 each year and require them to change business practices.[51]

Environmental groups argue that the regulations are long overdue and do not go far enough to successfully address the contamination. They note, for example, that the regulations contain no numeric limits or enforcement provisions. Two groups, the Environmental Law Foundation and Asociacion de Gente Unida por el Agua, have sued the state board over the regulation. The lawsuit remains pending.[52]

Legacy Pollutants. Another threat to the state's waters is so-called legacy pollutants, or pollution that stems from historic practices. These pollutants stem from agriculture, manufacturing and mining activities that have been banned or are no longer practiced. Legacy pollutants' historical nature pose a significant challenge for regulators: It is often impossible to hold former dischargers accountable, and removal of contaminants can be difficult and costly.

Major legacy pollutants include:

- ***Mercury.*** Used in 19th century gold mining practices in the Sierra Nevada mountains, mercury is now a prevalent contaminant in the Central Valley and San Francisco Bay regions. A study released in September 2008 showed that while some contaminants in sport fish declined during a 30-year period, mercury levels in fish remained relatively constant.[53]
- ***Polychlorinated Biphenyl (PCBs).*** PCBs were used in numerous products until they were banned in 1979, after they were identified as causing cancer in humans and disrupting animal reproduction. Despite the ban, PCBs linger and remain at high levels in San Francisco Bay and some Southern California lakes.[54]
- ***Perchlorate.*** Perchlorate, used in rocket fuel in the last half of the 20th century, has contaminated water in Sacramento County and Southern California, mostly in areas formerly used by the United States Department of Defense and the National Aeronautics and Space Administration. The Central Valley, Santa Ana and Los Angeles Regional Water Quality Control Boards have worked with industry and the federal government to control and remove perchlorate.

The Challenge Going Forward

California ushered in state-governed water quality protection with the passage of the Dickey Act in 1949, which set a regional course for regulation. The sweeping ambition of the Porter-Cologne Act in 1969 raised expectations that the state could eliminate water pollution, and established the principles for how California would regulate point source discharges. It made clear that discharge was a privilege, not a right, that solutions had to strike a reasonable balance between environmental protection and other concerns, and established basin plans as the foundation of regional regulation.

At the federal level, the similarly ambitious Clean Water Act followed in 1972. In its first incarnation, it attacked point source pollution such as industrial discharges and wastewater treatment. The act has evolved to focus on non-point sources and developing solutions for impaired water bodies, most notably total maximum daily loads for identified contaminants. This new focus has not come with the same level of federal funding that was available in the 1970s and 1980s, however.

Water Board's Efforts to Improve Programs, Processes

To their credit, the state water board has made several recent efforts to improve its programs and respond to criticism. Examples of the boards' reform efforts include:

- ***Strategic Plan Update.*** Adopted in September 2008, the water boards' Strategic Plan Update 2008 – 2012 outlines priorities for the water boards, both in terms of clean-water outcomes and in improving processes. The plan calls for the boards to prioritize programs for important watersheds, such as the Klamath River basin, for example, and prioritize needed basin plan updates. The plan also addresses concerns involving transparency and consistency, and calls for the development of state and regional water board work plans that include ways to measure performance. The plan has numerous specific goals with dates these goals will be achieved that will allow the Legislature, governor and stakeholders to assess board effectiveness. The plan was adopted after a one-and-a-half-year span that allowed significant stakeholder and staff input.
- ***New Offices.*** During the past two years, the state water board has created new offices within the board to improve effectiveness. The Office of Information Management and Analysis is intended as a way to improve both the boards' information technology systems and its ability to provide the public with useful information. The office was created on July 1, 2008 and oversees IT systems such as California Integrated Water Quality System (CIWQS) and also will produce routine reports depicting water board activities and outcomes. The Office of Research, Planning and Performance was created in 2006 to help better coordinate scientific research, work on strategic planning and develop performance measurement targets to help improve accountability within the water board system. The Office of Public Participation was created in 2007 to help strengthen the boards' efforts to involve the public in decision-making processes.
- ***Expert Panels.*** The state board has used panels of experts to review failing programs and make recommendations for change. In two cases, the reviews have helped the board make improvements to critical programs – the CIWQS and the Surface Water Ambient Monitoring Program (SWAMP) – that needed extensive restructuring. Both reviews were facilitated by Stephen Weisberg of the Southern California Coastal Water Research Project. In both cases, initial reviews of the programs – made public by the state water board – provided a harsh assessment of the programs but offered clear direction to make changes. For example, the review of CIWQS found that bifurcated management of the system and a broad, overly complex scope set the system up for failure. In both cases, a second review conducted about a year later showed significant improvement.
- ***Water Quality Improvement Initiative.*** Unveiled in May 2008 by the Schwarzenegger administration, the Water Quality Improvement Initiative was a comprehensive legislative proposal to reform some aspects of the water boards. The initiative called for the creation of a water quality council comprised of the chairpersons of each regional board to help improve consistency, and for the state and regional boards to establish priorities and report regularly to the Legislature on whether those priorities had been met. In addition, the initiative would change the state's interpretation of the 10 percent rule to allow potential appointees to serve on a board as long as they do not have income from an entity permitted by that specific board. Other proposals include delegating permitting authority from the regional boards to the regional board executive officers to allow the regional boards to focus on broader policy issues. In all, the initiative contained more than a dozen proposals for change.

California's main regulatory tools to enforce its clean water laws are the State Water Resources Control Board and nine regional water quality control boards. The state board sets policy and oversees the regional boards. The regional boards, which largely act independently of each other, develop basin plans and issue permits, monitor the results and assess fines when necessary. To a great degree, their structure and their policies reflect the major water protection laws passed in 1949, 1969 and 1972 with their heavy emphasis on point source pollution.

These laws have significantly reduced much of pollution that plagued California in the 1960s and 1970s, especially water contamination from point sources. But with the state's continued economic and population growth over the decades, some problems, such as sewage discharges, still escape a complete solution, in some cases because of cost. Other problems have emerged that defy easy solutions, such as stormwater runoff and agricultural runoff, as well as legacy pollution from old mines or contaminants from now-banned industrial practices. They now represent the biggest challenges California and its water boards face in living up to its commitment to provide clean water to its people now and in the future.

An Outdated System

Enacted in 1969, the Porter-Cologne Water Quality Control Act placed California in the vanguard of environmental protection.

In recent years, however, the water quality regulatory system developed nearly four decades ago is showing signs of its age. The system has not adapted to address modern water quality issues. Pollution from sources such as urban stormwater and agricultural runoff is now the biggest threat to surface water and groundwater. Legacy pollutants, such as mercury from mining practices, as well as aerial deposition from automobiles and other sources, also contaminate water. The traditional system of issuing permits to dischargers and monitoring those dischargers is not well-equipped to handle complicated issues that involve land use, diffuse pollution sources and complex scientific inquiry.

Regional boards are overwhelmed. Basin plans, the key regulatory document for each region, are decades out of date. Priorities are not matched to the most important threats to water quality. Process trumps a focus on clean water outcomes. Volunteer regional board members face increasingly difficult decisions that require a sophisticated understanding of water science and have profound ramifications for both the environment and the economy. Transparency, a key tenet of democratic government, is missing in regional board processes, as stakeholders complain they have little ability to interact with board members and do not always understand the rationale behind decisions. Regional boards across the state have differing philosophies and processes, and the state board has not adequately exercised its authority to ensure that the boards operate as one state agency, rather than 10 separate entities. Though the system is set up to protect water for the people of California, it is virtually impossible for the public to find easy-to-understand information on water quality in the state.

The result is a troubled system that lacks credibility with stakeholders, ranging from environmentalists to regulated businesses and local governments to the Legislature. In a disturbing illustration of the mistrust between the water boards and the water community, several stakeholders declined to publicly testify to the Commission about the boards because they were concerned there would be reprisals for publicly airing their complaints.

Worst of all, it is difficult to determine if the boards' regulatory programs are effectively cleaning and protecting California's waters. Many argue they are not.

"During the past 15 years, we have flat-lined in the effort to protect water quality," argues LaJuana Wilcher, a former administer with US EPA who advocates for a nation-wide overhaul of water quality regulatory practices.[55]

Cities of Arcadia, et al. vs. Los Angeles Water Board

Litigation involving 21 municipalities in Los Angeles County, the Building Industry Association (BIA) and the Los Angeles Regional Water Quality Board illustrates the difficulties boards are having regulating stormwater with out-of-date basin plans.

In 2004, as the Los Angeles board was conducting a triennial review of its basin plan, the cities and BIA asked the board to review its water quality standards in relation to stormwater regulation. Sections 13000 and 13241 of the Porter-Cologne Water Quality Control Act require the boards to enact standards that "attain the highest water quality which is reasonable," and the boards must consider several factors, such as probable beneficial uses of water, environmental characteristics of water, water quality conditions that could be reasonably achieved, and economic considerations, when it sets standards. The regulated entities argued that the basin plan's standards were developed before stormwater regulation was in place, and that due to stormwater's unique nature, new standards should be developed and applied in stormwater permits and during the TMDL process.

The board did not review the standards, arguing that the standards were adequate because the boards had considered the reasonableness factor and other factors when they were first developed. The state board approved the 2004 basin plan and declined to hear a petition for review from the regulated entities. In 2005, the group sued the board in state superior court, arguing that both stormwater permits and TMDLs were based on water quality standards set without consideration of stormwater issues. According to the lawsuit, the cities projected needing to spend several billion dollars complying with numeric limits on trash and trace metals as part of two TMDLs that were enacted based on existing water quality standards.

In July 2008, Judge Thierry Patrick Colaw sided with the plaintiffs, concluding that during the creation of the original basin plan and subsequent revisions, "there is no substantial evidence in the record to show that the boards have ever analyzed the 13241/13000 factors as they relate to stormwater." Colaw ordered the Los Angeles water board, and the State Water Resources Control Board, which has ultimate authority over the basin plans, to review water quality standards in the Los Angeles basin plan as they relate to stormwater.

The order created angst and confusion in the region, as the state board concluded that it could not authorize any new activity, including construction and industrial activities, until the matter was resolved. The judge later allowed the water quality standards to stand while the board conducted its review, and thus construction and industrial activity were allowed to resume.

But the lawsuit reveals what many stakeholders told the Commission: Stormwater regulation has been developed during the past 20 years based on standards that were largely created before nonpoint source water pollution was even considered. Other regional boards also have basin plans and water quality standards that were developed for point sources but are now being used in stormwater regulation.

Sources: Porter-Cologne Water Quality Control Act, sections 13000 and 13241. State Superior Court Judge Thierry Patrick Colaw. July 2, 2008. Judgment, Cities of Arcadia, et. Al. vs. State Water Resources Control Board and Los Angeles Regional Water Quality Control Board. Michael Lauffer, Chief Counsel, State Water Resources Control Board. July 16, 2008. Memo to Dorothy Rice, Executive Director, State Water Resources Control Board. State Superior Court Judge Thierry Patrick Colaw. August 28, 2008. Order, Cities of Arcadia, et. al. vs. State Water Resources Control Board and Los Angeles Regional Water Quality Control Board.

Through two public hearings, meetings of two Commission-created advisory committees, extensive interviews with stakeholders and a review of existing research, the Commission identified the following critical problems with California's efforts to improve and protect water quality:

- ***The relationship between the state and regional boards is not well-defined, leading to inconsistencies and inefficiencies among boards, an inability to set statewide priorities and a lack of focus on holding regional boards accountable for clean water outcomes.*** In statute, the state board has significant authority to steer regional board policies and provide statewide leadership. In practice, however, the state board does not provide enough oversight and regional boards have dramatically different approaches to similar problems, statewide priorities are unclear and there is not enough effort to understand which regional boards are the most effective at implementing clean water laws.
- ***The state and regional boards lack mechanisms to collect and analyze data properly, use scientific research and cost-effectiveness reviews to drive decision-making and provide useful information to the public, policy-makers and other researchers.*** Regional boards acknowledge they do not always have sufficient data to make decisions or determine whether programs are working. The state has struggled to implement an information technology system and coordinate scientific research so that it is applied in regulatory processes. Basin plans, the key regulatory document dictating most regional board processes, are out of date in most regions.
- ***An antiquated regional board structure and poor appeals process limits candidates for regional boards, hinders transparent decision-making, and asks volunteer board members to do too much.*** Regional boards face complex decisions that require water expertise that some board members do not have. Compounding that difficulty are ex parte rules that limit board members' ability to communicate with stakeholders, who in turn feel they are not able to work with boards in a collaborative manner. Federal and state conflict-of-interest provisions dramatically limit the pool of potential qualified candidates. And few stakeholders have confidence in the appeals process.
- ***The state – both water boards and other state agencies – is struggling to adapt appropriate strategies to address non-point source pollution.*** Non-point source pollution provides enormous challenges to the state and will require multi-

agency responses, but the state has no structures in place to address water quality problems that stem from land use, centuries-old pollution and air pollution. Urban stormwater is a vexing problem with costly solutions, yet the state has not developed an adequate system for assessing and prioritizing this problem and other non-point source pollution problems.

Inconsistencies and Inefficiencies

The framers of California's water quality regulatory system envisioned a decentralized governance structure that would lead to different objectives and standards in different regions. That is appropriate, as different regions have different hydrological conditions, and a contaminant may impact one water body differently than another.

But numerous stakeholders suggested that too often, regional board policies and processes vary dramatically, even on some of the most important statewide water issues. Examples include:

Water recycling. The Legislature in 1991 declared its support for increasing water recycling in the state by calling for the state to use 700,000 acre-feet of recycled water by 2000 and 1 million acre-feet by 2010. The 2000 goal was not met, and many believe the 2010 goal will not be met either.[56] Regional boards play a critical role in water recycling projects because reused water is often injected into ground water basins, giving boards authority to regulate that discharge. Boards have taken widely different approaches to recycled water projects; in fact, all boards do not offer the same type of permits for recycled water, with some issuing a NPDES permit and others regulating projects through water reclamation requirements.

"Inconsistent regulation of water recycling by state and local officials leads to confusion and uncertainty in how to design and manage water reuse systems and appears to have led to overly restrictive regulation and added costs, creating an obstacle to achieving the full potential for water reuse," a 2003 report on water recycling noted.[57]

The state board noted in 2007 that, "Regional Water Boards have established varying requirements for recycled water used for irrigation. Some have established limitations for salts in recycled water and others have not. Some water recycling irrigation projects have ground water monitoring requirements, but most do not."[58]

This can have profound effects: Los Angeles spent seven years working with the Los Angeles Regional Water Quality Control Board to obtain a permit to use recycled water for landscape irrigation purposes such as watering golf courses.[59] This frustration led to legislation in 2007 to allow entities seeking water recycling permits to bypass regional boards and obtain a permit from the state water board instead.[60]

The state board is currently working on the creation of a statewide policy on water recycling.

Stormwater. Stormwater policy also varies widely from board to board. The Central Valley board issued a relatively brief stormwater management permit (62 pages) for the city of Stockton in December 2007 that required the city to determine its own best management practices to address stormwater cleanup. By comparison, the Los Angeles board issued a draft stormwater management permit to Ventura County in August 2007 that was nearly twice as long (115 pages) and far more specific about the tasks the county and cities within the county should perform and the numeric limits on specific pollutants in stormwater. The permit listed specific best management practices that could be used and detailed how often streets should be swept.[61]

"Instead of a statewide plan and comprehensive approach to stormwater, precedents are being set, conditions for permits are being imposed and numeric limits are being imposed in a fragmented, case-by-case manner," said Terese Ghio, past president of the Industrial Energy Association.[62]

The California Stormwater Quality Association, a group including local government stormwater managers and private consultants, has been advocating for several years that the state board develop a comprehensive stormwater policy for medium- and large-size cities that they argue would improve the effectiveness of stormwater regulation and better allow measurement of that effectiveness. So far, however, the state board has not taken that up.[63]

Thus, regional boards have radically different approaches to stormwater regulation, one of the most difficult and contentious water pollution issues facing the state.

Monitoring, reporting and other processes. How regional boards develop information and report water quality data also differs. A 2006 report reviewing the state's Surface Water Ambient Monitoring Program – which is intended to gather and report statewide information on water quality – outlined several notable inconsistencies among regions. The review found, for example, that the North Coast Regional Water Quality Control Board and the

Central Valley Regional Water Quality Control Board appeared to be compiling their lists of impaired water bodies differently, with the North Coast region declaring much larger swaths of water bodies impaired, while the Central Valley board listed much smaller segments. The result makes it difficult to compare impaired water bodies in the two regions. The report also noted that bioassessment tools – used to help determine the health of a water body – had been developed differently by different regional boards.[64]

A report published by the State Water Resources Control Board in 2006 depicting water quality across the state noted that regional board water quality "assessments cannot be successfully integrated into an accurate statewide report because regions use a variety of assessment approaches and do not always apply criteria consistently."[65]

A US EPA review of inspection and enforcement activities by regional boards noted that it was difficult to compare regions because inspection reports and permit compliance reviews were done differently in different regions. "The documentation was not standardized across the RWQCBs (Regional Water Quality Control Boards) or the various water programs," the EPA noted.[66]

While the state water board's newly-created Office of Information Management and Analysis is attempting to improve the board's use of data and coordinate data gathering and reporting, inconsistent approaches to monitoring and data gathering limit the ability of the public and policy-makers to determine the health of the state's waters and whether various state strategies to improve water quality are effective.

Mark Lubell, an assistant professor in the Department of Environmental Science and Policy at the University of California, Davis, said he had attempted to study whether one of the state's main thrusts on water policy – gathering local water interests together to develop long-term water resource plans, referred to as Integrated Regional Water Management Planning – was protecting water quality. He found that due to different data gathering and monitoring in different watersheds, it was impossible to compare different water bodies in a meaningful way. Thus, he was unable to determine whether a major statewide initiative – one that has consumed hundreds of millions of dollars – is effective.[67]

Inconsistencies among boards also lead to inefficiency and expense. The Riverside County Flood Control and Water Conservation District reported that it spent nearly $2 million during a five-year period preparing three different sets of reports and permit applications because the three regional boards overseeing pieces of the district all required different paperwork.[68]

The state board can address regional inconsistency in multiple ways, including through rulings on appeals. The most effective avenue, however, would be through state board policies, which are intended as guidelines for all regional boards to follow. Currently, there are only 16 statewide policies.

State board officials complain that enacting policies is a long, staff-intensive process. Because some policies require scientific research, policies can take several years to develop. In addition, the state board is required to follow California Environmental Quality Act processes, which often take a year or longer.

Little Focus on Outcomes or Accountability

Are regional board permits, enforcement actions and other programs working to protect and improve California water quality? It is difficult to say.

Throughout the review process, the Commission found an alarming lack of information on the effectiveness of state water quality regulations. Regional boards submit a significant amount of data to the state board, from lists of impaired water bodies to work plans outlining upcoming plans, but there is not enough analysis done by the state board to determine program effectiveness. The state board does not provide enough leadership in directing regional board activity based on analysis of what is working, and what is not working.

Too much discussion within the boards – and among stakeholders – is focused on processes; not enough attention is paid to whether these processes lead to the desired clean-water outcomes.

Examples include:

- In a report summarizing current water quality monitoring practices and suggesting changes, an executive of the San Diego Regional Water Quality Control Board noted that monitoring and surveillance information and analysis was not integrated into board programs, with the result being “the Regional Board is unable to efficiently assure discharger compliance with regulatory requirements and effectively measure the performance and success of its own regulatory activities."[69]

- In a 2008 report detailing enforcement activities of the boards, the state water board noted that the boards do not track the environmental benefits of enforcement actions, such as the amount of pollutants reduced in water or the acres of wetlands or beaches restored. "This information could be collected when the enforcement case is resolved," the report notes. But it currently is not.[70]

There are numerous reasons for the lack of focus on outcomes.

Reviews by US EPA of water board practices are influential in directing the boards' activities, due to US EPA's authority over Clean Water Act activities. Many of US EPA's reviews of California measure the boards' processes and outputs, not outcomes. For example, most of what US EPA measured in its 2007 "Enforcement and Compliance Assurance State Review Framework" report for California focused on processes, such as data inputs, penalties assessed and timely reporting, instead of environmental outcomes.[71]

In addition, board members, staff and stakeholders argue the boards simply do not have enough resources to ensure programs are working. Regional monitoring, which allows boards to take a broad look at the health of a watershed, is under-funded. Regional monitoring is done in addition to self-monitoring conducted by permitees to ensure they comply with conditions of their permits, and is usually funded through the General Fund, not user fees. An advisory group formed by the state water board produced a report in 2000 with recommendations for surface water monitoring that suggested it would cost between $59 and $115 million annually to conduct a comprehensive monitoring program.[72] In the eight years since, funding has never reached that level. In the 2007-08 fiscal year, the state and regional boards spent about $9.5 million, or about 16 percent of the minimum amount recommended – on ambient monitoring.[73]

In some instances, court cases also create pressure to focus more on processes than outcomes. A 1999 settlement between environmental groups and the US Environmental Protection Agency has forced the Los Angeles Regional Water Quality Control Board to develop 92 total maximum daily load plans in 13 years, and a 1997 settlement set up an 11-year schedule for the North Coast Regional Water Quality Control Board requiring two TMDLs per year.[74] Some stakeholders argue that the tight timeline has led regional boards to quickly adopt

TMDLs without adequately determining whether they will have a positive impact on water quality.[75]

Regardless of these pressures, stakeholders with numerous different perspectives complained to the Commission that a lack of focus on outcomes has led to a lack of accountability for regional boards. Local government officials and business interests subject to stormwater permits argue that some regional boards' zeal to regulate leads to too-stringent requirements, which should be reined in by the state board. Environmentalists argue that the state board does not do enough to ensure that regional boards are conducting timely enforcement actions to ensure that regulated entities are not fouling the state's waters in violation of their permits.

Regional boards differ considerably in their enforcement activities. A 2008 state board report on enforcement noted a wide range in the percent of violations that received enforcement among the regional boards, with one board pursuing only 30 percent of violations and another pursuing 97 percent. The report noted that the "variation in enforcement actions reflects differing emphasis on enforcement at the Regional Water Boards."[76] There was no further discussion or analysis as to why that was, or whether one region or another was performing more effectively.

In her testimony to the Commission, Linda Sheehan, executive director of the California Coastkeeper Alliance, referred to that report as an example of the state board's reluctance to hold regional boards accountable for their actions. Sheehan said the report did not delve further into reasons why regional boards' performance on enforcement varied. "Under its current authority and structure, the state board can and must – but generally fails to – call out under-performance at the Regional Board level," she said.[77]

Funding Constraints Limit Programs

While offering many different perspectives on various problems facing the water boards, stakeholders and board officials were virtually unanimous on one issue: They argue there is not enough money made available to accomplish the state's clean water goals.

An unmet needs analysis performed by the state water board in 2001 found that the state and regional boards would need 260 percent more funding than they were receiving to fully carry out current duties and future duties based on emerging issues. The Legislative Analyst's Office concluded that the assumptions made by the state board in determining unmet needs were reasonable. The report noted the following staffing deficiencies:

- ***NPDES wastewater program.*** While the state and regional boards need 233 staff, there are about 100.
- ***NPDES stormwater program.*** While the state and regional boards need 400 staff, there are about 100.
- ***Wetlands and 401 certification.*** While the state and regional boards need 134 staff, there are 16.
- ***Waste Disposal Requirement program.*** While the state and regional boards need 290 staff, there are 77.
- ***Land disposal program.*** While the state and regional boards need 164 staff, there are 70.

This lack of staff hinders the boards' abilities to perform duties. A Legislative Analyst's Office report found that more than one-fourth of major wastewater treatment facilities had permits that had expired because regional boards had not updated them. In addition, until the summer 2008, the water boards had yet to assess fines for 9,592 mandatory minimum penalty violations that occurred between 2000 and 2007. While a state board effort begun in summer 2008 is attempting to address the fine backlog, this lengthy period between violation and actual fine limits the deterrent effect that prompt enforcement actions might have.

The boards are funded largely through fees and other non-General Fund sources. In the water boards' budget for the 2008-09 fiscal year, for example, only $38.7 million of the boards' $733.1 million budget came from the General Fund.

While the boards have the authority to raise fees to meet program costs, they cannot raise fees above the amount set in the budget every year by the Legislature and governor. In other words, the governor and Legislature would have to agree to dramatically raise fees if they wanted to increase staffing to the levels called for in the water boards' report. Policy-makers have been unwilling to do so.

In its budget analysis in 2008, the Legislative Analyst's Office recommended a new fee for all water users to pay for water board programs, suggesting that a fee of less than $10 on every water utility hookup in the state would raise nearly $20 million for the boards.

Sources: State Water Resources Control Board. April 30, 2008. "Baseline Enforcement Report." Legislative Analyst's Office. February 20, 2002. "Analysis of the 2002-03 Budget Bill. Legislative Analyst's Office. February 20, 2008. "Analysis of the 2008-09 Budget Bill." Linda Sheehan, Executive Director, California Coastkeeper Alliance. April 24, 2008. Written testimony to the Commission.

Boards Unable to Prioritize

California has no current mechanism to appropriately prioritize water quality problems and steer resources toward the solutions to those problems.

Faced with a broad mandate to protect all of the state's waters, the water boards have been unable to focus on the most important water bodies or the most pressing contamination problems. Testimony to the Commission largely centered on urban stormwater issues, which has a dramatic impact on local government and business, as well as the environment. Should addressing stormwater be the boards' top priority? Many argue it should, but the state board has not indicated that it is, or should be, its top priority.

There are true impediments to prioritization. The boards' increasing reliance on fees limits their ability to match resources to needs, for example.

California's water boards have an annual budget of more than $700 million, with most money coming from fees and other non-General Fund sources.[78] Board activities are funded by 74 separate revenue streams, which are often fees assessed for specific programs.[79]

"Our actions are very much budget-driven," Karl Longley, chairman of the Central Valley Regional Water Quality Control Board, told the Commission. "The money is typically in an account and cannot be used outside of that account or for other purposes. If there was a mechanism for the executive officers and the boards to redirect resources given proper justification, it would allow us to be more diligent in addressing priorities."

Critical activities such as basin planning, enforcement and ambient monitoring, all funded through the state General Fund, received less money for staff than did other activities, even those that could be considered a lower priority.

Aside from administration, for example, staffing levels for the water boards' underground storage tanks program are the highest of any program overseen by the boards. The program regulates gas stations and other facilities that store potential contaminants underground, and is paid for entirely by fees from regulated businesses. At one time, leaking underground storage tanks were a major problem in the state. However, increased regulation has lessened the threat: The

Staff May Be Too Concentrated in Sacramento

About 45 percent of the state and regional water boards staff works for the state board in Sacramento. Some stakeholders suggested the boards could re-allocate some staff to improve regional board performance.

"… in many key areas, personnel are congregated at the state board, rather than on the ground in the regions, where the vast majority of actual permitting and enforcement is taking place,'' Linda Sheehan, executive director of the California Coastkeeper Alliance, told the Commission in her testimony.

According to water board budget year 2008-09 information provided to the Commission, for example, 42 percent of the water boards' enforcement staff and 45 percent of the boards' basin planning staff work for the state board.

During difficult financial times when the water boards should not expect new monies from the General Fund, the boards could look at deploying some staff in Sacramento to regional boards.

Sources: Linda Sheehan, Executive Director, California Coastkeeper Alliance. April 24, 2008. Written testimony to the Commission. Page 2. State Water Resources Control Board. November 24, 2008. "Budget Information for Little Hoover Commission, FY 08-09." Provided to the Commission.

number of active cases involving leaking underground storage tanks has fallen dramatically in the last 12 years, from 20,177 in 1995 to 11,899 in 2007.[80] Despite the change, the state and regional boards still have nearly 200 staff assigned to the program – far more than those working on stormwater permits, enforcement activities or even TMDLs.

The underground storage tanks program may warrant as much staffing as it receives. The boards do not conduct routine studies of their staffing and programs to determine whether staffing levels and priorities match.

Water users and environmentalists complain that the boards are not focused on addressing the state's biggest water quality issues or realistically solving problems.

In the foothills of the Sierra Nevada, for example, a small sanitation district with a treatment plant that serves 83 people faces a $574,000 fine for violations of its NPDES permit for minor discharges into a creek bed that is dry most of the year. The sanitation district may need to spend more than $4 million upgrading the facility, despite a letter from the state Department of Fish and Game that the fish the board's regulations are trying to protect do not live in the creek and a letter from the state Department of Public Health noting that the "current degree of treatment is adequate to protect public health."[81]

In Los Angeles, local governments complain that they face expensive wastewater treatment upgrades because the Los Angeles Regional Water Quality Control Board continues to require that effluent in Ballona Creek, which is a fenced-off, concrete-lined channel, be treated to allow for swimming and other forms of contact recreation.[82]

In the Central Valley, an effort to establish a total maximum daily load (TMDL) for methylmercury is focused on reducing mercury in the current discharges of wastewater and stormwater systems, despite studies showing that 75 to 80 percent of the mercury in the Sacramento-San Joaquin River Delta is not coming from those discharges. The mercury pollution is a result of mining practices dating to the 1800s. Regulated entities there argue they may be forced to spend millions of dollars upgrading their systems even though the upgrades are not likely to result in a dramatic reduction of mercury in the water.[83]

Meanwhile, environmentalists note that non-dairy feedlots, such as those for cattle, which have the potential for causing major water quality damage, go unregulated in the Central Valley. And until an effort was initiated in summer 2008, the regional boards had levied more than 700 penalties during the previous eight years that had gone uncollected.[84] By not pursuing penalties in a timely manner, the deterrence affect that might come from enforcement efforts is lost.

Stakeholders told the Commission that the boards often are too narrowly focused on regulatory programs to work on larger solutions to the state's most pressing water quality problems, such as legacy pollutants, urban stormwater and agricultural runoff.

"There have not been enough forward-looking policies in the last decade," said Craig Wilson, an attorney representing the dairy industry and the former chief counsel of the State Water Resources Control Board. "The boards have been bogged down in minutia."[85]

One problem may be that the boards actually engage in too many prioritization processes. A 2008 report for the Ocean Science Trust intended to help the boards increase the use of science in decision-making noted that the "water boards prioritization processes are complex and numerous." The report listed six different activities or processes that the boards routinely conduct to set priorities.[86]

The state board made an effort to begin infusing prioritization into its system in 2008 with the adoption of a new strategic growth plan. The plan calls for prioritizing TMDL implementation in important watersheds such as the Klamath and Bay Delta, for example.

Struggling with Information Technology

One of the most profound problems facing California's water boards is its inability to develop information technology systems that can improve efficiency and provide better information to the boards, the public and policy-makers. Gathering data and using it to produce useful information is a key job of the water boards: There are at least 25 provisions in state statutes requiring the water boards to accumulate and produce information about water.[87]

Some of the best and easiest-to-use information about state water quality is produced not by the state, but by other interested groups. The California Coastkeeper Alliance has created on its Web site an interactive map showing the state's impaired water bodies using data culled from the state water board. The state does not have any similar maps on its Web site. Heal the Bay, a Southern California-based environmental group, produces weekly report cards on beaches across the state using monitoring information gathered by the water boards and local governments. The president of the group said that occasionally water board staff ask his group for data because it is better organized.[88]

Much of the monitoring data submitted to the regional water boards is still not electronic, and databases are not well organized. A 2006 report on a water board program designed to protect wetlands areas noted that when researchers sought to review 429 files regarding the program, they could only locate 257. More than 40 percent of the files could not be found.[89]

The state board's central information technology system, the California Integrated Water Quality System (CIWQS), has had a troubled history. CIWQS has been criticized by both the Legislative Analyst's Office and an independent review panel as unreliable, difficult to use and responsible for data-entry backlogs throughout the system.

"The State Water Board has a less functional system for water quality management than it had before CIWQS was implanted," the independent review panel concluded in a July 2007 report.[90]

The LAO noted that the state water board circumvented the Legislature in the initial stages of developing CIWQS. Turned down for funding by the Legislature in the 2002-03 budget year, the state board went ahead with the project anyway, seeking funds from US EPA.[91] Funding was less then originally intended, however, and the independent review panel found that a major problem with the system was that it was not funded appropriately to handle all of the functions the boards sought from the system. The panel also noted that the governance of the program was bifurcated between the EPA and two divisions within the state water board, leading to little accountability or proper oversight.[92]

In a follow-up report released in May 2008, the same panel found that significant progress had been made in improving the system but that there were still problems regarding the accuracy of data, the ability of the system to produce useful reports and the use of the system by the public.[93] Faulty algorithms in the programming can create false violations, for example, and it is still difficult for the public to navigate the system and determine what kinds of water quality issues are relevant in their region. A report on enforcement actions produced by the state board in 2008 highlighted continuing problems with CIWQS: A chart depicting violations of stormwater permits showed five regions reporting more facilities with violations than the number of facilities inspected – an impossibility.

The noncompliance rate "for the stormwater program is likely misleading due to the quality of information in the CIWQS database," the report notes.[94]

Lack of Data

The water boards issue permits, set standards and adopt TMDLs every year that have serious consequences for both business and the environment, and water board officials acknowledge some of the those decisions are essentially made without sufficient information. Lack of monitoring data, the vastness of California's waters and a still-growing understanding of water science contribute to regulatory guesswork. The effect of regulation is often unknown.

"We base our decisions on such little data," Pamela Creeden, executive officer of the Central Valley Regional Water Control Board, acknowledged at a Commission advisory committee meeting.[95]

In Creeden's region, the controversial waiver for waste discharge requirements for irrigated agriculture adopted in 2006 notes that "although there is information that discharges of waste from irrigated lands have impaired waters of the state, information is not generally available concerning the specific locations of impairments, specific causes, specific types of waste, and specific management practices that could reduce impairments and improve and protect water quality."[96]

A joint effort by Cal/EPA and the state Resources Agency which sought to illuminate various environmental issues in California showed the difficulties facing the state. According to the 2004 "Environmental Protection Indicators for California" report, 80 percent of the state's shoreline, 72 percent of the bays, harbors and estuaries, and 75 percent of rivers, streams, lakes and reservoirs were unmonitored in 2002, making it impossible to determine whether those water bodies were safe for swimming.[97]

The lack of information is not altogether due to a simple lack of funding for more monitoring. It is also a failure by the state to better coordinate information. Numerous state and federal agencies – ranging from the United States Geological Survey to the state Department of Water Resources and Department of Fish and Game, as well as local monitoring groups – gather water data. But there has been a limited effort by the state to pull that data together to make it accessible to regulators, the public and others who would be interested.

This lack of coordination limits the state's ability to protect and improve water quality and determine what programs are working. For example, water monitoring done through billions of dollars doled out through voter-approved water bonds, such as Propositions 13, 40 and 50, have not been collected in a standardized format with the same type of quality assurance, leaving it difficult to compare monitoring and data.

The California Environmental Data Exchange Network (CEDEN) has been intended as a way to link various water databases together. According to the CEDEN Web site, "CEDEN is a growing statewide cooperative effort of various groups involved in the water and environmental resources of the state of California," and the purpose of the network is "to allow the exchange of water and environmental data between groups and to provide access to the public."[98]

CEDEN remains under development, however. The project was recently transferred from the Department of Water Resources to the state water board, with the state water board allocating $500,000 in fiscal year 2007-08 to the project.[99]

Lack of Science

Countless water users, environmentalists and water experts noted that the water boards do not engage in sufficient scientific research to support new regulation. In his testimony to the Commission, United States Navy Rear Admiral Len R. Hering, Sr. suggested the state's water boards lacked credibility because they did not have a rigorous science program.[100]

The water boards do conduct and fund a significant amount of scientific research. A survey compiled in 2008 by the state water board found 95 current research projects funded by the state and regional boards.[101] The boards also have a peer review program, requiring reviews of all science in regulatory programs, run in partnership with the University of California. And some regional boards contribute to independent science-based groups that conduct relevant research: The San Francisco Bay Regional Water Quality Control Board is a contributor to the San Francisco Estuary Institute, a nonprofit organization that conducts research and monitoring in the San Francisco Bay. Three regional boards in Southern California and the state board are partners in the Southern California Coastal Water Research Project, a joint powers agency that conducts research and monitoring along the Southern California coastline.

The problem, however, is that the state board has had no mechanism to keep track of board-funded research, centralize information gathered in that research and analyze the research to ensure it informs board programs across the state. The result is an inefficient use of scientific resources, as well as a public perception that the water boards are not using science in their decision-making.

The board created a new Office of Research, Planning and Performance in 2006, which is still in its development stage. The survey of ongoing research was a first effort by the state board to get a better understanding of scientific studies throughout the regions.

Compounding the boards' inability to coordinate research and better infuse it into decision-making is the increasingly complex problems the boards face. Even a robust scientific program would be challenged to find cost effective solutions to such difficult issues as non-point source pollution or watershed-wide issues. Presentations at a 2008 meeting of the American Association for the Advancement of Science concluded, for example, that pesticides that run off the land and mix in rivers and streams combine to produce a greater toxic effect on salmon than the pesticides would have individually.[102] How do the boards design regulation to respond to that information?

Two reports in the last three years – one commissioned by the state water board and another by the Ocean Science Trust – have sought ways to improve the use of science within water quality regulations in California, and each report has acknowledged the complexity of the subject matter the water boards are attempting to tackle. The report commissioned by the Ocean Science Trust listed these subjects as in need of more scientific inquiry:

- Total maximum daily loads and water quality objectives:
    - ✓ Better understanding of watershed functioning and pollutant origin and dynamics.
    - ✓ Developing scientifically based pollutant standards and water quality indicators.

  - ✓ Evaluating the effectiveness and cost-to-benefit ratio of TMDLs as a regulatory tool.

- Stormwater and non-point source impacts, origins and controls:
  - ✓ Understanding the origins, impacts, and the efficacy of management practices and measures related to stormwater, urban and agricultural nonpoint sources, and hydromodification.
- Emerging contaminants:
  - ✓ Understanding the sources and impacts of emerging contaminants.
  - ✓ Determining how best to control emerging and legacy pollutants.
- Climate change impacts on water quality:
  - ✓ Assessing the predicted water quality impacts of climate change using authoritative, non-politicized science.
  - ✓ Developing a strategic approach to predicted climate change impacts and their effects on the current regulatory framework.[103]

Water users complain that the boards too often implement regulations without a sound understanding of the science behind the problems or solutions.

"Stormwater science and technology lag behind regulatory implementation," Chris Crompton, manager of the Environmental Resources Section for Orange County Public Works Department, told the Commission.

Without adequate data and science, it is difficult for the water boards to determine the biggest threats to water quality and the best use of limited resources to address those threats.

Outdated Basin Plans Undermine Credibility

Throughout much of the state, basin plans – the key document outlining water quality standards for the region – are outdated. The chairman of the Central Valley Regional Board said the salinity standards in his region's basin plan have not been updated since the 1970s.[104] The executive officer of the Lahontan Regional Board said most sections of his region's basin plan are 14 years old.[105]

In addition to being outdated, there is evidence that aspects of the original basin plans were created in the 1970s without scientific study or even accurate data. "Many basin plan elements are found to lack a solid technical and scientific foundation," notes a review of the Los Angeles Regional Water Quality Control Board's basin plan conducted in 2003 by consultants hired by regulated entities.[106] A similar review of the Central Valley Regional Water Quality Control Board's basin plan noted that numerous water quality objectives placed into the basin plan were provided in a memo from the state board and were not based on local conditions.[107]

While basin plans are supposed to be updated every three years, regional boards have rarely had the resources to conduct a full review, complete with new scientific research.

Budget information provided by the state board shows that most regional boards have fewer than three staff members working on basin plan updates. Of 1,592.7 employees in the entire system in fiscal year 2007-08, just 41.2 – or 2.6 percent – were dedicated to basin planning.

"Currently, basin planning updates are being conducted as a routine, housekeeping type of function instead of a true analysis of current conditions," said Terese Ghio, past president of the Industrial Environmental Association and also a former member of the San Diego Regional Water Quality Control Board.[108]

The last major statewide basin plan update was in 1994. Many stakeholders note that the update occurred just as non-point source regulation began to truly be implemented, and current basin plans do not account for stormwater, despite its differences from a typical point discharge.

Numerous conflicts arise in each region due to this problem, leading to arguments over information and science before water users and

A Missed Opportunity

In 2002, Californians approved Proposition 50, a $3.44 billion general obligation bond designed to improve water quality in the state. In 2006, voters approved Proposition 84, a $5.388 billion general obligation bond designed to improve water quality, flood control and parks. Both propositions included extensive funding for integrated regional water management plans (IRWMP), which is intended to bring various groups together in a region to create a plan to improve water quality and supply. Funding goes both to the creation of the plans and to implement projects called for in the plans.

Proposition 50 earmarked $500 million for IRWMP, which has been spent. Proposition 84 earmarked $1 billion for IRWMP, most of which had not been spent when the Commission was conducting its study. IRWMP projects have been positive in many regions of the state, and regional water boards have participated in some of the projects.

However, at a time when virtually every regional board in the state is struggling to impose regulation based on badly out-of-date basin plans, the IRWMP funding appears to be a missed opportunity. Instead of creating new plans for each region, some of the funding could have gone to help regional boards work with stakeholders to revise and modernize basin plans. According to the propositions, however, the money is intended for local groups and local projects, not state government-sponsored functions.

While an up-to-date basin plan would not likely accomplish all of the things an IRWMP calls for – basin plans would be less likely to spell out how a region could increase water supply, for example – there is little question that one of the most important issues facing water quality in the state is outdated basin plans. An effort to redo basin plans can bring stakeholders together to help plot out the state's water future – the same goal that IRWMP has – without creating an entirely new bureaucracy.

The state could have used some of the $1.5 billion in bond money approved during the last four years for water planning to update basin plans.

Sources: Smart Voter. Proposition 84: Water Quality, Safety and Supply. Flood Control. Natural Resource Protection. Park Improvements. State of California. http://www.smartvoter.org/2006/11/07/ca/state/prop/84. Also, Smart Voter. Proposition 50 Water Quality, Supply and Safe Drinking Water Projects. Coastal Wetlands Purchase and Protection State of California. http://www.smartvoter.org/2002/11/05/ca/state/prop/50/. Also, State Water Resources Control Board and Department of Water Resources. June 2007. "Proposition 50 Chapter 8 Integrated Regional Water Management Grant Program Guidelines Proposal Solicitation Packages Second Round."

other constituencies even begin to debate appropriate policy. Regulated entities contend that most water quality standards and beneficial uses were developed prior to stormwater regulations, and because stormwater is significantly different than point source discharges, basin plans should be updated to include standards specific to non-point sources.

State and regional board officials acknowledge this problem.

"The Basin Plans, originally written in the 1970s and periodically updated, currently do not fully reflect the Water Board's fast-growing body of knowledge and evolving regulatory approaches to regional and statewide concerns such as stormwater, non-point sources (e.g. irrigated agriculture), and biological integrity," reads the state water board's current strategic plan.[109]

The plan calls for all basin plans to be updated, but not until 2015.

A major obstacle in updating basin plans is money. The water boards do not generate any fees that could be applied to basin planning, so it is one of the few programs funded solely through the General Fund. This is, in part, why major updating efforts have not occurred.

Appeals Process Flawed

Appeals were cited by State Water Resources Control Board chairwoman Tam Doduc as a key piece of the state board's authority to direct regional board activities. Any aggrieved person can appeal a regional board decision – such as a permit, or enforcement action – to the state board, which then has the power to overturn the regional board or send the issue back to the regional board with direction on changes that should be made.

The Commission found, however, that many stakeholders do not have confidence in the appeals process.

Regional board decisions rarely are overturned by the board. According to information provided to the Commission, the state board received 231 appeals of regional board actions between July 1, 2001, and June 30, 2008. The board upheld regional board actions on 193 of those appeals, modified regional board actions on 33 appeals, and is still making a determination on 5 appeals. The board reversed 14 percent of the regional board actions that were appealed to it in this seven-year period.[110]

In addition, the process of reviewing potential appeals appears troubling. As described by Gary Wolff, vice chairman of the State Water Resources Control Board, the state board's executive director and chief counsel vet appeals and then make a recommendation to the board members as to whether that appeal should be heard by the board or not. It is up to board members to seek out staff to have a broader discussion on the potential appeal, and if board members do not respond, the executive director issues a letter to the petitioner with a decision as to whether the appeal will go forward. Wolff acknowledged that in recent years, most of the decisions to consider appeals are based on whether a legal violation has occurred – not whether an action contradicts state policy or could clear up a controversial issue.

Of particular concern is the inadequate explanation given to would-be petitioners. For example, Laurel Firestone, an attorney representing the Visalia-based Community Water Center, told the Commission that she received a one-page letter informing her that the state board would not review a petition she filed concerning the Central Valley Regional Water Quality Control Board's 2007 waiver for waste discharge requirements for dairies. The waiver was a controversial issue, marking one of the first efforts to regulate dairies in the country. Firestone said she received no further explanation from the board as to why her petition was denied. It was only at the Commission's hearing that she learned that there was a five-page explanation, a public document, on why the board denied the petition, but it was written by the board's chief counsel.

Two environmental groups, including the one represented by Firestone, since have gone to court to block the waiver, arguing it does not go far enough in regulating dairies.

"It is pretty common to have an appeal dismissed without explanation," noted Linda Sheehan, executive director of the California Coastkeeper Alliance, at the Commission's April 2008 hearing.

While chairwoman Doduc touted the appeals process as a key check on regional board behavior, she acknowledged one flaw.

"The petition process is a reactive process," she noted. "I think the state water board does need to be more proactive in terms of reaching out to regional boards, the various stakeholders and identifying emerging issues and getting ahead of the curve."

The problem, however, is that because the state board handles appeals, it is not allowed to comment or intervene on an action taken by a regional board that could be appealed to the state board. The state's Administrative Procedure Act prohibits anyone who might have a role in an appellate process from expressing an opinion on a proceeding if an appeal is possible.[111] Thus, the board's role as judge prevents it from taking a proactive role in some regional board activities.

"Most 'coordination' (between the state and regional boards) is reactive and happens at the end of processes when something goes wrong and there are appeals or lawsuits," Chris Crompton, manager of environmental resources for Orange County, told the Commission in written testimony. "This 'back-end coordination' is inefficient and hence costly, and has real environmental impacts from delayed decisions/actions."[112]

Outdated Rules Limit Critical Communications

Another factor that undermines stakeholder confidence in the system is the boards' strict prohibition against ex parte communications. Both state and regional board members are subject to Chapter 4.5 of the state Administrative Procedure Act, which prohibits communication between board members and anyone subject to an adjudicative proceeding, such as the issuance of a discharge permit, enforcement action or water rights permit.[113]

Some water users and others involved in the process complain that ex parte rules limit regulated entities' ability to discuss important and complex issues with board members. Instead, local governments, businesses and other stakeholders are often limited to just a few minutes of testimony before the board during a formal hearing, despite the profound fiscal impact board decisions can have on these regulated entities.

Carole Besswick, chairwoman of the Santa Ana Regional Water Quality Control Board and a former member of the South Coast Air Quality Management District, told the Commission that one of the biggest differences between the water boards and air district boards was that air board members had much more freedom to talk to the people they regulated. As an air regulator, Beswick noted she frequently interacted with those she regulated, which helped her better understand the issues she and stakeholders faced.[114]

Others also have complained about the water boards' ex parte rules, even other state agencies. In a 2000 letter to the state water board, the state Department of Water Resources complained that the water boards' "strict reading of the ex parte communication rules is not in the public interest, because it reduces the ability of the public and parties to seek assistance from the board and staff on complicated water rights issues and to work toward resolving problems."[115]

Ex parte rules are different at other state boards and commissions. The Integrated Waste Management Board was created in 1989 and the law enacting the board included what is referred to as a "sunshine" rule. Section 40412 of the Public Resources Code allows for communication between board members and regulated entities as long the board member fully discloses the communication at a public meeting.[116] Other boards, such as the California Public Utilities Commission and the state Air Resources Board, have similar provisions. The "sunshine" rule allows regulators to interact with stakeholders so that they can become better informed, but at the same time ensures that all such communications are known to everyone interested in the proceeding.

"As for the fairness of the process, the regulated community is frustrated by the fact that members of the SWCRB and the nine RWQCBs say they are unapproachable under state law," complained Mick Pattinson, president and CEO of Barratt American Homes, a Southern California homebuilder. "While it is perfectly acceptable and appropriate to speak with elected city, state and federal officials, it is unfathomable that the same rights do not apply to unelected board members."[117]

10 Percent Rule Limits Appointees

Governors have long struggled to find interested, qualified people to serve on regional water boards. With nine positions on each board, and because the positions are virtually voluntary, with only a $100 per diem paid per meeting, appointments are a continuing problem.

As the Commission conducted its study, five of the nine regional boards each had three vacancies, leaving a third of these board spots unfilled. Some boards have gone with as few as five members for months at a time. This can lead to difficulties in achieving the quorum necessary for a board to take action, slowing down decision-making and impacting the environment and businesses waiting for permits or other actions.

Part of the difficulty in finding appointees stems from the so-called 10 Percent Rule, which is embedded in both federal and state law. The Clean Water Act prohibits anyone from serving on a board that issues permits if they have earned "a significant portion of his income directly or indirectly from permit holders or applicants for a permit."[118] Similar language was adopted into state statute. The EPA later interpreted significant to mean 10 percent or more of income.

The 10 Percent Rule goes beyond typical conflict-of-interest rules, which forbid people from participating in decisions that could affect their income, by prohibiting someone from even serving on a water board if they have a conflict. The rule has dramatically narrowed the pool of potential water board candidates who were interested or qualified to serve.

For example, Sari Sommerstram, a watershed consultant with a Ph.D. in resource planning and conservation, was appointed to serve on the North Coast Water Quality Control Board by Governor Arnold Schwarzenegger. Despite her background in water, she was not allowed to continue on the board due to the 10 Percent Rule. Her husband raised trees which were sold to timber companies for use in reforestation, and because those same companies were regulated by the water board, she had to leave the board soon after she joined it.[119]

Additionally, while each regional board has a slot for a county supervisor, it is virtually impossible to find a supervisor who qualifies for a board position because counties are subject to regulation under stormwater permits and because in most medium- and large-sized California counties, supervisors are full-time county employees.

For a governor, identifying 81 people interested in serving on a regional board who do not have a 10 Percent Rule conflict is a daunting task.

There is widespread consensus among stakeholders and others in California that the 10 Percent Rule should be changed. In her testimony to the Commission, however, Alexis Strauss of US EPA noted that it was extremely difficult to change US EPA regulations. Others noted that because California is one of only a few states with part-time political appointees making permit decisions – Colorado and Virginia are two other states with state water boards – there is little interest in Washington, D.C., to enact regulatory reform.

An Increasingly Complex Job

As water quality regulations evolve to handle increasingly complicated pollution programs, some suggest a part-time board has a more difficult time making appropriate decisions.

State Water Resources Control Board member Art Baggett told the Commission that many routine permits have grown from 10 to 12 pages when he joined the board in 1999 to more than 100 pages today, in part because the state has stepped up enforcement of permits and dischargers are now more concerned about every detail.[120] Permits can take up a significant amount of board time at monthly meetings. Due to permits' increased complexity, many stakeholders suggest that regional board members simply rubber stamp staff suggestions because they do not have the knowledge base to question the details.

A former board member told the Commission that the boards can be overwhelmed by volumes of paperwork that are difficult to understand without a background in water science.

Terese Ghio, who served on the San Diego Regional Water Quality Control Board, told the Commission that many regional board members were simply unqualified to render decisions on technical and science-based regulations. Ghio noted she had a background in wastewater treatment and was able to question staff on permit technical issues, but many other board members are not.

Even with technical expertise, Ghio noted the difficulty of the job. "In some cases, it was thousands of pages given to us one week before the meeting," she said.

As the complexity of permits and other regulations grows, it is unclear whether regional boards can act as a check on staff, or other stakeholders, to ensure they are making the right decision for the environment and the economy.

U.S. Navy's Stormwater Permit Illustrates Difficulties

The United States Navy receives an industrial stormwater permit from the San Diego Regional Water Quality Control Board for operations on three Naval bases along ports in the San Diego region. The 2002 permit has created conflict between the board and the Navy, and the Commission heard public testimony from the Navy and received written testimony from the executive officer of the San Diego board regarding the conflict. The Commission is not taking a side in this dispute, rather, the Commission points to the issues surrounding the Navy's stormwater permit as illustrative of several systemic problems: The boards are attempting to regulate non-point source pollution with standards that were developed before non-point source pollution was regulated, leading to a credibility problem among stakeholders who argue non-point standards should be different; the boards do not have the resources to conduct appropriate research to justify regulations or find cost-effective solutions to easing pollution problems; the boards are not as collaborative with stakeholders as they could be, which results in disputes that hinder progress toward protecting water quality; and, the relationship between the state and regional boards is unclear.

The Navy makes several contentions regarding their 2002 permit and the toxicity standard required in the permit:

- The standard is nearly impossible to meet without building a $300-million water treatment facility.
- The board is using a standard created in the 1974 Water Quality Control Policy for the Enclosed Bays and Estuaries of California, which states that it is not intended for land runoff.
- Based on letters between the Navy and the state water board, the state board and the regional board have differing interpretations of the 1974 Water Quality Control Policy for the Enclosed Bays and Estuaries of California which would lead to differing regulations, but the regional board has ignored the state board's opinion and the state board has done nothing to direct the regional board on the issue.
- A study conducted by the Navy shows that even when Navy stormwater is higher than the toxicity standard, the receiving water – the water to which the stormwater flows – still is not toxic. Thus, the Navy argues that the standard is stricter than necessary to protect San Diego Bay.
- The Navy study was completed in 2006 and offered two alternatives for the board to use when measuring toxicity, yet the board for two years did not responded to those suggestions. "We believe the board did not consider the study because it does not have the technical expertise to review it,'' Rear Admiral Len R. Hering Sr. said in his testimony to the Commission.

The board argues that the permit and its use of the toxicity standard are valid. It contends that:

- The board's basin plan states that "all waters shall be maintained free from toxic substances in concentrations that are toxic to or produce detrimental physiological responses in human, plant, animal, or aquatic life…" and that the board is properly interpreting that broad standard and standards within the Water Quality Control Policy for the Enclosed Bays and Estuaries of California, which actually calls for the eventual phasing out of all discharges into the state's bays.
- The Water Quality Control Policy for the Enclosed Bays and Estuaries of California sets the toxicity standard the Navy is required to abide by for all "industrial process waters," which the board interprets as the Navy's stormwater. The state board's interpretation that "industrial process waters" does not refer to stormwater could be considered by the state board if the Navy appealed its permit to the state board, which it has not done.
- The board allowed the Navy four years from the date of the 2002 permit to begin complying with the toxicity standard.
- There are Best Management Practices, such as detention basins, filtration and wetlands, that the Navy could create to meet the standard that would be cheaper than a treatment facility, but the board is prohibited by state law from dictating to the Navy or other regulated entities how they comply with their permits.
- The Navy's argument that the board should measure pollution in the receiving water, instead of measuring the Navy's stormwater, is simply a way for the Navy to make no improvements to its stormwater discharge, and all dischargers should be measuring and improving their discharge.
- The Navy was allowed to present the findings from its study to the board in a 2006 public hearing, and the board may use some of the information from the study in the re-issuance of the permit, which is scheduled for 2009.

As the Commission was finalizing this study, the San Diego board was preparing a draft of a proposed new stormwater permit for the Navy that was scheduled to be adopted in early 2009.

Sources: Rear Admiral Leendert "Len" Hering, Sr., United States Navy. April 24, 2008. Verbal and written testimony to the Commission. Also, John Robertus, Executive Officer, San Diego Regional Water Quality Control Board. September 26, 2008. Memo to the Commission.

State Has Difficulty Addressing Modern Water Problems

As focus in water quality regulation has shifted from point source pollution controls to non-point source pollution, the water boards have found it increasingly difficult to address and reduce water pollution. Many non-point source pollution problems require solutions outside of the water boards' typical regulatory programs, and more interaction with other state and local regulatory agencies.

Consider: Studies suggest that some mercury contamination in water along the California coastline is caused by coal-burning power plants in China.[121] Other water pollution problems stem from sources closer to home, but are still difficult for water boards to address. Studies conducted by the Southern California Coastal Water Research Project have found that local air pollution contributes to water pollution. One study showed that 50 to 100 percent of trace metals in stormwater runoff were deposited from the air.[122] Pollution from both vehicles and stationary sources, such as power plants, ends up in the water.

"The old models that EPA has put forward to deal with stormwater as if it were just a subset of wastewater are not models that carry us forward," Alexis Strauss, director of the Water Division for EPA's Region 9, told the Commission.

The water boards need help from other regulatory agencies, particularly the state air resources board and other air districts. In an attempt to begin addressing aerial deposition, the state Air Resources Board and the state Water Resources Control Board met in a joint public session in February 2006. The boards heard presentations on the impacts of airborne metals and mercury

How Proposition 218 Affects Stormwater

Approved by voters in 1996, Proposition 218 requires local governments to obtain the approval of two-thirds of voters, or a majority of property owners, to raise certain fees or taxes. The proposition excluded sewer, water or trash collection, however, allowing cities and counties to raise fees on utilities based on the vote of elected officials.

Efforts to consider stormwater services as a utility exempted from Proposition 218 were challenged, and in 2002, an appellate court decision in Howard Jarvis Taxpayers Association v. City of Salinas found that charges imposed by the city to pay for stormwater management were not utility fees and therefore were not exempt from Proposition 218 requirements.

Because of this, many local government officials complain that they are unable to pay for stormwater management services in the same way they pay for wastewater treatment, despite facing the same kind of regulation as wastewater treatment. Stormwater funds must come from the general funds of each municipality and compete with other services, such as police and fire protection. One regional water board official noted that wastewater treatment operations in his region had an overall budget of about five times that of stormwater agencies.

Efforts to amend Proposition 218 have been made in the Legislature but have been unsuccessful. SCA 12, by state Sen. Tom Torlakson, D-Antioch, in 2007 would have exempted new or increased stormwater and urban runoff management fees from Proposition 218's requirements, but it did not make it through the legislative process.

Sources: Legislative Analyst's Office. December 1996. "Understanding Proposition 218." Senate Local Government Committee. June 27, 2007. Tom Mumley, Assistant Executive Officer. July 31, 2008. Personal communication with Commission. Bill Analysis, SCA 12 by state Sen. Tom Torlakson, D-Antioch.

in water and pledged to work together to continue investigating the issue. But no formal relationship has been created.

One avenue receiving attention as a way to better address non-point source pollution is through a broader focus on watershed health. The idea is to seek creative and collaborative ways to reduce water pollution when typical regulatory practices are not working. Several efforts involving the water boards have been made to increase the focus on watershed-wide planning and projects.

The state board launched a Watershed Management Initiative in 1995, which required each regional board to develop management strategies for each of its watersheds and funded positions at each regional board to work on watershed issues. Today, each regional board continues to employ a full-time or part-time person who works on watershed issues, mainly as a liaison between the boards and local watershed coalitions. In addition, efforts by CalFed – the joint state-federal agency overseeing the Bay Delta – and a watershed council created by Cal/EPA and the state Resources Agency have sought to encourage watershed-level management and planning in recent years. The state Department of Conservation, which is within the Resources Agency, is currently using money from Proposition 50 and other state funds to continue work on adopting a statewide watershed program that would help develop local watershed management plans and projects.[123]

Despite these efforts, the state is still struggling with implementing true watershed management. The watershed council created by the state has disbanded, and many facets of its strategic plan, such as getting all state agencies to agree on a common set of watershed boundaries or coordinating regulatory programs at the watershed level, have not occurred. An interagency task force of deputy directors that met for an 18-month period in 2005 and 2006 has disbanded. Interest among state leaders in the topic has waxed and waned.

The EPA and San Francisco Bay Regional Water Quality Board attempted to create a watershed permit that would regulate all entities, including non-point sources, discharging into one watershed, for example. The effort was abandoned, however, because the regulators and stakeholders could not come up with solutions to fairly regulate very different sources all in one permit.

The state has promoted the idea of watershed planning as a way to improve water quality and water supply, by distributing money through bonds in the past several years for local planning efforts.

About $640 million was proposed in Proposition 50 for Integrated Regional Water Management Planning (IRWMP) projects, for example, and another $1 billion is earmarked in Proposition 84 for similar projects.

Participation in the IRWMP process by regional boards has been mixed, however. Some boards, such as the Santa Ana Regional Water Quality Control Board and the North Coast Regional Water Quality Control Board, have been active participants. Others have not.

Strengthening Ties, Solving Problems

In a February 7, 1969, letter to the chairman of the State Water Resources Control Board, Assemblyman Carley V. Porter lamented that the state's preeminent water quality law was 20 years old. "... we are indeed in different times and facing different situations than existed in 1949," Porter wrote. The letter urged a comprehensive review of the 1949 Dickey Act, and led to a major overhaul that became known as the Porter-Cologne Act that passed later that year.[124]

Four decades after the creation of Porter-Cologne, a similar letter could be written about it: We are in different times and face different situations than the Porter-Cologne framers imagined in 1969.

Through its study process, the Commission found two inseparable issues. First, water quality problems in the state, and efforts to address them, are becoming increasingly complicated. This was underscored by a report released in October 2008 by the National Research Council that essentially declared two decades of national stormwater regulatory policy a failure.[125] Second, as it grapples with these complex water quality problems, California acts through a decentralized governance structure that lacks accountability and transparency, and is unable to match resources to priorities. As a consequence, many in the water community – from environmental groups to regulated entities – have lost confidence in the system.

The two issues combined lead the Commission to conclude that major reform is needed. A 40-year-old regulatory structure is simply not equipped to handle current problems.

A new, ideal system should include the following characteristics:

- ***A unified state agency.*** Completely distinct regional boards may have been appropriate in past decades, but current common problems – urban stormwater, for example, or impairments in different water bodies caused by the same contaminants or sources – call for a more centralized regulatory approach with a common vision and common processes. A unified state agency can better identify key problems in the state and align resources to address those problems. Efficiencies gained by a stronger bond between the state and regions will get to clean water outcomes faster and cheaper.

- ***Local input.*** A need for local input on water quality objectives remains, however, as water bodies are unique, with unique problems and solutions. Water quality objectives should continue to be set at the regional level, with vigorous debate and discussion among local stakeholders.
- ***A focus on accountability and outcomes.*** The public, and policy-makers, have a right to clearer information from the boards as to the state of the state's waters, and to which regulatory programs are effective – and which are not. Additionally, the boards must expand their scope beyond ensuring that dischargers are abiding by their permits toward this fundamental question: Are our programs protecting and improving water quality?
- ***Integrated science, accessible data.*** As water pollution problems increase in complexity, California needs to integrate more scientific analysis into board programs. The state board needs scientific advisors to help guide and coordinate research and use that research in regulation. In addition, the boards' dearth of water quality data must be rectified, and it can be: Numerous federal, state and local agencies, as well as other groups, already are collecting information. It is time for the state to make a serious effort to collect that information into an integrated system to allow the boards and others to use it to improve outcomes.

This system – one unified agency, with local input, an emphasis on accountability and outcomes and better use of science and data – will allow the boards and their communities to communicate better with stakeholders, and to better address problems. This should launch collaborative efforts in each region to focus on the most important tasks: updating basin plans, using science and economic analysis to drive decision-making, assessing program effectiveness and, when warranted, making swift changes.

Above all, California's water boards must set priorities. A mission to protect all waters everywhere to the same level – as stated in Porter-Cologne – simply is not possible, given the resources of the state, local governments and others. Water bodies must be prioritized, and so too must solutions. Economic analysis is needed to determine where the state can get the most clean up or pollution prevention for each dollar spent. Collaboration centered around watersheds is needed to spark innovative solutions to water quality problems that are caused by and affect entire ecosystems.

Some water board officials noted they thought of themselves as water cops. This is an apt description – the boards' job is to police and protect the waters. But just as modern policing has evolved to include the concept of community policing – with police working within neighborhoods to help prevent crime – so to must the water boards work in a collaborative way with water users and others who benefit from clean water to find solutions to water quality programs. Non-regulatory approaches could be appropriate answers in some watersheds.

The key to board effectiveness in the future is up-to-date basin plans, built on current science and an understanding of non-point source pollution. Basin plans were created more than 30 years ago. Many water quality standards have not been updated since, and may not have been based on sound science or monitoring data when they were created. This creates a fundamental lack of credibility in the boards' decision-making. The state, with stakeholder support, must launch an effort to ensure these foundational regulatory documents reflect the current status of water use and needs, as well as water protection priorities.

The water boards have made recent efforts to improve. New offices designed to improve information management, strategic planning and public participation are positive steps, and the boards should be commended for recognizing weaknesses and seeking ways to address those issues. The Commission met countless board members and staff who were working diligently to better programs and board performance. But the state water board's boldest proposal, the 2008 Water Quality Improvement Initiative, only recommend changes within the current structural framework. The Commission believes a more profound change is required, one that will involve thoughtful and committed leadership and engagement by the governor and Legislature.

Change will be difficult. The Commission found that while virtually all stakeholders had a laundry list of complaints regarding the water boards, most did not endorse a major structural overhaul. Many water users and others in the water arena preferred processes and actions taken by specific regional boards that benefited them. The Commission's goal is different: Its recommendations seek to drive change that will protect and enhance water quality through a process that is more fair, transparent and effective.

The Commission recommends reconstituting the state board as a nine-member board, with five of the board members serving solely on the state board and four members serving both on the state board and as a full-time chairperson of a regional board. The regional chairpersons would rotate on and off the state board, and serve staggered, two-year terms. All regional board chairpersons would be full-time, and appointed by the governor. A state board that includes a mix of state and regional perspectives should produce a more unified agency and allow the state board a better understanding of regional issues and vice versa. Regional board buy-in to state board policies and priorities would be increased, while the state board would continue to have a majority of voting members considering issues from a statewide vantage point. Statewide priorities and policies would be more likely to be implemented under this structure.

Other States' Governance Structures

During its study, the Commission examined the governance structures surrounding water quality regulation in other states to determine if there was a better model than the structure in California. California is unique: No other state governs water quality with a gubernatorally-appointed state board and gubernatorally-appointed regional boards.

Some states – including Virginia and Colorado – have appointees administering water quality, but both of those states have one board overseeing the entire state. Most states have a bureaucracy that sets water quality standards, although some have a decentralized system, in which regional offices set standards and administer other programs, and many have a stakeholder board involved in some aspects of decision-making.

The Commission could find no evidence that one governance style or another led to cleaner water. Nonetheless, there may be lessons California can learn from other states' systems. California may learn from the following states that are comparable in terms of size and geography:

- ***New York.*** The Division of Water within the New York State Department of Environmental Conservation handles National Pollutant Discharge Elimination System (NPDES) program activities, water quality monitoring, standards, total maximum daily loads (TMDLs), non-point source programs, water resource permitting, permitting for discharges to ground water and dam safety. The Department of Environmental Conservation has a central office in Albany and nine regional offices throughout the state. The department maintains a Water Management Advisory Committee, which began in 1979 and is made up of environmental, business, municipal, academic and citizen representatives. The committee allows water policies and issues to be vetted and informed by stakeholders.
- ***Oregon.*** The Oregon Department of Environmental Quality administers the NPDES program. There is a central office in Portland and three regional offices. The regional offices issue permits, handle compliance issues and take informal enforcement actions or refer potential enforcement issues to the central office. The central office issues general permits, develops state regulations and policies and oversees regional offices. While the department sets water quality standards, a gubernatorally-appointed Environmental Quality Commission approves those standards and hears appeals regarding penalties assessed by the department and other issues.
- ***Florida.*** The Florida Department of Environmental Protection administers the NPDES program. Six regional offices issue most point source permits and ensure compliance with those permits, while the main headquarters issues all stormwater permits for the state. Florida also has five water management districts, which administer flood management programs and control water rights and flow issues. Each district is run by nine gubernatorial appointees, and each district has taxing authority to raise money to improve water quality and supply.

Sources: United States Environmental Protection Agency. March 10, 2005. "Permitting for Environmental Results: NPDES Profile: New York and Indian Country." Washington D.C. United States Environmental Protection Agency. September 27, 2005. "Permitting for Environmental Results: NPDES Profile: Oregon and Indian Country." Washington D.C. United States Environmental Protection Agency. March 10, 2005. "Permitting for Environmental Results: NPDES Profile: Florida and Indian Country." Washington D.C. Robert Moresi, senior hydrogeologist, Black and Veatch, Tampa, FL. September 19, 2008. Personal communication with Commission.

This new structure will eliminate barriers between the boards and improve communication and collaboration among regions. It is the surest way to provide both a unified state agency while maintaining regional input through a regional board. While the regional board chairpersons will become full-time positions, the other members of the regional board will remain part-time volunteers paid a per diem. The regional board chairpersons will represent the state board in their districts and be point persons for monitoring implementation of state policy at the regional level.

Other structural changes are needed. To improve confidence in the system and ensure accountability, the appeals process must be stripped from the state board and handled by a separate appeals board. This will ensure appropriate oversight of board activities, restore confidence in the appeals process and, in addition, allow the state board more leeway to interact with regional boards before they make key decisions.

To increase emphasis on science, the state should create a science advisory board to help the state and regional boards coordinate research and ensure that research is properly integrated into regulation. Regional boards also should be encouraged to become involved in an independent, collaborative scientific institute such as the Southern California Coastal Water Research Project, which brings regulators and the regulated together to jointly sponsor scientific research.

The state also must create an independent data institute to help gather, coordinate and present water data. Acting as a water data library, the institute would allow the boards and others to tap into the vast amount of water quality information that is gathered, but currently not synthesized.

The Commission realizes these are ambitious proposals, particularly in a period where both the state and local governments face daunting fiscal crises. But there are savings to be had through these strategies, which can create government efficiency, leverage resources of multiple agencies and stakeholders, and reduce the conflict that can consume both public and private resources without producing better outcomes.

Protecting and improving water quality is a challenging task, but one essential to the state's vitality and growth.

Strengthening Ties, Redefining Roles

The Commission considered abolishing the regional boards in favor of a bureaucracy controlled in Sacramento. This idea was proposed in Governor Schwarzenegger's California Performance Review and holds some appeal: One department could improve efficiencies and consistency.

But many board officials and other stakeholders made a compelling case for the concept of regional decision-making for water quality regulation.

"The water quality problems of the rainy North Coast are just fundamentally different than the water quality problems of the Central Valley or the Colorado River desert," Craig Wilson, an attorney for the dairy industry and former chief counsel of the state board, told the Commission. "I think having an agency that responds to those differences is important."[126]

Santa Ana Regional Water Quality Control Board chairwoman Carole Beswick was persuasive in her argument for a regional board approach, noting that an appointed board can work with businesses and other stakeholders in a way that a civil servant would likely not.[127]

The Commission concludes that regional decision-making remains a sound approach.

Yet the Commission encountered numerous problems with the current regional board structure. Boards appear to have dramatically different approaches on some important policy issues and processes. Despite Porter-Cologne's framework giving the state board oversight authority of regional boards, the state board does not routinely exercise that authority and there is little accountability in the system to ensure that regional boards are achieving desired results or following state policies.

"The state board is extremely reluctant to get involved in decisions made at the local level," US Navy Rear Admiral Len Hering, Sr. told the Commission.[128]

In addition, governors of both parties have struggled to find 81 appointees at any given time who are qualified and interested in serving on regional boards, and as the complexity of water quality regulation has increased, it is questionable whether voluntary boards are capable of awarding proper permits, making other technically difficult decisions, and acting as a check on staff as they were intended to be.

The Schwarzenegger administration sought to address some of these issues through its proposed Water Quality Improvement Initiative. To address inconsistency problems, the initiative proposed the Water Quality Council, which would consist of the chairpersons of the nine regional boards and the chair of the state board. The council would hold public hearings and address issues of inconsistency by making suggestions to the state board. The council also would help the state board set statewide priorities.

The initiative also called for the reduction in size of regional boards from nine to seven members, and, in recognition of the regional boards' struggles to handle complex issues, proposed allowing executive officers to issue federal NPDES permits. Changes to the 10 Percent Rule that would only prohibit someone from serving on a regional board if they earned income from an entity permitted by that board – not all boards – would widen the pool of potential regional board appointees.

The initiative is a good start, but does not go far enough.

Instead of creating a new council, the state board should be reformed to include some regional board representation. Five members of the state board would be appointed by the governor to represent statewide interests, and have backgrounds similar to the current requirements, with one exception: instead of two spots for engineers, there should be one engineer position and another position for a scientist or resources economist with experience in water-related areas. Four other members of the state board would be serving simultaneously as the chairperson of a regional board. All of the members would be appointed by the governor, with the governor selecting the four regional board chairpersons to serve on the state board for two-year terms.

All nine regional board chairpersons should work full-time, allowing them to better coordinate and implement statewide policies, while also allowing them more time to work with executive officers and staff members in each region and to serve as a check on staff. All regional board chairpersons should have a background in water quality issues.

The Commission supports the administration's proposal to shrink regional boards to seven members. The boards should continue to be stakeholder boards, with the part-time members earning a per diem, which should be raised to $500 per meeting, as the administration proposed, and allowed to grow with inflation. Raising the per diem would help make these positions more attractive to a wider group of people, not just those who can afford such a time-consuming, semi-volunteer position.

The state board would continue to set statewide policies and priorities. In addition, the state board would be more capable of working with regional boards in advance of controversial decisions made at the regional level.

The six part-time regional board members should represent the following backgrounds: experience in water supply, conservation or production, experience in irrigated agriculture, experience in industrial water use, experience in local government, experience as a water-related scientist or engineer, and experience with a nongovernmental organization associated with recreation, fish, wildlife or the environment.

In addition, executive officers at each regional board would be allowed to conduct most permitting activity. Permits would still be issued through a public hearing process with executive officers conducting hearings that allowed water users as well as the public to comment on permits. Executive officers would become career executive assignment positions reporting to the executive director of the state board. At the state level, the executive director would issue state permits through a similar public process.

Regional boards would be required to conduct an annual review of the executive officer's performance, which would be taken under advisement by the executive director. This would further strengthen the relationship between the state and regions.

This new structure has the following advantages:

- ***Stronger tie between the state and regions.*** Overlapping regional and state board membership allows for a clearer structural relationship between the state board and regional boards. The frequent interaction between some regional board chairpersons, as they met as the state board, and the state board members would allow regions to share more information, to better set and implement similar priorities and to strengthen the concept of the boards as one state agency. In addition, changing the executive officer position from a regional board employee to a career executive assistant hired by the executive director of the state board would further improve the relationship between the regional boards and the state board.

- ***Strong chair bolsters leadership, clarifies state priorities.*** Implementing a "strong chair" system, in which the chairperson of the regional boards is full-time and the other members are not, allows the chairperson to develop more expertise in pertinent issues and become the true leader in the region on water quality. This concept is based on the successful model used by the state Air Resources Board.
- ***Retains regional decision-making.*** While the overlap between the boards would improve consistency and efficiency, regional boards would still adopt basin plans, adopt TMDLs and otherwise control water quality policy in their region.
- ***Focuses state and regional boards on planning and policy.*** By delegating permitting authority to regional executive officers and the executive director of the state board, state and regional boards would have more time to discuss and consider broader policies and update basin plans. This is the appropriate responsibility of the boards.
- ***Improves governor's ability to fill appointments.*** This proposal would reduce the number of state and regional water board appointees from an unworkable 86 to a more feasible 68. Governors should have an easier time finding 54 part-time regional board appointees, compared to the current 81.

Increasing Transparency and Accountability

Several aspects of the water boards' governance structure that hinder transparency and accountability require change.

Communication should be improved. Strict ex parte rules limit the ability to discuss issues with the regulated community. This leaves discussion to public hearings, in which speakers are often limited to a few minutes of testimony. These limits prevent communication between regulators and the regulated that could help boards better solve problems. The result is a lack of trust among stakeholders of the boards, and a lack of understanding as to why boards take the actions they do.

The Commission believes the water boards should adopt ex parte rules used by other boards, such as the Integrated Waste Management Board, that allow for communication between regulators and the regulated as long as they are disclosed in a public meeting.

If executive officers and the executive director are allowed to issue permits, they too should be allowed to communicate with all stakeholders as long as it is disclosed.

For greater understanding and better outcomes, communication should be encouraged.

Appeals process should be reformed. Many water users and others in the water community complained about the appeals process, arguing the state board rarely heard appeals and rarely was willing to overturn regional board decisions. The state board process of determining which appeals to consider is too staff-driven and often it is unclear to stakeholders why the board has not taken up an appeal. This adds to the mistrust stakeholders have for the boards.

Additionally, the state board's appellate role prohibits it from interacting with regional boards before they issue a controversial permit or make another decision that could be subject to appeal. The Administrative Procedure Act, which governs much of the boards' processes, require an absence of bias, prejudice or interest in a proceeding by a body that could hear the issue on appeal. Thus, the system is set up to create distance between the state and regional boards on decision-making, contributing to inconsistency and lack of communication and interaction between the state and regional boards.

Change is needed to restore confidence in the appeals process.

In an effort to improve the water boards' appeals process, the Commission examined how other state and federal environmental agencies that make quasi-judicial decisions, such as issuing permits, handle appeals.

Large local air quality management districts, such as the South Coast Air Quality Management District and the Bay Area Air Quality Management District, have hearing boards that handle appeals of district board decisions. The boards are appointed by the district board members and are paid a per diem for each meeting. The hearing board for the Bay Area Air Quality Management District, a five-member board consisting of an attorney, an engineer, a member of the medical profession and two members of the public, meet between three to five times each quarter to hear requests for a variance from district rules and appeals of abatement orders and permits.

US EPA also has an appeals board, which hears appeals of regulatory actions taken by US EPA under the Clean Water Act, the Clean Air Act, the Safe Drinking Water Act and five other environmental laws. US EPA's Environmental Appeals Board consists of four administrative law judges, who are appointed by the administrator of US EPA, who in turn is appointed by the President. A panel of three of the four board members hears each case. The board typically hears appeals based on the terms of federal permits or fines assessed by US EPA.

The Commission believes the water board appeals process should be separated from the board, to improve trust in the process and to give the state board room to become more involved in regional board issues before they get to the appeals stage.

A hearing board model is the best fit for the water boards. A board comprised of three administrative law judges, with backgrounds in water-related issues and appointed by the governor, should be created to hear appeals.

Anyone, whether regulated entities or members of the public, would be allowed to appeal a regional or state board decision to the appeals board, which would be required to review petitions for appeal and make decisions based on whether the action under the appeal was legally appropriate and consistent with state or regional policy. The board should follow guidelines set out in the state's Administrative Procedure Act for appeals processes, and should be required to issue a ruling on an appeal within 90 days of hearing. Petitioners who were unsatisfied with the results of an appeal could then go to court, as they do now.

Report cards would provide easy-to-understand information and add accountability. One of the most valuable and easily accessible reports published on water quality in the state is the Beach Report Card created by the environmental group Heal the Bay. Now in its 18th year, the report card gives a letter grade to more than 375 locations year-round, and has become so well respected that its grades have been used to obtain funding for water quality projects and cited during the water boards' process of listing impaired water bodies.

The grading process has gone through several iterations during the report cards' history, and the current formula requires weekly testing at each site for three indicator bacteria. The grading formula – a key to the credibility of the report cards – has been validated by the California Beach Water Quality Workgroup, an ad hoc committee that includes regulators, regulated entities, local governments and environmental groups, and is geared toward whether a beach is safe for swimming.

These report cards are important in two ways: They provide easily understandable information to the public, and they hold water quality regulators and dischargers accountable for outcomes. Beaches with poor grades indicate regulators and the regulated are not achieving the clean water called for by law.

Statewide, the Commission found an alarming lack of easy-access information about water quality, and an equally alarming lack of focus on clean water outcomes by the water boards. While the state does maintain a list of impaired water bodies to fulfill Clean Water Act requirements, it is difficult for the public to use that list to discern whether water bodies are truly safe for swimming, fishing or other uses.

To address both of these issues, the Commission believes the state should create a report card system for water bodies across the state based on Heal the Bay's Beach Report Card. Publicly accessible, easy-to-understand letter grades for water bodies throughout the state would act as a scorecard for regional boards, by answering this simple question: Are programs working to protect and improve water quality?

The report cards could emulate the state Air Resources Board's Air Quality Index, which has become an important tool for the public in assessing whether air quality is safe or not. Water body report cards could eventually provide a similar tool.

This is a long-term project. More monitoring would be needed, and decisions would need to be made regarding grading formulas. While the Beach Report Card is geared toward whether ocean water is safe for swimming, other water bodies could be graded for fishing or other beneficial uses. This process could be organized by the state water board with assistance from an expert panel, such as the California Water Quality Monitoring Council, by a research institute such as the Southern California Coastal Water Research Project, or the University of California. The program could be tested on a pilot basis on significant water bodies with routine monitoring already in place, and then expanded.

Report cards eventually could be used by the state board to measure regional board effectiveness, and for policy-makers to determine where water quality improvement projects are most needed.

Integrating Science

The boards acknowledge the need for improving and integrating the use of science in their decision-making processes. In a 2005 report commissioned by the state board to improve the use of science and engineering within the boards, consultant William Vance spoke with numerous board staff and wrote, "In general, the Regional Boards acknowledge their limitations in scientific expertise … ." Recommendations in the report focus on "creating a means or mechanism that will enable the Regional Boards to obtain scientific advice and recommendations from technical experts not readily accessible today."[129]

Too often, this deficit leads to disputes about science and information, rather than a productive discussion on developing an appropriate policy.

Numerous recommendations for adding more science to water quality regulation have been made in the last few years. US Navy Rear Admiral Len Hering, Sr. told the Commission he thought the water boards should emulate the state Air Resources Board and develop its own research center to work on water quality problems and solutions. A report published in March 2008 by the California Ocean Science Trust listed 25 recommendations for improving links between academic scientists and the water boards, including building a directory of water quality experts with specific expertise to help regional boards find scientists to work with, designating a seat on the state board for a scientist, and reforming the contracting process to improve working relationships with outside scientists.[130]

The report by Vance listed four possible structural changes, all submitted by regional and state board staff:

- Set up "blue ribbon" science panels that would provide advice and guidance on complex scientific issues.
- Create a science advisory panel that would provide technical review, comment and suggestions on Regional Board field studies and interpretation of data.
- Create a pool of in-house experts that would be available to any of the Regional Boards on an as-needed basis (i.e., for expertise currently not available, such as economic analysis or risk assessment).
- Set up an expeditious mechanism for consulting or contracting with experts in other state, federal or local agencies on highly technical issues or projects.[131]

Comparing the Water Boards to the Air Resources Board

Several stakeholders told the Commission that the state's air regulators – the California Air Resources Board – were more effective, transparent and respected than the water boards, and the water boards should do more to emulate the Air Resources Board. In his testimony to the Commission, US Navy Rear Admiral Len R. Hering, Sr. suggested regulations proposed by the state's Air Resources Board and local air pollution control districts were more credible because of the air board's ability to conduct research showing that regulations were practical and effective.

"California's air program is known for a strict adherence to a science-based approach, including a state-operated research facility that leads the world in air pollution science and technology,'' he said. "Air regulators in this state uses science in all aspects, and include economic analysis as a key aspect of decision-making. Water quality regulations, on the other hand, do not have the same scientific basis."

The air and water boards are not easily comparable, but there are interesting differences in the two regulatory systems that could be instructive to efforts to improve the water boards.

The California Air Resources Board (CARB) and 35 local air districts regulate emissions in the state. The CARB is responsible for regulating emissions from mobile sources, such as vehicles, fuels and consumer products, while the local air districts regulate emissions from stationary sources in their districts, such as factories or oil refineries. The CARB consists of 11 members, each appointed by the governor, with the chairperson working full-time and the other members, who represent geographical areas in the state, specific professional backgrounds or the public, serving part-time. Local air districts have varying rules as to board membership, with most including local elected officials and only some members who are appointed by the governor.

Unlike the state water board, CARB rarely issues permits, and instead adopts quasi-legislative actions. Local air districts issue permits. There is less interaction between CARB and local air districts, as they are not a single, unified agency and CARB does not hear appeals of local air district decisions. CARB is charged with setting ambient air quality standards for air basins that local air districts must work to attain through their permitting and policies, however. Air regulators regulate fewer contaminants than do water regulators, and are charged with only addressing contaminants that affect human health. CARB has formally identified 22 toxic air contaminants requiring regulation, while the water boards deal with far more contaminants.

Resources also vary dramatically between the two regulatory sectors. The state Air Resources Board has about 1,200 employees – not including the state's 35 local air districts. The water boards – both the state boards and the nine regional boards – employ a total of about 1,600 people. Locally, the Central Valley Regional Water Quality Control Board has about 275 employees covering a region that includes more than 30 counties. In contrast, the San Joaquin Air District covers eight counties and has about 500 employees. One of CARB's key funding sources is the motor vehicle account, which includes a fee charged to every car owner in the state. The water boards lack a similar funding stream.

CARB has a far more extensive scientific research arm than do the water boards. State statutes require CARB to administer and coordinate all air pollution research funded by the state, conduct studies every three years on the feasibility of air quality models and other analytical tools used to determine air quality, and appoint a screening committee to provide the board with advice on needed research and review research projects. While the water boards also have statutes requiring the state water board to determine state needs for water quality research and administer research, the statutes are less specific. CARB also is required to prepare an assessment of the cost effectiveness of available and proposed controls on emissions and develop a list that ranks the possible controls from least cost-effective to most cost-effective. Water law requires the water boards to consider economics when developing water quality objectives, but the statute is not specific as to how that should be done. Thus, CARB typically conducts an extensive cost-benefit analysis of proposed regulations and has eight economists on staff, while the water boards rarely conduct a full cost-benefit analysis.

Sources: Len R. Hering Sr., Rear Admiral, United States Navy. April 28, 2008. Testimony to the Commission. Sacramento, CA. Robert Jenne, Office of Legal Affairs, California Air Resources Board. February 9, 2006. "Key Air Agencies in California." Presentation to joint meeting of California Air Resources Board and State Watrer Resources Control Board. Sacramento, CA. Pamela Creeden, executive officer, Central Valley Regional Water Quality Control Board. September 17, 2008. Personal communication with Commission. Health and Safety Code Division 26 Air Resources Part 2 Air Resources Board Chapter 4 Research, 39701, 39703, 39705. Health and Safety Code Division 26 Air Resources Part 2 Air Resources Board Chapter 3 General Powers and Duties, 39606, 39607, 39609. Water Code Division 7 Water Quality, 13161, 13162, 13241.

All of these ideas have merit.

The Commission believes the state can best improve its integration of science into the boards' regulatory programs by creating a science advisory board.

A science advisory board, appointed by the state water board, could help the state and regional boards determine where scientific research was needed, help the state board in acting as a clearinghouse for current scientific research, help the boards better incorporate research findings into regulatory proceedings and advise the state board on continuing education options for staff scientists. The board, a five-member board of scientists and engineers paid a per diem for attending monthly public meetings, would help institutionalize the role of science in water board processes while also remaining independent of the boards themselves. The board could act as a liaison with outside scientists and regularly develop short- and long-term plans for scientific study.

Regional Science Institutes a Key to Better Science at Boards

Regional science institutes such as the Southern California Coastal Water Resources Program (SCCWRP) and the San Francisco Estuary Institute (SFEI) are invaluable to their respective regions. Both bring regulators, scientists and stakeholders together to propose and conduct relevant research:

- SCCWRP is a joint powers agency with 14 member agencies, including US EPA, the state water board and the Los Angeles, Santa Ana and San Diego regional boards, as well as several local government agencies. Each agency contributes funding, and a commission comprised of representatives from each agency meets quarterly to oversee impartial research that can be used in regulatory processes. SCCWRP's achievements and ongoing activities include regional monitoring, including a report issued every five years on the health of the Southern California shoreline; important research into the effects of aerial deposition on coastal waters; and research that led to the state water board's adoption of sediment quality objectives in 2008.
- SFEI also is a joint powers authority involving regulators, regulated entities, scientists and other stakeholders, including environmental groups. A board of directors guides research, including regional monitoring of San Francisco Bay; a wetlands science program; and studies on invasive species in San Francisco Bay.

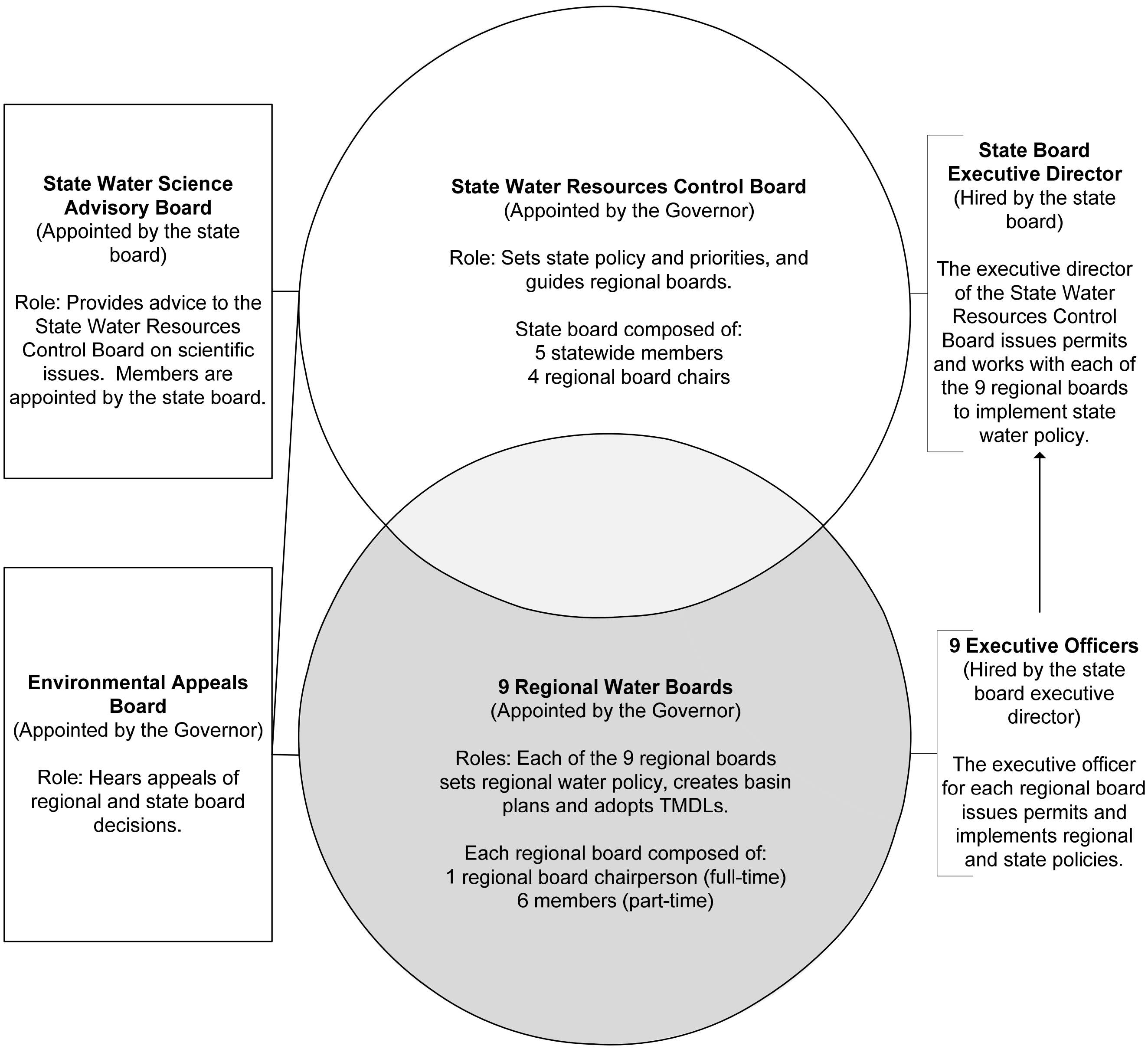
The Commission believes every regional board in the state should be affiliated with a body similar to SCCWRP or SFEI. The advantages are numerous: Collaborations among regulators and the regulated over science can build consensus around the underlying scientific issues of regulations and therefore lessen conflict and build relationships and trust among regulators, water users and other clean water constituencies. Also, a semi-independent agency can conduct and contract for research in a faster timeframe than state government. While it is important for the water boards to have competent scientists on staff, board personnel are often overworked and these outside agencies can do more thorough work that may be more credible with all sides.

Regions such as Lahontan and the Colorado River could combine to help create an institute that might include partners in the southern part of the Central Valley board's jurisdiction. In the Central Valley, the board could work with the new Delta governance structure to develop a science institute for work there. The North Coast could create its own organization, which is suggested by the Ocean Science Trust report, or join the San Francisco Estuary Institute.

Sources: Steve Weisberg, executive director, Southern California Coastal Water Research Project. July 14, 2008. Personal communication with Commission. Also, San Francisco Estuary Institute. "Region-wide Science for Ecosystem Management" brochure. Accessed at http://www.sfei.org/about. Also, T.C. Hoffman and Associates, LLC. March 2008. "Linking the Academic Community and Water Quality Regulators." Prepared for the California Ocean Science Trust.

April 10 and 11, 2013
Item No. 8
Supporting Document No. 5

Proposed Water Board Governance Structure



The board would not conduct research on its own, but act as a science oversight body for the boards. This is not a call for a new bureaucracy – the board could use staff from the state board.

As the Commission was preparing this report, Governor Arnold Schwarzenegger's Delta Vision Blue Ribbon Task Force was preparing a strategic plan for the Sacramento-San Joaquin River Delta and a proposal for a new Delta governance structure. As part of the process, there was discussion about the role of science in helping guide research in the Delta. Two separate proposals – one by Jeffrey Mount and Judy Meyer of the CalFED Independent Science Board and another by a science advisor for the task force – both called for an oversight board to conduct annual reviews of all science aspects of Delta water and ecosystem management.[132]

The rationale for a science oversight board in the Delta in both proposals applies equally to the need for a similar board as an arm of the state water board. The Commission urges the state to consider creating one scientific board that could oversee both the Delta and other state water issues.

Organizing, Leveraging Data

Hundreds of entities across the state – state agencies, local governments and private agencies – collect water quality data. Yet one of the biggest complaints among board officials, staff and stakeholders is the water boards' inability to cohesively gather, publish and analyze data to help inform the public, determine if regulatory efforts are effective and to drive decision-making.

The Legislature has sought to address this problem in several ways:

- AB 1404, approved in 2007, requires the state water board to provide a report by January 2009 on the feasibility of creating an integrated data system focusing on water supply and involving the water board's Division of Water Rights, the Department of Water Resources and the Department of Public Health.
- SB 1070, approved in 2006, created the California Water Quality Monitoring Council to help develop a "cost-effective, coordinated, integrated, and comprehensive statewide network for collecting and disseminating water quality information and ongoing assessments of the health of the state's waters and effectiveness of programs to protect and improve the quality of those waters."

- AB 1747 and SB 1049, approved in 2003, required any group receiving funding from Proposition 50 for water quality improvements to also monitor affected waters to determine a project's effectiveness. The legislation required that the monitoring data be compliant with the state's Surface Water Ambient Monitoring Program so that the data could be integrated and compared.

These efforts point toward the need for a statewide system that can coordinate water data from multiple sources and provide the public, policy-makers, regulators and others with useful information.

The state needs a water data library.

In its strategic plan, the state water board advocates for the creation of a statewide water data institute: "To improve transparency and accountability by ensuring that Water Board goals and actions are clear and accessible, by demonstrating and explaining results achieved with respect to the goals and resources available, by enhancing and improving accessibility of data and information, and by encouraging the creation of organizations or cooperative agreements that advance this goal, such as establishment of a statewide water data institute."[133]

This is an idea that should be pursued. The data institute could use new technology allowing for a federated system, linking data through a data exchange network. Each data provider would be responsible for maintaining its data, but the data could be accessed through a common portal. Some in the water community and board officials including Gary Wolff, vice chairman of the state water board, suggest the data institute should be managed by a non-state entity to encourage buy-in from the numerous data providers. An institute could be housed in an existing entity, such as the Southern California Coastal Water Research Project or the San Francisco Estuary Institute, or controlled by the California Water Quality Monitoring Council created by SB 1070.

This is a big task, as it would require hundreds of data gatherers to agree to standardized monitoring protocols and quality assurance, and allow their information to be used by others. It also would require a stable funding stream. But a coherent, easily-accessible library of data on water quality – and water use – would be a powerful tool for a state that faces profound water challenges in the future.

Updating Basin Plans

Nothing undermines the water boards' credibility and adds uncertainty to the regulatory process as much as outdated basin plans. While the boards do make minor changes to the basin plans every three years, and add TMDLS to them as they are adopted, the last major update, in the mid 1990s, preceded the increase in non-point source regulation. Many controversies and conflicts at the regional board level stem from regional boards' efforts to implement non-point source regulations using a basin plan that does not truly address the specificities of non-point source water pollution, which is different than point source water pollution. Regulated entities have a legitimate argument that regulation should be tailored for stormwater, irrigated agriculture and other non-point sources.

With the core regulatory document silent on some of the biggest water quality issues in the state, the regional boards are regulating in the dark.

The Commission heard compelling testimony from officials with the Santa Ana Regional Water Quality Board, regarding a multi-year, multi-stakeholder effort to revise that region's basin plan.

Concerns in 1995 that water quality objectives related to nitrate-nitrogen and salts would require dischargers to spend billions of dollars and might also discourage water recycling, the Santa Ana board created a task force to review the objectives to assure their technical and scientific validity. Twenty-two water supply and wastewater agencies participated, eventually contributing $3.5 million to a process that involved significant research. Regional board staff, including the executive officer, participated in nearly 100 meetings as the task force prepared a major overhaul of several aspects of the regional board's basin plan.[134]

According to written testimony supplied to the Commission by Santa Ana Regional Water Quality Control Board chairwoman Carole Beswick, keys to the task force's success included extensive discussions in the beginning of the process regarding the science needed, and the buy-in from all task force members that they would abide by regulations imposed by scientific findings. In other words, stakeholders agreed to go where the science took them.[135]

In 2004, the regional board approved significant changes to its basin plan based on the task force's work, including revised boundaries for ground water subbasins and new water quality objectives for nitrate-nitrogen and salts in those ground water boundaries; new water quality objectives for other contaminants, such as chloride and sulfate; and new wasteload allocations for discharges of nitrogen and salts to the Santa Ana River. In all, 10 major aspects of the basin plan were updated.[136]

Gerard Thibeault, executive officer of the Santa Ana regional board, described the task force process to the Commission, and noted that when the basin plan updates were enacted, there was no dissenting testimony. Thibeault emphasized the importance of the task force's meetings, where regional board staff and stakeholders were able to hash out differences in lengthy conversations. During public hearings before the board, speakers often are limited to a few minutes.

"It is difficult to try and argue very complex technical issues in front of the board when all of the stakeholders have polarized positions," he said. "The task force allowed those arguments to be worked out."[137]

The Santa Ana region has unique characteristics that may have allowed it to gain unanimous support for basin plan changes that might be more difficult in other regions. It is the state's smallest region geographically. And a joint powers agency, the Santa Ana Watershed Project Authority, has effectively promoted collaboration among stakeholders in the region.

Nonetheless, other regions should emulate the Santa Ana region to update their basin plans. The state board should promote the idea and help facilitate regional board basin plan update task forces. Given the state's budget deficit, it seems unlikely that the state will be able to pay for the work needed to update basin plans. Thus, water users and others with a stake in clean water will need to contribute. While it is an upfront cost, stakeholders will benefit in the long run by avoiding lengthy disputes over permits and other conflicts that result from outdated basin plans.

Developing current basin plans is the most critical task facing the water boards.

Solving Problems

The state and regional water boards face an expanding set of threats to water quality at the same time that the state is grappling with water supply issues fueled by climate change, population growth and a continuing dispute about the best ways to deliver water from north to south.

Throughout its study, the Commission found the boards too often focused on processes instead of results. The boards must reposition themselves from regulatory agencies to problem-solving agencies focused on clean water outcomes. This will require three important steps: working more collaboratively with stakeholders and other federal, state and local agencies; focusing on watershed health; and incorporating cost-effectiveness tests into their analysis to help determine the best ways to approach water quality problems.

A collaborative approach. While the boards do follow state law and have public participation processes for virtually all of their proceedings, many stakeholders complained that the boards do not work in a collaborative manner. This is despite examples of collaboration that have been productive:

- ***Brake Pad Partnership.*** Since the 1980s, studies showed high levels of copper in the southern portion of San Francisco Bay. Copper contamination continued in the Bay even as nearby wastewater treatment plants reduced copper discharges 10-fold. Continued monitoring and studies showed that area stormwater had unusually high levels of copper, and research was able to pinpoint a source for that copper: automobile brake pads. Every time cars brake, bits of copper in brake pads land on streets. That copper is washed away during storms. Faced with the near-impossible task of regulating automobile brake pads, which have design specifications mandated by the federal government, the San Francisco Bay Regional Water Quality Control Board and Bay Area stormwater managers decided to approach the brake pad industry to work on voluntary changes. A coalition of stormwater managers, environmental groups, board staff and some brake pad manufacturers was formed, with each contributing funding to further study the issue. The Brake Pad Partnership generated new research on copper in the Bay, including studies that allowed the Regional Board to relax limits on the amount of copper in the Bay while still upholding beneficial uses. The group is now preparing legislation that could impose new state restrictions on the use of copper in brake pads that will have some industry support.[138]
- ***Santa Ana Stormwater Quality Standards Task Force.*** Attempts to create water quality objectives for bacteria in water used for recreation created controversy in the Santa Ana region, so the

board agreed to create a stakeholder task force to look at the issue. Five entities are funding the task force, with no money coming from the regional board. A total of 54 agencies and organizations, including environmental groups, are participating. The task force began with three principles: new objectives and beneficial uses would be science-based, within current law, and all task force members agreed to support the new science-based objectives and standards even if it meant they would be more stringent. The task force has met monthly and took a creative approach to determining the beneficial uses of some water bodies: They set up video cameras at 12 locations to determine whether people were using them for recreation or not. Changes may allow some water bodies that are not used for recreation to have less stringent standards, in exchange for tougher standards where those water bodies meet receiving waters that are used for recreation. This will allow regulated entities to spend more time and money on waters with higher-priority uses. Basin plan amendments are expected to be completed in 2009.[139]

- ***Water Plan Update Steering Committee.*** In the past, the Department of Water Resources took sole responsibility for creating the Water Plan, which is the state's master plan for water. For its 2009 update of the Water Plan, however, DWR has created a Steering Committee of 19 state agencies, including the water boards, to better integrate water supply, water use efficiency, water quality, flood management planning and environmental stewardship into the plan. The Steering Committee is working together on nine Water Plan items, including recommendations on how to adapt to climate change and updating and expanding regional reports. DWR officials believe the committee will improve the Water Plan by including more attention to non-DWR issues, but also build inter-agency relationships to better address future water issues.[140]

Within the water boards, the boards must do a better job of working with stakeholders and the public to solve problems. The traditional method of issuing permits and requiring dischargers to monitor themselves is not as effective in dealing with non-point water pollution problems that have diffuse, hard-to-regulate origins. For example, because stormwater pollution is caused in part by individual actions, public education may play a key role in addressing the problem. In addition, stormwater permit processes that require stormwater agencies to develop best management practices to address stormwater pollution often do not include enough interaction between the boards and agencies to determine program effectiveness during the five-year life of a typical permit.

In an address delivered to the California Stormwater Quality Association in 2006, consultant Armand Ruby proposed annual meetings between regulators and stormwater agencies in which the two parties could consider monitoring data, determine the contaminants they were most concerned about and develop strategies to address those concerns.[141] This does not often happen.

"More time and attention should be paid to getting the public and the regulated community and the regulators into a room to talk, rather then just having three minutes of testimony from each side at a hearing," noted Linda Sheehan, executive director of California Coastkeeper, at one of the Commission's public hearings.

In 2008, the state water board's effort to develop a statewide water recycling policy may have helped create a new model for policy development. With near unanimous dissent among stakeholders regarding a recycling policy proposal created by state water board staff, stakeholders agreed to work together and develop a policy that they would then propose to the board. After several months, the stakeholder group – which consisted of environmental groups, municipal wastewater treatment groups and the Association of California Water Agencies – created a 13-page proposal that all sides agreed on. The proposal suggested new goals for the use of recycled water in the state, called for state- and stakeholder-funded basin plan updates dealing with salt and nutrient issues, a streamlined permitting process to encourage recycled water projects, and the creation of an expert panel to advise the state on how to handle emerging contaminant issues that might affect wastewater and efforts to clean and recycle wastewater.

Boards should use this model to develop future policies.

Other sources of pollution will require more cooperation and collaboration among the water boards and other government agencies.

The state has taken a small step toward addressing air pollution that contaminates water. In February 2006, the state water board and the Air Resources Board met in a joint hearing to discuss aerial deposition and water pollution. The board heard presentations on research suggesting, among other things, that wood burning stoves contribute to Lake Tahoe pollution and emissions from cement kilns contribute mercury to the San Francisco Bay.[142]

While more studies are needed, existing research is clear: Air pollution does impact water.

While the initial meeting between the two state boards was positive, no subsequent meetings have been scheduled. The boards should meet again, and perhaps annually, to begin determining how best to address this difficult situation. Should the water boards begin regulating power plants, automobiles and other sources? Should the air boards expand their scope, from regulating 22 toxic air contaminants the directly impact human health, to other contaminants that impact water? How should regional boards and local air districts work together to address localized issues?

In its report on the boards' use of science, the California Ocean Trust noted several scientific questions regarding air pollution's effects on water quality that needed addressing:

- Developing studies and determining the impacts of atmospheric deposition pollutants on water quality and how to address this in TMDLs.
- Developing conceptual frameworks and models to determine how these systems interact and effect water quality.
- Determining pollutant loads in water from air- and land-based sources.[143]

These questions and issued need to be addressed, and state environmental officials should be working on solutions.

California needs a broad discussion of the impact of land development on water quality that is potentially beyond the scope of the water boards. As California's economy grows and changes, agricultural land is lost and urbanization increases, these issues will increase in importance.

Low Impact Development a Key Response to Stormwater

As the water boards have attempted to improve regulation surrounding urban stormwater, they have begun to focus more on low impact development (LID) as both a key to reducing stormwater discharges and as a potential source of recycled water. The state, as a whole, should continue discussing ways to encourage and improve LID.

The goal of LID is to maintain the hydrology of a development site even as development occurs. LID attempts to hold water on site through water storage and infiltration with the ground. Examples of LID include rooftop gardens on public buildings, rain barrels that catch rain water for reuse, permeable pavement and other methods that decrease the imperviousness of an area that often occurs when it is developed into an urban use.

LID marks a profound change in urban development. Past practices focused on moving water from rain storms quickly away from development to prevent flooding. In Los Angeles, for example, engineers designed concrete channels to convey large volumes of water from occasional but fierce rain storms.

The water boards and other state agencies have made efforts to promote – and require – LID:

- ***Central Coast LID Center.*** Using $2.25 million from the state board, the Central Coast Regional Water Quality Control Board helped develop the Central Coast LID Center, which opened in 2008. The non-profit, affiliated with an already-existing LID center in Maryland, opened in San Luis Obispo in 2008, and will develop technical expertise for the state on LID, provide education and outreach on the topic and serve as a library for research on the issues.
- ***LID Education Project.*** Developed by the water boards, the Coastal Commission and several other groups, including the California Stormwater Quality Association, the project is intended to hold workshops and promote LID throughout the state to local government officials, state officials, developers and others. The project, which was just launched 2008, is seeking to raise more than $2 million to pay for the workshops and other efforts.
- ***LID Regulations.*** Both the state water board and some regional boards have begun to require LID in permits. The San Francisco Bay Regional Water Quality Control Board, for example, is requiring in stormwater permits that new development maintain pre-development erosion levels, while the San Diego Regional Water Quality Control Board in its stormwater permits is requiring all new development and redevelopment projects to implement LID where feasible. Other boards are beginning to place numeric limits on development sites, limiting the amount of impervious surfaces in new development.

The construction industry and municipalities have objected to some of the boards' more aggressive efforts to require LID, arguing that it can increase design and construction costs. In addition, local governments may need to review decades-old ordinances: The city of Lompoc, for example, found that ordinances required impervious concrete in parking lots, which conflicted with Central Coast Regional Water Quality Control Board's requirements to dramatically decrease imperviousness.

Despite these conflicts, most stakeholders agree that LID is an essential tool to addressing stormwater pollution. In addition, LID may help local communities retain and eventually reuse water by recharging ground water basins. A 2005 report by the Los Angeles and San Gabriel Rivers Watershed Council noted that 500,000 acre-feet of stormwater runoff flow from the Los Angeles County basin to the ocean each year. The report noted that if the region could instead capture that water and reuse it, Southern California would be less dependent on water imports from Northern California.

Sources: Water Education Foundation. 2007. "Stormwater Management: Turning Runoff into a Resource." Eric Berntsen, State Water Resources Control Board. January 28, 2008. "Incorporation of LID into State Water Board Programs." Roger Briggs, Executive Officer, Central Coast Regional Water Quality Control Board, and Al Wanger, Deputy Director, California Coastal Commission. October 27, 2008. "Statewide Low Impact Development Education Project." Presented to the Water Quality Coordinating Committee. Central Coast Regional Water Quality Control Board. June 10, 2008. "Staff report, Proposed Re-Direction of Low Impact Development Project Funds to Support the Central Coast Low Impact Development Center."

There are already statutes in place that could be used to increase state government collaboration:

Environmental Policy Council. Section 71017 of the Public Resources Code creates the California Environmental Policy Council, which is comprised of the secretary of Cal/EPA and the heads of the other agencies within EPA, including the chairperson of the State Water Resources Control Board. The council was created to provide guidance for entities seeking a consolidated permit from multiple environmental regulators. It met in 1999 to help resolve issues relating to oxygenate methyl tertiary-butyl ether (MTBE), which was added to gasoline to mitigate air quality problems from gas but was later found to harm water quality.

The council could be used to help address cross-media pollution issues affecting water quality.

Environmental Goals and Policies Report. Enacted by Governor Ronald Reagan in 1970, the Environmental Goals and Policies Report is intended to outline the state's goals as they relate to land use, population growth and distribution, development and conservation of natural resources, including air and water quality. The report is supposed to be produced by the Governor's Office of Planning and Research, reviewed by the Legislature and approved by the governor every four years. It has only been issued twice in 38 years: once in 1978 and again in 2003. The 2003 report, however, was published the same month that Governor Gray Davis was recalled and failed to generate comment or reaction from the Legislature or Governor Arnold Schwarzenegger.

The 2003 report detailed expected population and economic trends, and how those trends could impact everything from air and water quality to agricultural land and open spaces to human health and energy resources. The report also included 58 broad and specific goals for improving sustainable development in the state, including promoting infill development in cities, preserving water quality through watershed protection efforts and encouraging development that supports public transportation possibilities.

Governors of both parties simply have ignored the statute calling for this report. And while some of the issues that could be raised in this report are addressed in other ways – Governor Arnold Schwarzenegger has convened the Climate Action Team, consisting of multiple state agencies, to work on achieving greenhouse gas reductions, for example – an updated version of this report could help the state frame water quality priorities for the future, particularly as they concern urban stormwater and other non-point pollution sources.

Focusing on watershed health. The state board's new strategic plan emphasizes the boards' need to focus on watersheds as a critical way to improve water quality. "A watershed approach is hydrologically-focused, recognizes the degree to which ground water and surface water bodies are connected physically, recognizes the linkages between water quantity and water quality, and requires a comprehensive watershed protection approach," reads the preamble to the strategic plan.[144] A key action item in the plan requires the state board to identify priority watersheds and focus resources on impairments in those watersheds.[145]

National efforts underway to promote watershed-based planning and regulation can be used as examples. The National Research Council's report on stormwater, issued in October 2008, recommends that the EPA scrap its current stormwater permitting program in favor of regulating on a watershed basis. The report proposes moving from a site-by-site and stormwater permitting process to a permitting process that focuses on broad goals within a watershed and would include point source dischargers and non-point source dischargers.[146]

The National Research Council suggests integrating all discharge permitting under a municipal authority, which would be the lead permittee, and then identifying broad goals and objectives for the watershed and specific solutions for restoration and protection. The report notes that federal funding would be required to help implement such a major change, which includes folding the TMDL program be folded into the new permitting system as well.

Some states, notably Oregon, already have experimented with watershed permitting. Oregon's use of the watershed permitting concept led to a creative solution to addressing water impairment due to temperature, which affects the state's salmon. A discharger emitting heated water into the Tualatin River was allowed to plant trees that created shade and cooled water along the river. The alternative would have required building an expensive system to cool the discharges that would have contributed to climate change.[147]

Watershed-based Permitting

According to the National Research Council, components of watershed-based permitting would include:

- Centralizing responsibility and authority for implementation with a municipal lead permittee working in partnership with other municipalities in the watershed as co-permittees.
- Adopting a minimum goal in every watershed to avoid any further loss or degradation of designated beneficial uses within the watershed's component water bodies.
- Assessing water bodies that are not providing designated beneficial uses in order to set goals aimed at recovering these uses.
- Defining careful, complete, and clear specific objectives to be achieved through management and permitting.
- Comprehensive impact source analysis as a foundation for targeting solutions.
- Determining the most effective ways to isolate, to the extent possible, receiving water bodies from exposure to those impact sources.
- Developing and appropriately allocating funding sources to enable the lead permittee and partners to implement effectively.
- Developing a monitoring program composed of direct measures to assess compliance and progress toward achieving objectives and diagnosing reasons for the ability or failure to meet objectives, in support of active adaptive management.
- Developing a market system of trading credits as a tool available to municipal co-permittees to achieve watershed objectives, even if solutions cannot be uniformly applied.

Source: National Research Council. October 15, 2008. "Urban Stormwater Management in the United States. Page 391. Washington, D.C.

US EPA commissioned the stormwater study, and may attempt to implement a watershed approach in coming years. With this new federal focus in mind, the state and regional boards should emphasize watershed health by creating a new focus on how regulations affect watersheds. The Central Coast Regional Water Quality Control Board has begin this process by creating a new performance measurement structure focused on healthy watersheds.

Strategies the boards could implement include redeploying staff to place more emphasis on watershed health, increasing the use of regional monitoring to get a better sense of the overall state of watersheds, and working more closely with local watershed coalitions or convening watershed stakeholder groups. State law allows regional water boards to direct public agencies to conduct studies of issues affecting water quality, and in a presentation to state and regional board members in October 2008, Richard McMurtry of the Santa Clara County Creeks Coalition suggested using that authority to require all dischargers into a watershed to pool resources, study the watershed and develop priorities and strategies for addressing watershed-wide issues. This could be a step toward watershed permitting.

Legislation supported by the Building Industry Authority in 2008 authorized counties or cities to convene water quality committees to "develop and facilitate cooperation in achieving local water quality solutions" and develop watershed water quality management plans. The legislation would have required regional boards to consider the plans as amendments to their basin plans. The legislation, AB 938 by Assemblyman Charles Calderon, was approved by the Assembly but failed to pass in the Senate.

This is an arena where the board can and should exercise leadership on their own and convene watershed quality committees to provide input to the boards and, working with the EPA, begin considering pilot projects to implement watershed permitting.

Focusing on watershed health should help the boards focus more on solving water quality problems and on outcomes.

Central Coast Board Shifts Focus Toward Outcomes

Concerned that too much emphasis was placed on processes instead of outcomes, the Central Coast Regional Water Quality Control Board has developed a new performance measurement strategy to emphasize clean water outcomes and measure progress toward those outcomes. Through public meetings and internal staff meetings, the board created an overall vision statement for the agency and three specific, measurable goals. Four teams are working on achieving the goals, with staff from each program area involved in each team to ensure that changes happen system-wide. Staff is allowed to spend about 10 percent of their time on the project. Three of the teams are working on one of the specific goals, while the fourth team is charged with assessing the overall effectiveness of the new strategy.

The project has already led the board's agricultural program to begin comparing growers' monitoring reports, water quality data for nitrate and toxicity in streams, pesticide use information and inspection information to determine overall water quality. It is the first time the board has used Geographic Information System tools to link area land use and water quality data.

The board's vision is "Healthy Functioning Watersheds," and the three goals, along with some ways the board will measurement achievement of the goals, are:

- ***By 2025, 80 percent of our aquatic habitat is healthy and the remaining 20 percent exhibits positive trends in key parameters.*** The board seeks to ensure all agriculture lands have riparian buffers, ensure open space preservation in all important groundwater recharge areas and ensure that all new developments and redevelopment projects are designed to minimize runoff and maximize groundwater recharge. The board will likely develop a basin plan amendment to protect riparian and wetland habitat.
- ***By 2025, 80 percent of lands within any watershed will be managed to maintain healthy watershed functions, and the remaining 20 percent will exhibit positive trends in key parameters.*** The board will measure the percent of impervious surfaces in the region and seek ways to reduce those surfaces, and measure toxicity in runoff and seek to reduce toxicity. Long term, the board will study trends in water quality based on land development and incentivize groundwater recharge and water recycling projects.
- ***By 2025, 80 percent of our groundwater will be clean, and the remaining 20 percent will exhibit positive trends in key parameters.*** The board will measure groundwater nitrate concentrations and salt to determine effectiveness, work on basin plan amendments for groundwater recharge area protections and work with dischargers to groundwater on development of site-specific salt management plans.

Sources: Roger Briggs, executive officer, Central Coast Regional Water Quality Control Board. July 23, 2008. Personal communication with the Commission. And Central Coast Regional Water Quality Control Board. June 4, 2008. "Staff Report for Regular Meeting of June 4, 2008. Status Report on Regional Board Vision and Measureable Goals." San Luis Obispo, CA.

Considering Economics. Porter-Cologne requires the water boards to consider the economic consequences of regulations when they set water quality objectives, and states that "waters of the state shall be regulated to attain the highest water quality which is reasonable, considering all demands being made and to be made on those waters and the total values involved, beneficial and detrimental, economic and social, tangible and intangible."[148]

The statute, however, provides scant guidance on how the boards should specifically consider economic or other factors as they determine appropriate regulations. In addition, a state appeals court, in *City of Arcadia v. State Water Resources Control Board*, gave the boards significant leeway in determining how they consider the costs of a regulation.[149]

The state board has provided some guidance to regional boards as to how to consider the economics of water quality objectives through the board's administrative manual, but the Commission's questioning of regional board officials at its April 2008 hearing illustrated that the boards do not have a thorough or consistent process to determine the costs of new rules, nor do they attempt to determine the most cost-effective ways to solve water quality problems.

One former regional board member, Terese Ghio, told the Commission that she felt like the board gave very little thought to cost.

"Cost-benefit analysis was never really vetted," said Ghio, who was a member of the San Diego Regional Water Quality Control Board for four years. "It's talked about, the box is checked, but it's never really done."[150]

This approach contrasts to the federal government, where US EPA has a lengthy history of using cost-benefit analysis in decision-making. Both Presidents Reagan and Clinton issued executive orders requiring cost-benefit analysis in EPA regulations, indicating bi-partisan support for the concept.[151] The EPA's manual, "Guidelines for Preparing Economic Analyses," is a lengthy document detailing the agency's process for establishing the costs and benefits of regulations.

A formal cost-benefit analysis can be time-consuming and expensive. At the very least, the state and regional boards should use cost-effectiveness tests as they analyze their regulatory actions – such as water quality objectives and TMDLs. Ranking options by cost-effectiveness can help set priorities and find strategies that provide the most benefit in terms of protecting and improving water quality. Porter-Cologne's requirement that regulations be reasonable suggests that the board should have a standardized procedure to analyze the potential costs of regulations, as well as some indication of the value of the potential benefits the regulations would produce.

In a 2006 paper entitled, "A Guide to Consideration of Economics Under the California Porter-Cologne Act," economists David Sunding and David Zilberman of University of California at Berkeley present their proposal for a economic evaluation process that can be used by the boards. Their proposal does not call for a full-scale cost-benefit analysis; instead it provides a method for the boards to gather information and provide a clear statement for the boards' rationale in setting regulations.

Adopting this process would improve transparency in the boards' decision-making process, allow the boards more information as they adopt regulations and instill more confidence among stakeholders in board decisions. Cost-effectiveness analysis could also help set priorities.

The Clean Water Act prohibits using excessive cost as a reason for not implementing a water quality standard or a TMDL, and the Commission is not advocating for the elimination of regulations simply because they are expensive. But adopting a formal process to analyze the costs of a regulation will provide the board with more information; boards are free to consider other issues in adopting regulations.

In its report, the Ocean Science Trust noted: "Cost-benefit analysis of present regulatory, management, and remediation measures

Proposed Economic Analysis for Water Boards

In a 2006 paper, University of California professors David Sunding and David Zilberman proposed that the state and regional water boards conduct, at minimum, a relatively quick economic analysis before imposing new regulations. The professors presented an eight-step process:

- A listing of the affected parties, including private industry and government agencies, together with a qualitative description of the impacts.
- Solicitation of data from the public regarding potential compliance and related costs for the proposed policy.
- The public's reported cost of compliance in relation to the revenue, cost, and profit margin of affected firms, and relative to the total budget of affected public entities.
- A statement of what the board staff thinks the costs are likely to be that specifically considers the data solicited from the public and the reasons for the board's estimate.
- A statement of potential factors that could affect the estimate, such as technological uncertainties, monitoring limitations, etc.
- A description of competitive conditions in the affected sectors, and an assessment of whether water quality regulations are likely to place California firms at a significant competitive disadvantage.
- A statement of the average time needed to obtain permits from the various boards, and a qualitative assessment of the impacts of delay.
- A statement of the goals to be achieved by the proposed regulation and an explicit consideration of these goals given the costs (i.e, at least a statement that "the board believes that $XX million represents a reasonable expenditure to achieve YY.") This description would include the types and numbers of beneficiaries, and an identification of other investments beyond those resulting from the regulation that are needed to produce the beneficial uses.

Source: David Sunding and David Zilberman, College of Natural Resources, UC Berkeley. April 6, 2006. "A Guide to the Consideration of Economics Under the California Porter-Cologne Act." Pages 53-54. Berkeley, CA.

could assist the water boards in choosing the most effective use of limited resources to improve water quality."[152]

Summary

With California facing inevitable population growth, the climate change threat and the collapse of the Sacramento-San Joaquin River Delta, the need for clean water has never been greater.

Created nearly 40 years ago, the current governance structure to ensure clean water is outdated and in need of reform. The governor, Legislature and water quality regulators must act now to restore consistency, transparency and accountability to the state and regional water boards. A more unified board system that can identify statewide priorities and implement them at the regional level is essential. This new system, with up-to-date basin plans, a commitment to the use of science and data, and willingness to seek creative solutions to solve modern water quality problems, can be a key player in the state's future.

A failure to act endangers both the environment and the economy.

Recommendation 1: To move toward a more consistent, transparent and accountable governance structure that allows for both statewide policy and regional flexibility, reform the State Water Resources Control Board and the Regional Water Quality Control Boards by strengthening ties between the boards, refocusing the boards on broad policy-making and restoring confidence in the appeals process. Specifically, the state should:

- ❑ Restructure the State Water Resources Control Board as a full-time, 9-member board charged with creating state policy, setting priorities and overseeing regional board activities. Members of the board should be appointed by the governor and confirmed by the state Senate. Five members of the state board would serve solely as state board members, including one person who would be chairperson of the state board, as named by the governor. These members should have the following backgrounds: One in engineering, one in water rights law, one in water quality, one in water-related science or resource economics, and another would represent the public. The position of regional chairperson would become full-time. Four regional chairpersons would serve on the state board for staggered, two-year terms, with membership rotating among all nine regional board chairpersons.

- Reconstitute the nine Regional Water Quality Control Boards as seven-member boards with six part-time members and a full-time chairperson, all appointed by the governor. The chairperson would be charged with monitoring statewide policies that are implemented at the regional level. Boards would continue to be stakeholder-boards, with six part-time members with the following backgrounds: experience in water supply, conservation or production; irrigated agriculture; industrial water use; local government; water science or engineering; and experience with a nongovernmental organization associated with recreation, fish or wildlife. Regional boards would focus on updating basin plans, adopting total maximum daily loads and other quasi-legislative functions.

- Empower the executive officers of each Regional Water Quality Control Board and the executive director of the State Water Resources Control Board to issue permits, allowing the boards to focus on updating basin plans, setting broad policy and focusing on upcoming water quality challenges. Executive officers would become Career Executive Assignment positions and report to the executive director of the State Water Resources Control Board. Regional boards would conduct an annual evaluation of the executive officer that would be taken under advisement by the executive director.

- Exempt state and regional board members, regional board executive officers and the state board executive director from ex parte rules within the state Administrative Procedure Act that prohibit interaction with regulated entities. Instead, require board members and permit-issuing executives to disclose their contacts with regulated entities at public meetings, as is currently done by other boards such as the Integrated Waste Management Board.

- Create a new appeals board that would address appeals of quasi-adjudicative functions such as permits and enforcement actions. Removing the appeals process from state board jurisdiction would restore confidence in the process and allow the state board to take a more proactive approach in regional board issues. The members should have backgrounds in water issues and would be appointed by the governor to hear appeals. The board would follow Administrative Procedure Act policies in conducting hearings.

Recommendation 2: The state must improve and increase its use of data, scientific research and planning to better inform the public, respond to current and future water quality problems and focus more on accountability. Specifically, the state should:

- Create a Water Science Advisory Board for the State Water Resources Control Board. Members, appointed by the state board, should have backgrounds in environmental science and engineering. The board would help both the state and regional water boards and other state water agencies coordinate research, propose needed research, advise the boards on how to incorporate research into regulatory processes and increase the effectiveness of scientific peer review.
- Create an independent Water Data Institute that would act as a state library for water quality and supply data. The institute would pool information from various state agencies and other water monitoring groups to provide accessible information to the public, regulators and researchers.
- Develop report cards. Report cards for each major water body should allow the public easy access to information they can use and could act as a way to hold regional boards accountable for their effectiveness. The report cards should be developed and published by regional science institutes or an independent entity, such as the University of California.
- Launch a statewide effort to ensure that all regions have up-to-date basin plans. Regional boards should propose stakeholder-financed efforts similar to the one conducted by the Santa Ana Regional Water Quality Control Board.

Recommendation 3: The state must increase focus on clean water outcomes and emphasize collaboration, creativity and problem-solving to address current water quality problems. Specifically, the state should:

- Collaborate with other government agencies. Because land use, automobile emissions and other factors outside the traditional purview of the water boards are major contributors to non-point source pollution of water, the water boards must work with other government agencies on solutions. The state water and air boards should routinely meet to develop regulatory strategies to address air pollution's effects on water. The state should revive the Environmental Protection Council, which already exists in statute and consists of the heads of each of the boards and departments within Cal/EPA.

- Emphasize a watershed approach. To increase focus on outcomes and solving complex problems, the water boards should develop more processes aimed at watershed health.
- Use stakeholder task forces. As the Santa Ana Regional Water Quality Control Board has done, other regional boards should increase the use of stakeholder task forces to work through difficult regulatory issues.

Recommendation 4: The water boards must develop standardized economic analysis procedures to help set priorities and determine the most effective and efficient means to improve water quality.

- To fully implement Porter-Cologne's demand that water quality regulations be reasonable, given other economic and social factors, the boards must institute the use of economic analysis into decision-making. Cost-effectiveness analysis also would increase transparency of board decision-making and help the boards set priorities.

Conclusion

California's state and regional water boards have a profound impact on the environment and the economy. The boards issue more than 50,000 discharge permits, regulating the state's biggest metropolises as well as its smallest wastewater treatment plants. Theirs is an enormous and challenging task: implementing ambitious and complicated federal and state laws, incorporating the still-evolving scientific understanding of pollution's causes and solutions and working with limited resources.

This job, however, is critical to the state's future. Demand for water grows with population growth. Water supply is threatened by climate change and the potential for earthquakes to destroy the state's levee system. Pressures are mounting on the state to improve the health of the Sacramento-San Joaquin River Delta, protect threatened fish species and restore waters around the state to ensure they are swimmable, fishable and drinkable.

Change is needed to help the boards meet their mission.

Regional decision-making – an idea first conceived for California water quality regulation nearly 60 years ago – remains a sound approach, as conditions in different water bodies merit different approaches and standards. But California needs a better way to set overarching state water quality policy, as well as a better way to implement policies that are important to the overall health of the state's water bodies.

This is nowhere more important than in the area of non-point source pollution. The current system is based on the outdated model of combating source pollution, where emitters could be easily identified and their actions modified though the permit process.

The Commission found a critical need for a more unified regulatory agency that has clear priorities and procedures that can be implemented throughout the state. While current statutes give the State Water Resources Control Board ample authority to direct the nine Regional Water Quality Control Boards, in practice the regional boards are too independent, with differing policies and processes on even some of the most important statewide issues.

The current structure has not produced a clear ranking of its water quality priorities, the first step in matching resources and action to the state's biggest water quality threats. The process for setting policy offers little transparency and little emphasis on accountability or outcomes.

Given the tools that exist, it is unacceptable that the public and policy-makers do not have easy-to-understand information to answer the most basic questions for water quality policy: What is the state of the state's waters, and which water board programs are effective at improving water quality and which are not?

Until the boards, starting with the state board, shift their focus from process to outcomes, the answers to these questions will remain elusive.

Other problems also limit the boards' effectiveness: Regional board members face too many technically difficult decisions, preventing them from focusing on broader policy issues. The boards have struggled to collect and use data, and there is no state-led clearinghouse of scientific research or analysis indicating the best ways to tackle modern water quality problems.

Structural solutions to these problems lie in strengthening the relationship between the state and regional boards, re-focusing gubernatorial appointees on big-picture problems and solutions, reforming the appeals process, creating more avenues for the boards to use science and economic analysis in rule-making, and developing a statewide water data institute to coordinate water quality data gathered throughout the state.

These changes should re-focus the boards on setting priorities with the goal of protecting and improving California's waters. Ultimately, the boards' effectiveness should be measureable by whether its actions improve water quality.

Environmental regulation will always cause conflict, as regulators push for tougher standards, more protections, and, inevitably, more costs. Conflict at the water boards is not inherently a problem. But the Commission found too much conflict about process and not enough confidence that the boards' structure, policies and processes would lead to reasonable, effective solutions. The boards must evolve to rebuild that confidence. Change will be required too to begin showing more clean water success stories.

As the Commission conducted its study in 2008 of the water boards' governance structure, a task force appointed by Governor Arnold Schwarzenegger simultaneously was reviewing governance, water supply and environmental issues in the Sacramento-San Joaquin River Delta. The Commission's recommendations for a stronger, more proactive State Water Resources Control Board should not be in conflict with its earlier calls for a stronger governance structure for the state's management of the Delta. A strong state water board is essential to developing and implementing the policies that will help restore the Delta ecosystem and maintain water quality for not only the Delta, but the water transferred through it to the farms and cities of Central and Southern California.

The Commission's Study Process

The Commission initiated this study in early 2008 to review the governance structure regarding water quality regulation in the state and the relationship between the State Water Resources Control Board and the nine Regional Water Quality Control Boards. The Commission's goal was to assess the roles of the state and regional boards and the challenges facing the boards in their efforts to appropriately respond to the state's pressing water quality needs. As part of its study, the Commission investigated how to best balance the need for consistent statewide policy and the need for flexibility to handle regional issues. The Commission also explored the state's water quality goals and whether the state and regional boards have policies in place to reach those goals.

As part of the study, the Commission convened two public hearings. At the first public hearing, held in March 2008, the Commission heard from water quality regulators, including the chairwoman of the State Water Resources Control Board, two representatives of regional water quality control boards and the head of the United States Environmental Protection Agency's Region 9 water division. In addition, the Commission was briefed on the history of water quality regulation and the current roles of various state agencies in overseeing state water policy. At the second hearing, in April 2008, the Commission received input from representatives of regulated entities and environmental groups. Hearing witnesses are listed in Appendix A.

The Commission also convened two advisory group meetings during the course of this study. Both meetings included water quality regulators, representatives of regulated entities and environmental groups, legislative staff, and academics interested in water quality regulation. The first meeting, on May 21, 2008, focused on state water quality priorities and the advantages and disadvantages of the regional water quality control board system. The second meeting, on June 25, 2008, included discussion on the Water Quality Improvement Initiative and other possible changes to water quality governance in the state.

A subcommittee meeting, held on August 28, 2008, allowed the Commission to vet some ideas for reform through a group of water quality regulators and representatives of regulated entities and environmental groups.

A list of people who participated in the advisory group and subcommittee meetings is included in Appendix B.

Commission staff received valuable feedback from numerous stakeholders and other water quality experts, attended several State Water Resources Control Board meetings, one regional water quality control board meeting and the October 2008 meeting of the Water Quality Coordinating Council.

All written testimony submitted electronically for each of the hearings, and this report is available online at the Commission Web site, www.lhc.ca.gov.

Appendices & Notes

✓ ***Public Hearing Witnesses***

✓ ***Little Hoover Commission Public Meetings***

✓ ***Selected Acronyms***

✓ ***Notes***

Appendix A

Little Hoover Commission Public Hearing Witnesses

Witnesses Appearing at Little Hoover Commission Public Hearing on California's Water Boards, March 27, 2008

Carole Beswick, Chairwoman, Santa Ana Regional Water Quality Control Board

Lisa Beutler, Associate Director, Center for Collaborative Policy

Tam Doduc, Chairwoman, State Water Resources Control Board

Karl Longley, Chairman, Central Valley Regional Water Quality Control Board

Alexis Strauss, Director, Water Division, United States Environmental Protection Agency, Region 9

Witnesses Appearing at Little Hoover Commission Public Hearing on California's Water Boards, April 24, 2008

Chris Crompton, Manager, Environmental Resources Section, Orange County Public Works Department

Laurel Firestone, Co-Executive Director, Community Water Center

Terese Ghio, Vice President of Governmental Relations, Arena Pharmaceuticals

Rear Admiral Leendert "Len" R. Hering, Sr., Commander, Navy Region Southwest

Mick Pattinson, President, Barratt American Homes

Linda Sheehan, Executive Director, California Coastkeeper Alliance

Craig Wilson, Counsel, Community Alliance for Environmental Stewardship

Appendix B

Little Hoover Commission Public Meetings

California's Water Boards Advisory Committee Meeting – May 21, 2008

Desi Alvarez, Deputy City Manager, City of Downey

Arthur Baggett, Board Member, State Water Resources Control Board

Carole Beswick, Chairwoman, Santa Ana Regional Water Quality Control Board

Alf Brandt, Principal Consultant, Assembly Committee on Water, Parks and Wildlife

Kevin Buchan, Senior Coordinator, Bay Area Region and State Water Issues, Western States Petroleum Association

Tony Francois, Attorney/Lobbyist, KP Public Affairs

Craig Johns, Principal, California Resource Strategies, Inc.

Roberta Larson, Attorney, California Association of Sanitation Agencies

Phil Nails, Policy Consultant, Assembly Republican Caucus

John Robertus, Executive Officer, San Diego Regional Water Quality Control Board

Linda Sheehan, Executive Director, California Coastkeeper Alliance

Brian White, Vice President for Legislative Affairs, California Forestry Association

Craig Wilson, Counsel, Community Alliance for Environmental Stewardship

Gary Wolff, Vice Chairman, State Water Resources Control Board

California's Water Boards Advisory Committee Meeting – June 25, 2008

Nate Beason, Supervisor, Nevada County Board of Supervisors

David Beckman, Director, Coastal Water Quality Project, Natural Resources Defense Council

David Bolland, Senior Regulatory Advocate, Association of California Water Agencies

Alf Brandt, Principal Consultant, Assembly Committee on Water, Parks and Wildlife

Geoff Brosseau, Executive Director, California Stormwater Quality Association

Kevin Buchan, Senior Coordinator, Bay Area Region and State Water Issues, Western States Petroleum Association

Ken Farfsing, City Manager, City of Signal Hill

Randal Friedman, California Government Affairs, United States Navy Region Southwest

Mark Grey, Director of Environmental Affairs, Building Industry Association of Southern California

John Herrick, Counsel and Manager, South Delta Water Agency

Craig Johns, Principal, California Resource Strategies, Inc.

Roberta Larson, Attorney, California Association of Sanitation Agencies

Karl Longley, Chairman, Central Valley Regional Water Quality Control Board

Mark Newton, Director, Resources & Environmental Protection, Legislative Analyst's Office

Mick Pattinson, President, Barratt American

Dorothy Rice, Executive Director, State Water Resources Control Board

Brian White, Vice President for Legislative Affairs, California Forestry Association

Craig Wilson, Counsel, Community Alliance for Environmental Stewardship

California's Water Boards Subcommittee Meeting – August 28, 2008

Geoff Brosseau, Executive Director, California Stormwater Quality Association

Catherine Freeman, Senior Fiscal and Policy Analyst, Legislative Analyst's Office

Mark Grey, Director of Environmental Affairs, Building Industry Association of Southern California

Karl Longley, Chairman, Central Valley Regional Water Quality Control Board

Mark Lubell, Associate Professor, Department of Environmental Science and Policy, University of California, Davis

John Robertus, Executive Officer, San Diego Regional Water Quality Control Board

Linda Sheehan, Executive Director, California Coastkeeper Alliance

Gary Wolff, Vice Chairman, State Water Resources Control Board

Appendix C

Selected Acronyms

CARB: California Air Resources Board

Cal/EPA: California Environmental Protection Agency

Caltrans: California Department of Transportation

CEDEN: California Environmental Data Exchange Network

CIWQS: California Integrated Water Quality System

CPR: California Performance Review

CWA: Clean Water Act

DOIT: Department of Information Technology

DWR: Department of Water Resources

EPA: United States Environmental Protection Agency

GAMA: Groundwater Ambient Monitoring and Assessment

IRWMP: Integrated Regional Water Management Plans

LAO: Legislative Analyst's Office

LID: Low Impact Development

MMP: Maximum Minimum Penalty

MS4: Municipal Separate Storm Sewer Systems

MTBE: Methyl Tertiary-butyl Ether

NPDES: National Pollutant Elimination Discharge System

PCBs: Polychlorinated Biphenyl

RWQCBs: Regional Water Quality Control Boards

SCCWRP: Southern California Coastal Water Resources Program

SEP: Supplemental Environmental Project

SFEI: San Francisco Estuary Institute

SWAMP: Surface Water Ambient Monitoring Program

TMDL: Total Maximum Daily Load

WDR: Water Discharge Requirement

WQCC: Water Quality Coordinating Committee

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VIA E-MAIL

January 11, 2013
Mr. Wayne Chiu, P.E.
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, Ca 92123-4340

Re: Comment Letter– Tentative Order No.R9-2013-0001, Regional MS4 Permit, Place ID: 786088Wchiu."

Dear: Mr. Chiu,

On behalf of Building Industry Association of Southern California, Inc. (BIASC), Construction Industry Coalition on Water Quality (CICWQ) and the members of both, we appreciate the opportunity to provide comments on the San Diego Regional Water Quality Control Board Tentative Order No. R9-2013-0001; NPDES No. CAS0109266, National Pollutant Discharge Elimination System (NPDES) Permit and Waste Discharge Requirements for Discharges of Urban Runoff from the Municipal Separate Storm Sewer Systems ("MS4s") Draining the Watersheds within the San Diego Region (the "Tentative Order"). In addition, we respectfully request that our comment letter submitted to the Regional Board on September 14, 2012 be made a part of our overall comments to the Tentative Order and admitted into the formal administrative record, because the constructive suggestions for permit improvement remain relevant at this point in the Tentative Order development.

BIASC is a nonprofit trade association representing nearly 1,000 member companies, which together have nearly 100,000 employees. For decades, BIASC's members have built the majority of the new homes in Ventura, Los Angeles, Orange, Riverside, and San Bernardino Counties in southern California. CICWQ is an education, research, and advocacy water quality coalition comprised of representatives from five industry trade associations (in addition to BIASC) which are involved in the development of public and private building, infrastructure and roads throughout California (Associated General Contractors, Engineering Contractors Association, Southern California Contractors Association, Engineering and General Contractors Association, and United Contractors). All of the above trade associations, their members and the union labor work force are affected by the post-construction runoff control requirements proposed in the Tentative Order, and this letter is meant to provide the San Diego Regional Board with constructive suggestions for improvement.

We appreciate the Regional Board's earlier release of a precursor to the Tentative Order as an Administrative Draft, and the extensive stakeholder involvement process that ensued over the summer and autumn of 2012. Unfortunately, the Tentative Order does not reflect critically important changes to the Tentative Order's Development Planning requirements which we and many other public and private stakeholders recommended, both during the focused stakeholder meetings and in comments submitted to the Regional Board. Moreover, Regional Board staff does not provide sufficient findings of fact to support the priority project water quality and hydromodification control design criteria and performance standards in the Tentative Order. The requirements proposed in the Tentative Order are vastly different from those contained in the 2010 South Orange and South Riverside County MS4 permits, and there is simply insufficient performance data to demonstrate the need for any change.

We are concerned that key water quality and hydromodification control provisions within the Development Planning section (Section C.3) are (i) unsupported by substantial evidence, (ii) very bad public policy, and (iii) not properly considered as legally required. Specifically, certain provisions: (i) lack sufficient auditing or performance data showing the need for or advisability of such requirements, (ii) lack technical or scientific basis, and (iii) depart without any justification from required and approved technical documents that have been issued by the San Diego Regional Board for priority development projects in San Diego, Orange, and Riverside Counties. In addition, the hydromodification control provisions illuminate the Regional Board's failure to consider the factors required by California Water Code section 13241 – especially subsection (b) thereof.

1. There are no findings of fact to support changes in the requirements to evaluate, design and install LID BMPs (Section E.3.c) when comparing the proposed requirements in the Tentative Order with that of the requirements in the 2010 adopted South Orange and South Riverside County MS4 permits.

The Orange and Riverside County permits have been in effect for a short period of time (<2 years); and there is no data (program audits or annual report data, for example) that we can find that would support any changes to priority development project water quality control design criteria (found in Section E.3.C of the Tentative Order). Moreover, in one particular instance concerning which we and others have repeatedly commented to Regional Board staff, there is no technical justification provided by staff for requiring biofiltration LID BMP to be sized at 1.5 times the remaining design capture volume not reliably retained on-site. Section E.3.c.(3)(b)(i)[c] requires that if biofiltration is used as an alternative compliance method the biofiltration BMP is required to be sized to 1.5 times the design capture volume, which is an increase from the existing South Orange County permit. The permit and the fact sheet provide no technical justification for the 1.5 factor and therefore this requirement should be deleted from the permit. BIASC and CICWQ comment letter submitted to the Regional Board on September

14, 2012 and attachments including suggested permit redline remains relevant in this matter. We have provided this here as Attachment1.

2. There are no findings of fact or supporting technical and scientific data indicating the need for changes in hydromodification control requirements for priority development projects.

As we have commented before, there needs to be (i) an in-stream hydromodification control performance standard using the erosion potential (EP) approach; and (ii) the permit must recognize that there are a number of different types of channel hardening that have been used for armoring in stream systems besides concrete. In Attachment 1, we again make suggestions for improving the consistency of hydromodification control standards with those identified and allowed in the South Orange County MS4 permit.

The Tentative Order provides an "on-site" option for addressing hydromodification through flow duration control. This is an important element of the hydromodification control standard. However the Tentative Order is incomplete in that it lacks an option to assess and demonstrate hydromodification control through in-stream metrics. In many cases, significant development within a watershed has already caused hydromodification impacts. Requiring project-by-project flow duration control for each new project may not address the existing issue as effectively as a regionally-coordinated approach that combines upland control with in-stream remedies. Including the EP standard—as BIASC and CICWQ urge--would enable the development of more comprehensive approaches that include both upland controls and stream modifications (i.e., restoration). This option is critical for more effectively and efficiently protecting the region's aquatic resources.

Additionally, the Tentative Order includes an unnecessarily narrow definition of hardened channels that includes only those channels lined with concrete. Other forms of artificial hardening may be comparably resistant to hydromodification impacts, such as channels that are lined with rip rap, armored with soil cement, or armored with other practices. While the co-permittees or the project proponent should be responsible for demonstrating that a specific channel material is sufficiently stable, the narrow definition currently provided by the Tentative Order does not allow the use of sound engineering judgment and does not allow for use of innovative materials.

The comment letter submitted by BIASC and CICWQ to the Regional Board on September 14, 2012 remains relevant here, as the Regional Board staff did not make any changes to the hydromodification control requirements except for minor exemption allowances for using USGB council's LEED for redevelopment program standards. Exemptions, generally, are welcome and appropriate. But, in practice, referencing a voluntary, national green building and development certification program for use as part of a NPDES permit does not provide a viable pathway for most priority development projects that are located in already urbanized areas that are served by existing MS4 infrastructure. Exemptions identified in the adopted San Diego Hydromodification Management Plan are appropriate and should be cited and referenced in the Tentative Order, and any reference to USGB LEED standards deleted.

3. Preserve the 2010 adopted San Diego County Hydromodification Management Plan elements

The Regional Board staff has provided no technical justification for the new hydromodification provisions. The HMPs for San Diego and South Orange County are based on sound science and should be allowed time to understand if they are adequate for mitigating hydromodification impacts. The Regional Board adopted the San Diego Hydromodification Management Plan (HMP) in July 2010. Significant work, technical analysis and stakeholder input have gone into the development of the HMP and these requirements have been in effect for just 16 months. Rather than providing separate criteria, the permit should acknowledge implementation of the Regional Board approved HMP as a sufficient mechanism for meeting hydromodification requirements. Of particular note and concern is the removal of exemptions for certain priority development projects (projects in urban areas with greater than 70% existing impervious surface, for example) that discharge to an MS4 system that then discharges into a significantly hardened channel system. It is unquestionably bad public policy to require installation of controls (or payment of in-lieu fees to compensate for the inability to install controls) when there is no threat to the receiving water.

To this end--and for sake of brevity, we support and encourage the Regional Board to accept comments from Orange County Public Works which pertain to the hydromodification control requirements. Changes in permit language as indicated in the County's redline of the Tentative Order would sufficiently address our concerns about the tentative hydromodification control requirements, and we urge the Regional Board to accept these changes.

Regional Board staff has publically stated that the proposed hydromodification control requirements in the Tentative Order are consistent with the 2010 adopted HMP and that only minor adaptation is necessary. That assertion is simply not true and in fact adoption of the Tentative Order requirements will render the HMP obsolete and require a total overhaul. According to the County of San Diego and the co-permittees within the County (and private developer stakeholders), more than $1.5 million have been spent to date developing the plan and conducting required monitoring. By changing the performance standards, requiring hydromodification controls at all priority development projects, and removing standard exemptions that are found in all other 4th term MS4 permits in California, the Regional Board is sweeping away years of program development activities and turning program implementation on its head. The Tentative Order should explicitly recognize the findings of hydromodification management plans (HMPs) that have been previously approved by this Regional Board. The South Orange County HMP and the San Diego County HMPs were both the products of rigorous technical analysis based on the state of the practice, which were reviewed in detail by Regional Board Staff. The findings of these efforts must not be jeopardized under the new terms of the Tentative Order. *S*pecifically, findings regarding exempt water bodies must be appreciated and upheld, and they should be explicitly recognized in the Tentative Order.

4. The Tentative Order's proposed hydromodification control measures betray the Regional Board's failure to take into account the considerations required by California Water Code section 13241

For years, BIASC and CICWQ have been urging the water boards when developing MS4 permit requirements to address and respect their longstanding legal obligation to take into account the six, specified, non-exclusive factors which are set forth in California Government Code section 13241. The water boards have persistently refused. Most recently (just months ago), the Los Angeles Regional Board dismissed its obligation to consider the Section 13241 factors by noting that it had, in fact, more or less considered two of them (economics and some technical considerations). If the Regional Board here were to adhere to such a position, it would act in violation of California law and without justification.

There is perhaps no greater example of a permit condition written pursuant to a failure to consider the Section 13241 factors than the hydromodification control measures in the Tentative Order – particularly those which impose heroic, expensive engineering standards on development that drains into hardened flood control channels. Section 13241, subsection (b), requires consideration of the "[e]nvironmental characteristics of the hydrological unit under consideration…." By imposing expensive hydromodification control measures even where a receiving flood control system is already firmly hardened, the Tentative Order ignores this Section 13241, subsection (b), factor (obviously so, and regrettably consistent with the Regional Board's general refusal to take into account all six Section 13241 considerations).

BIASC and CICWQ believe that the water boards' persistent refusal to take demonstrably and meaningfully into account the Section 13241 required considerations results from a mistaken view of the applicable law. Specifically, the water boards' seemingly hold to the belief that the "maximum extent practicable" standard in federal law absolves the state agencies of any obligation to apply Section 13241when issuing MS4 permits. If indeed the water boards' legal position is thus, then it reflects a mistaken view of the degree of "federalism" reflected in the Clean Water Act and its interplay with the California Water Code. Moreover, such a position would reflect a failure to apply basic "federal preemption principles," which apply any time a party claims that federal law displaces state law.

BIASC and CICWQ urge the Regional Board to reconsider and reverse its refusal to apply meaningfully all six Section 13241 considerations, and to correct the Tentative Order accordingly.

Concluding Remarks:

BIASC and CICWQ have been active participants and contributors to the creation of improved MS4 permits across southern California. We continue to believe that rational, *implementable*, and *effective* permit requirements are critical to achieving great progress concerning water quality and our environment. We hope that these comments are received in the manner in which they are intended – to create a workable permit that improves water quality to the maximum extent practicable. We remain committed to a positive dialog with the Regional Board and its staff – one that will result in an informed, balanced and effective permit.

If you have any questions or want to discuss the content of our comment letter, please feel free to contact me at (951) 781-7310, ext. 213, (909) 525-0623, cell phone, or mgrey@biasc.org.

Sincerely,

Mark Grey, Ph.D.
Director of Environmental Affairs and Technical Director
Building Industry Association of Southern California and
Construction Industry Coalition on Water Quality

Enclosures:
Attachment 1

cc. Andy Henderson, Esq., Building Industry Legal Defense Foundation

VIA E-MAIL

September 14, 2012
Ms. Laurie Walsh, Senior Engineer
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, Ca 92123-4340

Re: ADMINISTRATIVE DRAFT REGIONAL MUNICIPAL SEPARATE STORM SEWER SYSTEM (Tentative Order No. R9-2012-0011)

Dear: Ms. Walsh

On behalf of the Building Industry Association of Southern California, Inc. (BIA/SC) and the Construction Industry Coalition on Water Quality (CICWQ) and the members of both, we appreciate the opportunity to provide comments on the Administrative Draft of the San Diego County Regional MS4 Permit (Administrative Draft Permit). We submit these comments in addition to and in support of comments made by our affiliate in San Diego County, the Building Industry Association of San Diego and its coalition partners, and comments submitted by Rancho Mission Viejo.

BIA/SC is a nonprofit trade association representing nearly 1,000 member companies, which together have nearly 100,000 employees. BIA/SC's members have, for decades, built the majority of the homes in Ventura, Los Angeles, Orange, Riverside, and San Bernardino Counties in southern California. CICWQ is a water quality coalition comprised of representatives from five industry trade associations (in addition to BIA/SC) involved in the development of public and private building, infrastructure and roads throughout California (Associated General Contractors, Engineering Contractors Association, Southern California Contractors Association, Engineering and General Contractors Association, and United Contractors). All of the above trade associations and their members and the union labor work force are affected by the post-construction runoff control requirements proposed in the Draft Permit, and this letter and supporting attachments are intended to provide the San Diego Regional Board staff with constructive suggestions for improvement.

We appreciate the Regional Board's release of the Administrative Draft Permit in April 2012, and the extensive stakeholder involvement process that ensued over the summer of 2012. The comments provided here are intended to further meet the permit's underlying objective of protecting and improving water quality within the watersheds administered by the San Diego Regional Board. Our comments, supporting attachments, and suggested redline permit language modifications reflect years of working not only on MS4 permits issued by the San Diego Board, but other MS4 permits administered by the Los Angeles, Santa Ana, and San Francisco Bay Regional Water Quality Control Boards.

We have four primary concerns with the Administrative Draft Permit content and the following discussion summarizes those concerns and provides the technical basis for those concerns including supporting attachments:

1. **Administrative Draft Permit Provision E. 3.c.(2)(c) establishes a zero discharge standard for biofiltration-type LID BMPs that are designed with an outlet/underdrain. This type of LID BMP cannot meet the on-site design capture volume standard as it is written. Such a zero discharge standard is scientifically and technically unsound and unsupported.**

Biofiltration is an established LID BMP for use in attempting to mimic pre-development hydrology. The US EPA, in multiple guidance documents produced since 2006, have recognized the use of biofiltration-type systems such as curb contained biofilters, bioswales, rain gardens, and using landscape areas for impervious area disconnection as essential LID BMP elements to include in land development projects, a few of which are cited below. The inclusion of biofiltration BMPs in US EPA's menu is a reflection of the practical limitations to retention of stormwater – retention practices are not universally feasible or desirable. When appropriately selected and designed, biofiltration BMPs achieve high levels of pollutant removal, which may exceed pollutant removal achieved in retention BMPs, particularly in cases where retention BMPs are inappropriately applied.

The retention requirement is contrary to EPA's definition of LID because it disfavors development strategies designed to appropriately "filter" runoff, such as bioretention cells or other vegetated LID BMPs. There are five principal EPA documents regarding LID; and four of them identify the appropriate roles of biotreatment-type BMP, such as detention (i.e., slow down, treat through vegetation, and then release across property lines), filtration, and surface release of stormwater.

In a compilation of case studies by EPA, most of 17 exemplary projects included biotreatment elements, such as bioretention, swales, and wetlands. *See* U.S. EPA 841-F-07-006. Each of two case studies described in another EPA document (s*ee* Attachment 1 at pp. 1-2, EPA 841-B-00-005) included the use of underdrains, and the example in one of the two specifically fed into the MS4 system at issue. Another EPA document updated in January 2009 refers to the many practices used to adhere to LID principles of promoting a watershed's hydrologic and ecological functions, such as bioretention facilities and rain gardens. *See* Attachment 2 at p. 2, EPA-560-F-07-231 (describing "an under-drain system to release treated stormwater off site," permitting planted areas to "safely allow filtration and evapotranspiration of stormwater");

http://www.epa.gov/owow/nps/lid/ (fact sheet describing under-drains used to release treated stormwater off site and permitting planted areas to safely allow filtration of stormwater). Thus, EPA's literature and guidance clearly recognize the important and even necessary role that biofiltration/biotreatment approaches play in real-world implementation of LID principles.

The National Research Council, in their 2008 Report to Congress titled "Urban Stormwater Management in the United States" cite the use of biofiltration and bioretention systems in improving water quality and in attempting to mimic predevelopment hydrology at many different site contexts and locations across the United States. The 2008 NRC report contains and cites numerous examples of using biofiltration type systems to reduce runoff volume and pollutant loads. The 2008 NRC Report clearly recognizes the role that biofiltration systems play in the LID BMP feasibility and selection process, and in achieving runoff management goals. The report states "In some situations ARCD (Aquatic Resources Conservation Design) practices will not be feasible, at least not entirely, and the SCMs [stormwater control measures] conventionally used now and in the recent past (e.g., retention/detention basins, biofiltration without soil enhancement, and sand filters) should be integrated into the overall system to realize the highest management potential." Note that the NRC report definition of ARCD includes both retention and biofiltration elements.

From a management perspective, a review of 4th Term Phase I MS4 permits within California (San Francisco Bay Area, Sacramento Area, North and South Orange County, Western and Southern Riverside County, and San Bernardino County) shows that the use of biofiltration to meet water quality volume and flow control performance standards is clearly allowed (See matrices submitted by BIA/SC_CICWQ at the August 22, 2012 Stakeholder Meeting and provided to the Regional Board by Mark Grey on August 24, 2012). These Regional Boards in California recognize that biofilter-type LID BMPs are an integral component of applying site design principles which seek to mimic pre-development hydrology. Furthermore, these permits implement a clear LID BMP feasibility and selection process, one that first requires examination of on-site retention systems (infiltration, harvest and use, and evapotranspiration), before moving to the evaluation and potential selection of bioinfiltration (some infiltration achieved) and biofiltration systems. This feasibility evaluation hierarchy, which is clearly explained in the South Orange County and South Riverside County MS4 permits adopted by the San Diego Regional Board in 2009 and 2010, respectively, must be preserved and included in the next version of the Administrative Draft Permit.

In summary, the zero discharge standard established by the Administrative Draft Permit significantly narrows the definition of LID, which is contrary to US EPA guidance, the 2008 NRC Report, and the standards established in recently-adopted Permits by the San Diego Regional Board and other Regional Boards. In essence, the proposed provisions would establish a standard that (i) will be impracticable in a relatively large proportion of sites, and (ii) has not been demonstrated to be necessary to protect receiving water quality. We provide in Attachment 3 suggested permit language to address the continued use of biofiltration.

2. **A mitigation requirement is established when using flow-thru biofiltration-type LID BMPs to manage that portion of the SWQDv that is not retained on-site. This requirement is inconsistent with all other adopted Phase I MS4 permits in California and nationally. Biofiltration and bioretention BMPs are established LID practices; requiring accompanying mitigation of SWQDv that has already been biofiltered penalizes and dis-incentivizes use of these controls.**

Equally problematic, because it does not allow biofiltration type LID BMPs to meet the on-site storm water quality design volume (SWQDv) standard, is the current requirement in Administrative Draft Permit Provision E. 3.c.(2)(c) to "perform mitigation for the portion of the pollutant load that is not retained on-site." In other words, the draft provisions would require that, if a project proponent cannot retain 100 percent of the SWQDv on-site, and must therefore use biofiltration LID BMPs (with a treated discharge), then the use and installation of these systems will trigger an off-site mitigation or in-lieu fee program participation requirement. This provision in the Administrative Draft Permit is technically unjustified, disfavors the use of all types of recognized biofiltration LID BMPs, and could theoretically require a project proponent to not only pay for the installation and O&M of a biofiltration LID BMP, but also require mitigation or fee payment for that portion of runoff managed by it.

Biofiltration BMPs including natural treatment systems such as those that are part of the Irvine Ranch Water District's Natural Treatment System in Orange County (a regional example) can remove vast quantities of pollutant load, and provide other benefits such as habitat, flood control, and aesthetic, recreational and educational value. To relegate multi-benefit biofiltration or biotreatment BMPs applied at a site scale to a status inferior to on-site retention BMPs is not justified on a water quality basis, and is poor public policy, essentially depriving the region of an extremely important and effective approach to managing water quality.

While we agree that project proponents should be required to retain stormwater where technically and economically feasible, there are numerous conditions beyond a project's control that make retention infeasible, undesirable and/or ineffective. For example, in achieving a zero discharge standard, it is necessary to either maintain pre-project ET (which is generally impracticable) or increase the volume of stormwater that is infiltrated (which is the common result). Over-infiltrating rainwater can have adverse consequences such as altering the natural flow regime of the receiving waters such that riparian habitat changes, mobilizing pre-existing contamination in shallow groundwater, increasing inflow and infiltration to sanitary sewers, causing damage from rising groundwater, and other potential effects. By discouraging the use of biofiltration LID BMPs where there are more appropriate than retention, the Administrative

Draft Permit irresponsibly encourages the use of retention where it may have adverse consequences.

Retention BMPs are not necessarily more effective than biofiltration BMPs as the Administrative Draft Permit implies, especially considering the back-to-back-to-back nature of storm systems that arrive in southern California during winter months and deliver the majority of total rainfall volume. The Administrative Draft Permit establishes a SWQDv that must be retained, but does not specify the time over which this volume must be drawn down (i.e., drained) in order to have capacity for the volume from subsequent storms. The rate at which the SWQDv can be drained is a function of the infiltration rates of soils and the demand for harvested water. Where soils are not sufficiently permeable and/or where harvested water demands are moderate to low, the drawdown time of retention BMPs can be in the range of several days to several weeks.

In comparison, biofiltration BMPs are designed with engineered soils that can generally drain the SWQDv much more quickly, on the order of several hours. In cases where retention opportunities are limited, this results in a higher level of capture and treatment by biofiltration BMPs than retention BMPs, which can more than offset the lower “treatment efficiency” afforded by biofiltration compared to full retention. For example, based on rigorous technical analysis contained in the Orange County Technical Guidance Document (Figure III.2, Page III-11), a hypothetical biofiltration BMP draining in 12 hours would achieve approximately 25 percent greater treatment of average annual stormwater runoff volume than an equivalently sized retention BMP that drains in 72 hours and approximately 60 percent greater treatment than a retention BMP that drains in 10 days.

Because drawdown time is an important factor in (i) assessing BMP effectiveness and (ii) evaluating the site-specific determination of whether retention or biofiltration are preferable, we strongly recommend (in addition to allowing the use of biofiltration or biotreatment systems to meet the retention standard) including a secondary performance metric of managing 80 percent of annual runoff volume using continuous simulation modeling. This provides a means of accounting for the performance of strictly on-site retention BMPs versus the addition of biofiltration or biotreatment BMPs which can be designed to manage a greater volume of average annual runoff volume than retention BMPs of the same size. The total amount of water captured and treated and associated pollutant load reduction should be a primary deciding factor in whether retention or biofiltration BMPs are selected for a given project. As written, the Administrative Draft Permit strongly discourages an entire group of effective practices which have the potential to provide better protection of water quality, when compared to retention, in a wide range of cases. Attachment 3 provides suggestions for permit language which corrects these deficiencies.

3. Hydromodification control measures should allow use of the EP method to meet in stream standards; recognize multiple types of channel hardening when evaluating applications for hydromodification control exemptions

In Attachment 3, we also make suggestions for improving the consistency of hydromodification control standards with those identified and allowed in the South Orange County MS4 permit. Specifically, we recommend providing for an in-stream hydromodification control performance standard using the erosion potential (EP) approach and recognizing that there are a number of different types of channel hardening that have been used for armoring in stream systems besides concrete.

The Administrative Draft Permit provides an "on-site" option for addressing hydromodification through flow duration control. This is an important element of the hydromodification control standard. However the Administrative Draft Permit is incomplete without an option to assess and demonstrate hydromodification control through in-stream metrics. In many cases, significant development within a watershed has already caused hydromodification impacts. Requiring project-by-project flow duration control for each new project may not address the existing issue as effectively as a regionally-coordinated approach that combines upland control with in-stream remedies. Including the EP standard enables the development of more comprehensive approaches that include both upland controls and stream modifications (i.e., restoration). This option is critical for more effectively and efficiently protecting the region's aquatic resources.

Additionally, the Administrative Draft Permit includes an unnecessarily narrow definition of hardened channels that includes only those channels lined with concrete. Other forms of artificial hardening may be comparably resistant to hydromodification impacts, such as channels that are lined with rip rap, armored with soil cement, or armored with other practices. While the Permittees or the project proponent should be responsible for demonstrating that a specific channel material is sufficiently stable, the narrow definition currently provided by the Administrative Draft Permit does not allow the use of sound engineering judgment and does not allow for use of innovative materials.

Finally, the Administrative Draft Permit should explicitly recognize the findings of hydromodification management plans (HMPs) that have been previously approved by this Board. The South Orange County HMP and the San Diego County HMPs were both the products of rigorous technical analysis based on the state of the practice, which were reviewed in detail by Board Staff. The findings of these efforts must not be jeopardized under the new terms of the Administrative Draft Permit. Specifically, findings regarding exempt water bodies must be appreciated and upheld, and they should be explicitly recognized in the Administrative Draft Permit per our suggested redline.

4. The Permit must preserve important provisions for watershed level design and implementation of LID BMPs.

The proposed development project criteria and requirements in the Administrative Draft Permit do not include the language in the current South Orange County Permit that provides for Alternative Compliance for Watershed-Based Planning (See page 40-41 of the 2009 Permit). We ask that the Regional Board continue to recognize the protections to water quality and enhancements to water bodies which are achieved through watershed-based projects such as the Rancho Mission Viejo Ranch Plan, as it has in the current South County MS4 permit, and define Watershed Planning as an alternative and co-equal approach to the project-specific requirements. Attachment 3 to this submittal contains suggested redline language for addition to the Administrative Draft Permit.

Concluding Remarks:

BIA/SC and CICWQ have been active participants and contributors to the creation of improved MS4 permits across southern California. We continue to believe that rational, *implementable*, and *effective* permit requirements are critical to achieving great progress concerning water quality and our environment. We hope that these comments are received in the manner in which they are intended – to continue the discussion of how we can create a workable permit that improves water quality to the maximum extent practicable. We remain committed to a positive dialog with the Board and its staff – one that will result in an informed, balanced and effective permit.

If you have any questions or want to discuss the content of our comment letter, please feel free to contact me at (951) 781-7310, ext. 213, (909) 525-0623, cell phone, or mgrey@biasc.org.

Sincerely,

Mark Grey

Mark Grey, Ph.D.
Director of Environmental Affairs and Technical Director
Building Industry Association of Southern California and
Construction Industry Coalition on Water Quality

April 10 and 11, 2013
Item No. 8
Supporting Document No. 5

United States
Environmental Protection Agency

Office of Water (4203)
Washington, DC 20460

EPA-841-B-00-005A
October 2000

Bioretention Applications

Inglewood Demonstration Project, Largo, Maryland
Florida Aquarium, Tampa, Florida

Key Concepts:

- Retrofits
- Structural Controls
- Source Controls

LOW-IMPACT DEVELOPMENT CENTER

Project Benefits:

- Retrofit Opportunity
- Pollutant Removal
- Volume Reduction
- Cost-Effectiveness

Introduction

Two case studies demonstrate the potential to use integrated management plans (IMPs) in the design of new parking facilities and as retrofits for existing parking facilities. The Inglewood study in Largo, Maryland, compared the pollutant removal efficiency of a bioretention cell in a laboratory setting to that of a comparable facility constructed in a parking lot. The Florida Aquarium study in Tampa, Florida, included monitoring of several storm events for volume and water quality control.

Inglewood Project Area

The project area is an existing 5-acre outdoor parking area located in a highly urbanized office park adjacent to Interstate 95. Runoff from adjacent areas does not flow across the lot. The slope of the parking area is approximately 3 percent. Parking stalls are aligned at 90-degree angles, and there are approximately 30 cars in each row of an aisle. At the end of each aisle are planting areas surrounded by curbs and gutters. Curb drainage inlets have been placed in some of the islands to intercept and collect runoff as sheet flow, which is piped to a downstream regional stormwater management facility.

Inglewood Project Description

The Inglewood project consisted of a laboratory segment and a field segment. The laboratory segment involved construction of a planter box filled with a typical bioretention facility soil mixture (50 percent construction sand, 20 to 30 percent topsoil, and 20 to 30 percent compost). This facility is approximately half the size in volume of the Inglewood facility. The box was planted with representative plants and mulched. A synthetic stormwater mixture was applied and the pollutant removal efficiency, temperature, and runoff volume rate were measured. The pollutant mix included metals (copper, lead, and zinc), phosphorus, organic nitrogen, and nitrate.

A landscaped island measuring approximately 38 feet by 12 feet was chosen as the retrofit area. The island contains a curb inlet that drains into the municipal storm drain system. Almost the entire drainage area is impervious. A 4-foot slot was cut into the curb immediately before the inlet. The landscaped island was then excavated to a depth of 4 feet. An underdrain was installed and tied into the bottom of the existing inlet to completely drain the planting soil to avoid oversaturation. The underdrain was covered with 8 inches of 1- to 2-inch gravel and backfilled with typical bioretention soil mix. The backfill extended to a depth of about 12 inches below the top of the curb, which allows for a ponding depth of approximately 6 inches of water in the island

Figure 1. Bioretention landscaping at the Inglewood demonstration project site.

Table 1. Summary of bioretention pollutant removal results for the Inglewood demonstration project.

Pollutant	Input mean ± standard deviation	Output mean ± standard deviation	Output range	Output percent removal mean ± standard deviation
Cu dissolved (µg/L)	120 ± 27	63 ± 6.5	55–75	48 ± 12
Cu total (µg/L)	120 ± 27	69 ± 9.4	55–85	43 ± 11
Pb dissolved (µg/L)	54 ± 9.4	11 ± 6	6.7–25	79 ± 26
Pb total (µg/L)	54 ± 9.4	16 ± 7	6.7–26	70 ± 23
Zn dissolved (mg/L)	1.1 ± 0.021	0.24 ± 0.44	0.11–0.56	78 ± 29
Zn total (mg/L)	1.1 ± 0.021	0.39 ± 0.44	0.12–1.4	64 ± 42
Ca (mg/L)	44 ± 6.4	32 ± 6.1	24–41	27 ± 14
Cl^- (mg/L)	5.1 ± 0.48	162 ± 80	74–228	3,000[a]
Na (mg/L)	3.1	359 ± 170	68–497	11,000[a]
P (mg/L)	0.83	0.11 ± 0.017	0.10–0.13	87 ± 2
TKN (mg/L as N)	6.9 ± 0.81	2.3 ± 0.64	1.7–3.0	67 ± 9
NO_3^- (mg/L as N)	1.3 ± 0.05	1.1 ± 0.15	0.94–1.2	15 ± 12

[a]Shows percent production.

before a backwater is created at the curb opening. Subsequently the area was planted and covered with 3 inches of shredded hardwood mulch. Figure 1 shows the bioretention area after vegetation was established.

The stormwater mixture was applied to a 50-square-foot area in the field facility at a rate of 1.6 inches per hour for 6 hours. The removal rates for several pollutants are shown in Table 1. In addition to pollutant removal, the runoff temperature was lowered approximately 12 °C as the runoff was processed and filtered through the soil mixture. Most of the pollutant removal process occurred in the mulch layer.

A similar field investigation was conducted on an 8-year-old facility, and the metals removal rate was much higher (Davis et al., 1998). This effect might be attributed to slower flow rates through the soil, which has higher clay content, as well as greater pollutant uptake by vegetation.

Inglewood Project Summary and Benefits

This study showed the feasibility of retrofitting an existing parking facility and demonstrated the consistency of laboratory and field pollutant removal performance. The retrofit cost approximately $4,500 to construct and treats approximately one-half acre of impervious surface. The bioretention retrofit was a more cost-effective way to filter pollutants than many proprietary devices designed to treat the same volume of runoff. These proprietary devices could cost $15,000 to $20,000, would be more expensive to maintain, and would not significantly decrease runoff volume or temperature. Also, bioretention areas offer the ancillary benefit of aesthetic enhancement. It is interesting to note that a drought occurred after the installation of the plants, and although many of the other plants in the parking lot died or experienced severe drought stress, the plants in the bioretention facility survived because of the retained water supply.

Florida Aquarium Project Area

The Florida Aquarium site is an 11.5-acre, asphalt and concrete parking area that serves approximately 700,000 visitors per year. Runoff was controlled using the following IMPs:

- End-of-island bioretention cells
- Bioretention swales located around the parking perimeter
- Permeable paving
- Bioretention strips between parking stalls
- A small pond to supplement storage and pollutant removal

Figure 2 is an illustration of the site that details the type and location of runoff controls.

Florida Aquarium Project Description

A total of 30 storm events were monitored for one year at the Florida Aquarium site during 1998-1999. The Southwest Florida Water Management

District measured rainfall and flow from eight of the subcatchments in the parking area and collected water quality samples on a flow-weighted basis. Comparisons between pavement areas controlled by IMPs and uncontrolled asphalt areas were made for peak runoff rate, runoff volume, runoff coefficients, and water quality. Sediment cores from swales also were collected and analyzed.

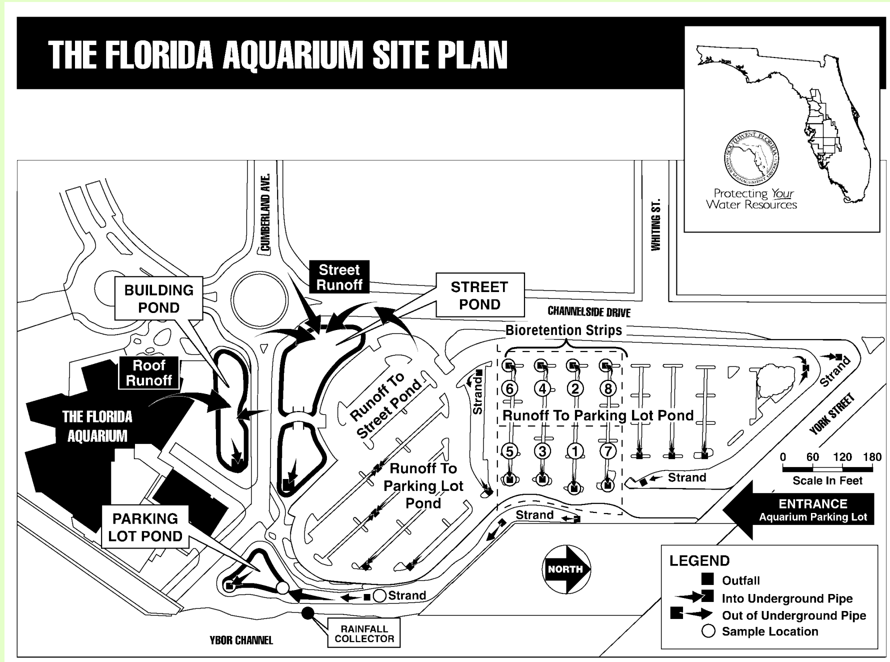

Figure 2. Layout of the Florida Aquarium site with IMPs. The eight basins outlined with dotted lines were evaluated in this part of the study.

Florida Aquarium Project Summary and Benefits

The parking areas controlled by IMPs showed a significant reduction in runoff volume and peak runoff rate. Table 2 shows pollutant load reductions for three pavement types; reduction is compared to pollutant loads in runoff from a basin without a swale. Much of the pollutant reduction is attributed to the reduced runoff in basins with swales. Because the swales are only the first element in the treatment train, even better removal efficiencies should be seen when data are analyzed for the entire system.

Table 2. Load efficiency of pollutants expressed as percent reduction for three types of pavement at the Florida Aquarium site.

Constituents	Percent pollutant reduction[a]		
	Asphalt w/swale	Cement w/swale	Porous w/swale
Ammonia	45	73	85
Nitrate	44	41	66
Total Nitrogen	9	16	42
Orthophosphorus	-180	-180	-74
Total Phosphorus	-94	-62	3
Suspended Solids	46	78	91
Copper	23	72	81
Iron	52	84	92
Lead	59	78	85
Manganese	40	68	92
Zinc	46	62	75

[a]The basins with swales were compared to a basin without a swale to determine the amount of reduction in pollutant loads possible using these small alterations. Notice that the efficiencies for phosphorus are negative, indicating an increase in phosphorus load in the basins with a swale.

References

Davis, A., M. Shokouhian, H. Sharma, and C. Minami, 1998. *Optimization of Bioretention Design for Water Quality and Hydrologic Characteristics*. Report 01-04-31032. Final report to Prince George's County, Maryland.

Rushton, B. 1999. *Low Impact Parking Lot Design Reduces Runoff and Pollutant Loads: Annual Report #1*. Southwest Florida Watershed Management District, Brooksville, Florida.

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April 10 and 11, 2013
Item No. 8
Supporting Document No. 5

Design Principles

for Stormwater Management on Compacted, Contaminated Soils in Dense Urban Areas

EPA's Brownfields Program is designed to empower states, communities, and other stakeholders in economic redevelopment to work together in a timely manner to prevent, assess, safely clean up, and sustainably reuse brownfields. A brownfield is a property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. EPA's Brownfields Program provides financial and technical assistance for brownfield revitalization, including grants for environmental assessment, cleanup, and job training.

What is Green Infrastructure?

Most development and redevelopment practices cover large areas of the ground with impervious surfaces such as roads, driveways, sidewalks, and new buildings themselves, which then prevent rainwater from soaking into the ground. These hard surfaces increase the speed and amount of stormwater that runs into nearby waterways, carrying pollutants and sediment each time it rains.

Green infrastructure seeks to reduce or divert stormwater from the sewer system and direct it to areas where it can be infiltrated, reused or evapotranspirated. Soil and vegetation are used instead of, or in conjunction with, traditional drains, gutters, pipes and centralized treatment areas. In many new and redevelopment projects, green infrastructure is implemented to manage and mitigate the polluted runoff created by precipitation that falls on rooftops, streets, sidewalks, parking lots and other impervious surfaces.

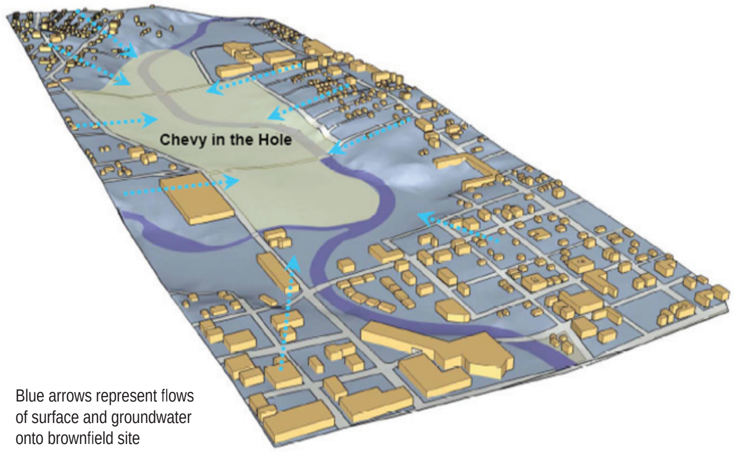
How can Green Infrastructure be Applied to Brownfield Sites?

Preparing brownfields for redevelopment often requires capping of contaminated soils, creating even larger impervious surfaces. The challenge for managing stormwater on brownfield sites is allowing this capping while mitigating the impervious surface conditions that can negatively impact local waterways.

Unlike many conventional developments, impervious footprints on brownfields cannot always be minimized through site designs that incorporate more porous surfaces to allow for infiltration. Direct infiltration on a brownfield site may introduce additional pollutant loads to groundwater and nearby surface waters. However, green infrastructure practices exist that can retain, treat and then release stormwater without it ever coming in contact with contaminated soils.

A bioswale in Wilmington, Delaware, designed to absorb and retain stormwater runoff.

The University of Michigan's School of Natural Resources and Environment developed design guidelines that use low impact development techniques on contaminated sites. Using a former industrial site in Flint, Michigan, called Chevy in the Hole, graduate students considered and refined methods to prevent residual contamination from moving with stormwater.



Blue arrows represent flows of surface and groundwater onto brownfield site

Design Considerations

A key component of using green infrastructure for brownfield sites is treatment and storage of stormwater, rather than complete infiltration. Most brownfields that have residual contamination need caps, so vegetated areas need to be located above caps and fitted with underdrain systems to remove overflow stormwater.

Development and redevelopment projects should start with keeping existing trees onsite, minimizing compaction of earth that inhibits water infiltration, and planting trees and other vegetation in areas where none exists. Retaining existing tree cover and vegetated areas helps infiltrate and evapotranspirate stormwater runoff while intercepting large amounts of rainfall that would otherwise enter waterways as runoff.

Buildings and other impervious surfaces can be strategically located to act as caps over areas with known contamination. Areas with fill caps can include soils and vegetation above the cap in the form of swales or rain gardens. If fitted with an under-drain system to release treated stormwater off site, these planted areas can safely allow filtration and evapotranspiration of stormwater. Additional features like impermeable liners or gravel filter blankets can be coupled with modified low impact development (LID) practices that safely filter stormwater without exposing the water to contaminated soils.

Green roofs are an ideal way to reduce the runoff from building roofs by encouraging evapotranspiration of rainwater. Another option for brownfield sites is the capture and reuse of stormwater for non-potable uses; this can include runoff storage in rain barrels for irrigation of green roofs or landscaped areas, or in cisterns that store rainwater for toilet flushing and other uses.

Site location within the watershed is very important. In particular, projects in groundwater recharge areas should avoid low impact development practices that promote infiltration, and use techniques that directly discharge treated stormwater instead. Furthermore, new and redeveloped sites near brownfields should use green infrastructure practices to prevent additional runoff from flowing onto potentially contaminated areas.

Overall, when developing a stormwater management plan on a brownfield, surrounding sites must be considered. *(Source: Flint Futures: Alternative Futures for Brownfield Redevelopment in Flint, Michigan.)*

The Matthew Henson Conservation Center in Washington, DC, utilizes a green roof.

General Principles for Using Green Infrastructure on Brownfield Sites

Guideline #1: Differentiate between groups of contaminants as a way to better minimize risks.

Guideline #2: Keep non-contaminated stormwater separate from contaminated soils and water to prevent leaching and spreading of contaminants.

Guideline #3: Prevent soil erosion using vegetation, such as existing trees, and structural practices like swales or sediment basins.

Guideline #4: Include measures that minimize runoff on all new development within and adjacent to a brownfield. These measures include green roofs, green walls, large trees, and rainwater cisterns.

Definitions

Bioswales are open channels with a dense cover of vegetation where runoff is directed or retained to evapotranspirate and filter.

Evapotranspiration is the return of water to the atmosphere either through evaporation or by plants.

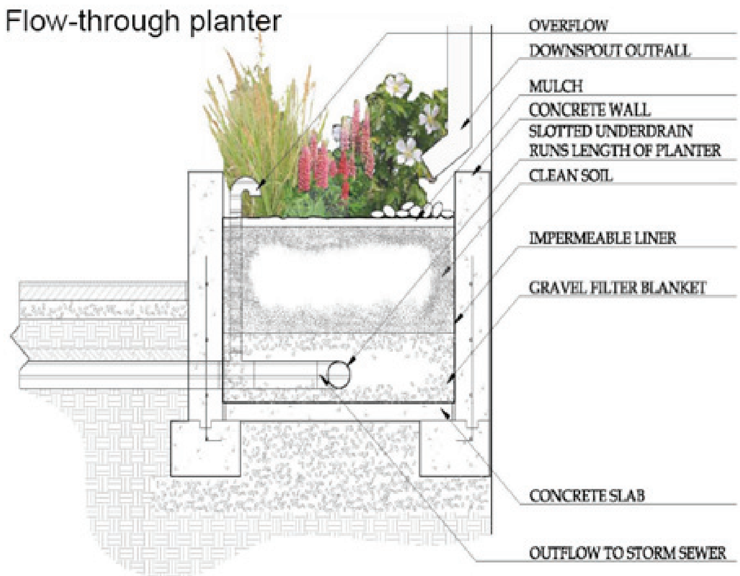
Green Infrastructure and ***Low Impact Development (LID)*** both refer to systems and practices that use or mimic natural processes to infiltrate, evapotranspirate or reuse stormwater or runoff on the site where it is generated.

Green roofs can be used to effectively reduce or eliminate runoff from small and medium sized storms. A soil mixture is placed over a waterproof membrane and drainage system and then planted with water absorbent and drought tolerant plants. Most systems also have root barriers. These roofs soak up stormwater and release it back into the atmosphere through evaporation and plant respiration, while draining excess runoff.

Rain gardens serve the same purpose as stormwater planters and are appropriate where there is more area to plant vegetation. Sizing is dependent on the area of impervious surfaces draining to the rain garden, but they can be designed to only treat a portion of the runoff so they can be placed in most situations.

Stormwater harvest and reuse. Rainwater harvested in cisterns, rain barrels, or other devices may be used to reduce potable water used for landscape irrigation, fire suppression, toilet and urinal flushing, and custodial uses. Storage and reuse techniques range from small-scale systems (e.g., rain barrels) to underground cisterns that may hold large volumes of water.

Stormwater planters. Downspouts can be directed into stormwater planters. These planters are used to temporarily detain, filter and evapotranspirate stormwater using plant uptake.



Additional Resources

The Emeryville, California *Stormwater Guidelines for Green, Dense Redevelopment* provides guidance on using vegetative stormwater treatment measures for this dense, brownfield-laden city: www.ci.emeryville.ca.us/planning/stormwater.html.

EPA's *Green Infrastructure Web site* (www.epa.gov/npdes/greeninfrastructure) provides definitions, case studies and performance data for various practices that might be applicable to brownfield sites.

The Low Impact Development Center is dedicated to research, development, and training for water resource and natural resource protection issues. The Center focuses specifically on furthering the advancement of Low Impact Development technology: www.lowimpactdevelopment.org.

Green Roofs for Healthy Cities collects and publishes technical information on green roof products and services: www.greenroofs.org.

The Center for Watershed Protection's Better Site Design Tools provide links to various better site design resources and publications: www.cwp.org/PublicationStore/bsd.htm.

American Rivers' *Catching the Rain: A Great Lakes Resource Guide for Natural Stormwater Management* describes a variety of low impact development strategies that can be implemented in a wide range of built environments. Available at: www.americanrivers.org/site/DocServer/CatchingTheRain.pdf?docID=163

NRDC's *Rooftops to Rivers: Green Strategies for Controlling Stormwater and Combined Sewer Overflows* is a policy guide for decision makers looking to implement green strategies in their own area, including nine case studies of cities that have successfully used green techniques to create a healthier urban environment. Available at: www.nrdc.org/water/pollution/rooftops/contents.asp

Portland's (Oregon) *Trees for Green Streets: An Illustrated Guide* is a guidebook that helps communities select street trees that reduce stormwater runoff from streets and improve water quality. Available at: www.metro-region.org/article.cfm?articleID=263

Seattle's *pilot Street Edge Alternatives Project (SEA Streets)* is designed to provide drainage that more closely mimics the natural landscape prior to development than traditional piped systems. Good information can be found at: www.seattle.gov/util/About_SPU/Drainage_&_Sewer_System/Natural_Drainage_Systems/Street_Edge_Alternatives/index.asp

EPA's *Protecting Water Resources with Higher-Density Development* report helps communities better understand the impacts of higher and lower density development on water resources. The findings indicate that low-density development may not always be the preferred strategy for protecting water resources. Available at: www.epa.gov/dced/water_density.htm.

Portland Metro's (Oregon) *Green Streets: Innovative Solutions for Stormwater and Stream Crossings* is a handbook that describes stormwater management strategies and includes detailed illustrations of "green" street designs that allow infiltration and limit stormwater runoff. Available at www.metro-region.org/article.cfm?articleID=262

EPA's *Protecting Water Resources with Smart Growth* is a report intended for audiences already familiar with smart growth concepts who seek specific ideas on how techniques for smarter growth can be used to protect water resources. The report describes 75 policies that communities can use to grow in the way that they want while protecting their water quality. Available at: www.epa.gov/dced/water_resource.htm

EPA's *Using Smart Growth Techniques as Stormwater Best Management Practices* reviews nine common smart growth techniques and examines how they can be used to prevent or manage stormwater runoff. Available at: www.epa.gov/dced/stormwater.htm

EPA's *Brownfields Program Website* (www.epa.gov/brownfields) provides information on and resources for assessing, cleaning up and redeveloping brownfields, including grant funding opportunities.

3. Development Planning

Each Copermittee must use their land use/planning authorities to implement a development planning program that includes, at a minimum, the following requirements.

a. PERMANENT BMP REQUIREMENTS FOR ALL DEVELOPMENT PROJECTS

Each Copermittee must prescribe the following BMP requirements during the planning process (i.e. prior to project approval and issuance of grading or building permits) for all pollutant-generating[14] development projects (regardless of project type or size), where local permits are issued~~, including unpaved roads and flood management projects:~~

(1) General Requirements

(a) All BMPs must be located so as to remove pollutants from runoff prior to its discharge to any receiving waters~~, and as close to the source as possible~~;

(b) Multiple development projects may use shared permanent BMPs as long as construction of any shared BMP is completed prior to the use or occupation of any development project from which the BMP will receive runoff; and

(c) Permanent BMPs must not be constructed within a waters of the U.S. or waters of the state except those that have obtained a CWA Section 401 Water Quality Certification or Waste Discharge Requirement as applicable.

(2) Source Control BMP Requirements

The following source control BMPs must be implemented at all development projects where applicable and feasible:

(a) Prevention of illicit discharges into the MS4;

(b) Storm drain system stenciling or signage;

(c) Properly designed outdoor material storage areas;

(d) Properly designed outdoor work areas;

(e) Properly designed trash storage areas; ~~and~~

~~(f) Any additional BMPs necessary to minimize pollutant generation at each project.~~

[14] Pollutant generating development projects are those projects that generate pollutants at levels greater than natural background levels.

(3) Low Impact Development (LID) BMP Requirements

The following LID BMPs must be implemented at all pollutant generating development projects where applicable and feasible:

(a) Maintenance or restoration of natural storage reservoirs and drainage corridors (including topographic depressions, areas of permeable soils, natural swales, and ephemeral and intermittent streams);~~[14]~~[15]

(b) Buffer zones for natural water bodies (where buffer zones are technically infeasible, require project applicant to include other buffers such as trees, access restrictions, etc.);

(c) Conservation of natural areas within the project footprint including existing trees, other vegetation, and soils;

(d) Construction of streets, sidewalks, or parking lot aisles to the minimum widths necessary, provided public safety is not compromised;

(e) Minimization of the impervious footprint of the project;

(f) Minimization of soil compaction to landscaped areas;

(g) Disconnection of impervious surfaces through distributed pervious areas;

(h) Landscaped or other pervious areas designed and constructed to effectively receive and infiltrate, retain and/or treat runoff from impervious areas, prior to discharge to the MS4;

(i) Small collection strategies located at, or as close as possible to, the source (i.e. the point where storm water initially meets the ground) to minimize the transport of runoff and pollutants to receiving waters;

(j) Use of permeable materials for projects with low traffic areas and appropriate soil conditions;

(k) Landscaping with native or drought tolerant species; and

(l) Harvesting and using precipitation.

~~14~~ 15 Development projects proposing to dredge or fill materials in waters of the U.S. must obtain a CWA Section 401 Water Quality Certification. Projects proposing to dredge or fill waters of the State must obtain Waste Discharge Requirements.

(4) Long-Term Permanent BMP Maintenance

Each Copermittee must require the project applicant to submit proof of the mechanism under which ongoing long-term maintenance of all permanent BMPs will be conducted.

(5) Infiltration and Groundwater Protection

(a) Infiltration and treatment control BMPs ~~designed to primarily function as large, centralized infiltration devices (such as large infiltration trenches and infiltration basins)~~ must not cause or contribute to an exceedance of an applicable groundwater quality objective. At a minimum, such infiltration and treatment control BMPs must be in conformance with the design criteria listed below, unless the development project applicant demonstrates to the Copermittee that one or more of the specific design criteria listed below are not necessary to protect groundwater quality. The ~~The design criteria listed below do not apply to small infiltration systems dispersed throughout a development project.~~ Permittees may establish different design criteria than those listed below for different BMP types based on the inherent degree of risk to groundwater quality (for example, dry wells versus bioretention).

(i) Runoff must undergo pretreatment such as sedimentation or filtration prior to infiltration;

(ii) Pollution prevention and source control BMPs must be implemented at a level appropriate to protect groundwater quality at sites where infiltration treatment control BMPs are to be used;

(iii) Infiltration treatment control BMPs must be adequately maintained to remove pollutants in storm water to the MEP;

(iv) The vertical distance from the base of any infiltration treatment control BMP to the seasonal high groundwater mark must be at least 10 feet. Where groundwater basins do not support beneficial uses, this vertical distance criteria may be reduced, provided groundwater quality is maintained;

(v) The soil through which infiltration is to occur must have physical and chemical characteristics (e.g., appropriate cation exchange capacity, organic content, clay content, and infiltration rate) which are adequate for proper infiltration durations and treatment of runoff for the protection of groundwater beneficial uses, unless first treated or filtered to remove pollutants prior to infiltration;

(vi) Infiltration treatment control BMPs must not be used for areas of industrial or light industrial activity, and other high threat to water quality land uses and activities as designated by each Copermittee, unless first treated or filtered to remove pollutants prior to infiltration; and

(vii) Infiltration treatment control BMPs must be located a minimum of 100 feet horizontally from any water supply wells.

(b) The Copermittees may collectively or individually develop alternative mandatory design criteria to that listed above for infiltration and treatment control BMPs which are designed to primarily function as centralized infiltration devices. Before implementing the alternative design criteria in the development planning process the Copermitee(s) must:

(i) Notify the San Diego Water Board of the intent to implement the alternative design criteria submitted; and

(ii) Comply with any conditions set by the San Diego Water Board.

b. PRIORITY DEVELOPMENT PROJECTS

(1) Definition of Priority Development Project

Priority Development Projects include the following:

(a) All new development projects that fall under the Priority Development Project categories listed under Provision E.3.b.(2). Where a new development project feature, such as a parking lot, falls into a Priority Development Project category, the entire project footprint is subject to Priority Development Project requirements; and

(b) Those redevelopment projects that create, add, or replace at least 5,000 square feet of impervious surfaces on an already developed site, or the redevelopment project is a Priority Development Project category listed under Provision E.3.b.(2). Where redevelopment results in an increase of less than fifty percent of the impervious surfaces of a previously existing development, and the existing development was not subject to Priority Development Project requirements, the performance and sizing requirements discussed in Provisions E.3.c.(2) and E.3.c.(3) apply only to the addition or replacement, and not to the entire development. Where redevelopment results in an increase of more than fifty percent of the impervious surfaces of a previously existing development, the performance and sizing requirements apply to the entire development.

(2) <u>Priority Development Project Categories</u>

(a) New development projects that create 10,000 square feet or more of impervious surfaces (collectively over the entire project site). This category includes commercial, industrial, residential, mixed-use, and public development projects on public or private land which fall under the planning and building authority of the Copermittee.

(b) Automotive repair shops. This category is defined as a facility that is categorized in any one of the following Standard Industrial Classification (SIC) codes: 5013, 5014, 5541, 7532-7534, or 7536-7539.

(c) Restaurants. This category is defined as a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC code 5812), where the land area for development is 5,000 square feet or more.

(d) Hillside development projects. This category includes any development which creates 5,000 square feet or more of impervious surface which is located in an area with known erosive soil conditions, where the development will grade on any natural slope that is twenty-five percent or greater.

(e) Environmentally sensitive areas (ESAs). This category includes any development located within, directly adjacent to, or discharging directly to an ESA, which either creates 2,500 square feet of impervious surface on a proposed project site or increases the area of imperviousness of a proposed project site to 10 percent or more of its naturally occurring condition. “Directly adjacent to” means situated within 200 feet of the ESA. “Discharging directly to” means outflow from a drainage conveyance system that collects runoff from the subject development or redevelopment site and terminates at or in receiving waters within the ESA.

(f) Parking lots. This category is defined as a land area or facility for the temporary parking or storage of motor vehicles used personally, for business, or for commerce that has 5,000 square feet or more of impervious surface.

(g) Streets, roads, highways, freeways, and residential driveways. This category is defined as any paved impervious surface that is 5,000 square feet or more used for the transportation of automobiles, trucks, motorcycles, and other vehicles.

(h) Retail gasoline outlets (RGOs). This category includes RGOs that meet the following criteria: (a) 5,000 square feet or more or (b) a projected Average Daily Traffic (ADT) of 100 or more vehicles per day.

(i) Large development projects. This category includes any post-construction pollutant-generating new development projects that result in the disturbance of one acre or more of land.

(3) Priority Development Project Exemptions

Each Copermittee has the discretion to exempt the following projects from being defined as Priority Development Projects:

(a) Sidewalks constructed as part of new streets or roads and designed to direct storm water runoff to adjacent vegetated areas;

(b) Bicycle lanes that are constructed as part of new streets or roads but are not hydraulically connected to the new streets or roads and designed to direct storm water runoff to adjacent vegetated areas;

(c) Impervious trails constructed and designed to direct storm water runoff to adjacent vegetated areas, or other non-erodible permeable areas;

(d) Sidewalks, bicycle lanes, or trails constructed with permeable surfaces.

c. PRIORITY DEVELOPMENT PROJECT PERMANENT BMP PERFORMANCE AND SIZING REQUIREMENTS

In addition to the BMP requirements listed for all pollutant generating development projects under Provision E.3.a, Priority Development Projects must also implement permanent BMPs that conform to performance and sizing requirements.

(1) Source Control BMP Requirements

Each Copermittee must require each Priority Development Project to implement applicable source control BMPs listed under Provision E.3.a.(2).

(2) Retention and Treatment Control BMP Requirements

Each Copermittee must require each Priority Development Project to implement BMPs to retain and treat pollutants onsite in the following order:

(a) Each Priority Development Project must be required to implement LID BMPs as described in Provision E.3.a.(3);

(b) Each Priority Development Project must be required to implement LID BMPs that are sized and designed to retain the volume equivalent to runoff produced from a 24-hour 85th percentile storm ~~event[15]~~ event[16] ("design capture volume").~~;~~

(c) If onsite retention using LID BMPs is technically infeasible per Provision E.3.c.(4), flow-thru LID ~~and/or conventional~~ treatment control BMPs, such as bioretention with an underdrain, must be implemented to treat the portion of the design capture volume that is not retained onsite. Flow-thru LID treatment control BMPs that are sized for the portion of the design capture volume that is not retained onsite may be used if full onsite retention is technically infeasible. Flow-thru LID treatment control BMPs must be designed for an appropriate surface loading rate to prevent erosion, scour and channeling within the BMP. ~~Additionally, project applicants must perform mitigation for the portion of the pollutant load in the design capture volume that is not retained onsite, as described in Provision E.3.c.(4)(c).~~

(d) If it is shown to be technically infeasible per Provision E.3.c.(4) to retain and/or treat with flow-thru LID treatment control BMPs sized for the portion of the design capture volume that is not retained onsite, then the project must implement conventional treatment control BMPs in accordance with Provision E.3.c.(2)(d) below and must participate in the alternative compliance program in Provision E.3.c.(4)(c).

(~~d~~e) All onsite treatment control BMPs must:

(i) Be correctly sized and designed so as to remove pollutants from storm water to the MEP;

(ii) Be sized to comply with the following numeric sizing criteria:

[a] Volume-based treatment control BMPs must be designed to treat the remaining portion of the design capture volume that was not retained and/or treated with flow-thru LID treatment control BMPs sized for the portion of the design capture volume that is not retained onsite~~retained or onsite~~; or

[b] Flow-based treatment control BMPs must be designed to ~~mitigate (filter or~~ treat~~)~~ either: 1) the maximum flow rate of runoff produced from a rainfall intensity of 0.2 inch of rainfall per hour, for each hour of a storm event; or 2) the maximum flow rate of runoff produced by the 85th percentile hourly rainfall intensity (for each hour of a storm event), as determined from the local historical rainfall record, multiplied by a factor of two, or 3) an alternative design rate that is demonstrated to result in the treatment of a volume of stormwater equivalent to that achieved under c.(2)(e)(ii)[a].

(iii) Be ranked with high or medium pollutant removal efficiency for the project's most significant pollutants of concern. Treatment control BMPs with a low removal efficiency ranking must only be approved by a Copermittee when a feasibility analysis has been conducted which exhibits that implementation of treatment control BMPs with high or medium removal efficiency rankings are infeasible for a Priority Development Project or portion of a Priority Development Project.

[15] This volume is not a single volume to be applied to all areas covered by this Order. The size of the 85th percentile storm event is different for various parts of the San Diego Region. The Copermittees are encouraged to calculate the 85th percentile storm event for each of its jurisdictions using local rain data pertinent to its particular jurisdiction. In addition, isopluvial maps may be used to extrapolate rainfall data to areas where insufficient data exists in order to determine the volume of the local 85th percentile storm event in such areas. Where the Copermittees will use isopluvial maps to determine the 85th percentile storm event in areas lacking rain data, the Copermittees must describe their method for using isopluvial maps in its BMP Design Manuals.

(3) Hydromodification Management BMP Requirements

Each Copermittee must require each Priority Development Project to implement hydromodification management BMPs so that:

(a) ~~(a)~~ Post-project runoff flow rates and durations do not exceed pre-development (naturally occurring) runoff flow rates and durations by more than 10 percent (for the range of flows that result in increased potential for erosion or degraded channel conditions downstream of Priority Development Projects).

OR

The erosion potential ratio is maintained to within 10 percent of the target value from the project discharge point to a downstream receiving water that is exempt from the hydromodification management BMP requirements per Provision E.3.c.(3)(d). Erosion potential is the ratio of total long-term sediment transport capacity or channel work in the proposed condition versus the pre-development (naturally occurring) condition.

(i) In evaluating the range of flows that results in increased potential for erosion of natural (non-hardened) channels, the lower boundary must correspond with the critical channel flow that produces the critical shear stress that initiates channel bed movement or that erodes the toe of channel banks.

~~(ii) For artificially hardened channels, analysis to identify the lower boundary must use characteristics of a natural stream segment similar to that found in the watershed. The lower boundary must correspond with the critical channel flow that produces the critical shear stress that initiates channel bed movement or erodes the toe of the channel banks.~~

(ii~~i~~) The Copermittees may use monitoring results pursuant to Provision D.2.b.(6) to re-define the range of flows resulting in increased potential for erosion or degraded channel conditions, as warranted by the data.

(b) ~~(b)~~ Post-project conditions ~~runoff flow rates and durations~~ must ~~compensate~~ manage for the loss of bed sediment supply due to the development project, ~~should~~ if significant loss of sediment supply occurs as a result of the development project.

~~(a)~~(c) If hydromodification management BMPs are technically infeasible per Provision E.3.c.(4), project applicants must perform mitigation for the portion of the runoff volume that is not controlled and will cause or contribute to increased potential for erosion of receiving waters downstream of the Priority Development Project, as described in Provision E.3.c.(4)(c).

~~(b)~~(d) Exemptions

Each Copermittee has the discretion to exempt a Priority Development Project from the hydromodification management BMP requirements where the project:

(i) Discharges storm water runoff into underground storm drains discharging directly to water storage reservoirs, lakes, enclosed embayments, ~~or~~ the Pacific Ocean, or exempt river reaches identified in Hydromodification Management Plans (HMPs) approved by the San Diego Water Board;

(ii) Discharges storm water runoff into conveyance channels whose bed and bank are ~~concrete lined~~artificially hardened all the way from the point of discharge to water storage reservoirs, lakes, enclosed embayments, ~~or~~ the Pacific Ocean; ~~or~~or exempt river reaches identified in HMPs approved by the San Diego Water Board; or

(iii) Discharges storm water runoff into other areas identified by the San Diego Water Board as exempt from the requirements of Provisions E.3.c.(3)(a)-(c)~~.~~, ~~S~~such areas include those identified in HMPs approved by the San Diego Water Board.

(4) Alternative Compliance for Technical Infeasibility

At the discretion of each Copermittee, alternative compliance may be allowed for certain Priority Development Projects to comply with Provisions E.3.c.(2) and E.3.c.(3), subject to the following requirements:

(a) Applicability

Priority Development Projects may be allowed alternative compliance if:

(i) The Copermittee reviews and approves site-specific hydrologic and/or design analysis performed by a registered professional engineer, geologist, architect, or landscape architect;

(ii) The project applicant demonstrates, and the Copermittee determines and documents, that retention LID, flow-through LID treatment control BMPs, and/or hydromodification management BMPs per Provisions E.3.c.(2) and E.3.c.(3) were incorporated into the project design to the maximum extent technically feasible given the project site conditions;

(iii) The project applicant is required to perform mitigation described in Provision E.3.c.(4)(c) with a net result of at least the same level of water quality protection as would have been achieved if the Priority Development Project had fully implemented the retention LID, flow-through LID treatment control BMPs, and hydromodification management BMP requirements under Provisions E.3.c.(2) and E.3.c.(3) onsite.

(b) Criteria For Technical Infeasibility

Each Copermittee must develop, or develop in collaboration with the other Copermittees, criteria to determine technical infeasibility for fully implementing the retention LID and hydromodification management BMP requirements under Provisions E.3.c.(2) and E.3.c.(3) and include these requirements in the Permanent BMP Sizing Criteria Design Manual pursuant to Provision E.3.d. Technical infeasibility may result from conditions including, but not limited to:

(i) Locations that cannot meet the infiltration and groundwater protection requirements in Provision E.3.a.(5) due to the presence of shallow bedrock, contaminated soils, near surface groundwater, underground facilities, or utilities;

(ii) Brownfield development sites or other locations where pollutant mobilization is a documented concern;

(iii) The design of the site precludes the use of soil amendments, plantings of vegetation, or other designs that can be used to infiltrate and evapotranspirate runoff;

(iv) Soils cannot be sufficiently amended to provide for the requisite infiltration rates;

(v) Locations with geotechnical hazards;

(vi) Insufficient onsite and/or offsite demand for storm water use;

(vii) Modifications to an existing building to manage storm water are not feasible due to structural or plumbing constraints; and

(viii) Smart growth and infill or redevelopment locations where the density and/or nature of the project would create significant difficulty for compliance with Provisions E.3.c.(2) and E.3.c.(3) onsite.

(c) Mitigation

Priority Development Projects that meet the Copermittee's technical infeasibility criteria developed pursuant to Provision E.3.c.(4)(b) must be required to mitigate for the increased flow rates, increased flow durations, and/or increased pollutant loads expected to be discharged from the site. For the pollutant load in the volume of storm water not retained onsite with retention LID BMPs treated with flow-thru LID treatment control BMPs sized for the portion of the design capture volume that is not retained onsite, ~~, tre~~ or increased potential erosion of downstream receiving waters not fully controlled onsite with hydromodification management BMPs, the Copermittee must require the project applicant to either 1) implement an offsite mitigation project, and/or 2) provide sufficient funding for a public or private offsite mitigation project via a mitigation fund.

(i) *Mitigation Project Locations*

Offsite mitigation projects must be implemented within the same hydrologic unit as the Priority Development Project, and preferably within the same hydrologic subarea. Mitigation projects outside of the hydrologic subarea but within the same hydrologic unit may be approved provided that the project applicant demonstrates that mitigation projects within the same hydrologic subarea are infeasible and that the mitigation project will address similar potential impacts expected from the Priority Development Project.

(ii) *Mitigation Project Types*

Offsite mitigation projects must include, where applicable and feasible, retrofitting opportunities and stream and/or habitat rehabilitation or restoration opportunities identified in the Water Quality Improvement Plans, identified pursuant to Provision B.3.a. Other offsite mitigation projects may include green streets or infrastructure projects, or regional BMPs upstream of receiving waters. In-stream rehabilitation or restoration measures to protect or prevent adverse physical changes to creek bed and banks must not include the use of non-naturally occurring hardscape material such as concrete, riprap, or gabions. Project applicants seeking to utilize these alternative compliance provisions may propose other offsite mitigation projects, which the Copermittees may approve if they meet the requirements of Provision E.3.c.(4)(a).

(iii) *Mitigation Project Timing*

The Copermittee and/or project applicant must develop a schedule for the completion of offsite mitigation projects, including milestone dates to identify, fund, design, and construct the projects. Offsite mitigation projects must be completed upon the granting of occupancy for the first project that contributed funds toward the offsite mitigation project, unless a longer period is authorized by the San Diego Water Board.

(iv) *Mitigation Fund*

A Copermittee may choose to implement additional mitigation programs (e.g., pollutant credit system, mitigation fund) as a means for developing and implementing offsite mitigation projects, provided the projects conform to the requirements for project locations, types, and timing described above.

(5) Alternative Compliance for Watershed-Based Planning

Where a development project, greater than 100 acres in total project size or smaller than 100 acres in size yet part of a larger common plan of development that is over 100 acres, has been prepared using watershed and/or sub-watershed based water quality, hydrologic, and fluvial geomorphologic planning principles that implement regional LID BMPs in accordance with the sizing and location criteria of this Order and acceptable to the Regional Board, such standards shall govern review of projects with respect to Provision E.3. of this Order and shall be deemed to satisfy this Order's requirements for LID site design, buffer zone, infiltration and groundwater protection standards, source control, treatment control, and hydromodification control standards. Regional BMPs must clearly exhibit that they will not result in a net impact from pollutant loadings over and above the impact caused by capture and retention of the design storm. Regional BMPs may be used provided that the BMPs capture and retain the volume of runoff produced from the 24-hour 85th percentile storm event as defined in Provision E.3.c. and that such controls are located upstream of receiving waters. Any volume that is not retained by the LID BMPs, up to the design capture volume, must be treated using LID biofiltration sized for the design capture volume that has not been retained. Where regional LID implementation has been shown to be technically infeasible (per Provision E.3.c.(4)(b)) any volume up to and including the design capture volume, not retained by LID BMPs, nor treated by LID biofiltration, must be treated using conventional treatment control BMPs in accordance with Provision E.3.c.(2)(d) and participation in the mitigation program in Provision E.3.c.(4)(c).

BIOCOM

Mr. Gary Strawn
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San Diego Regional Water Quality Control Board
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San Diego, CA 92123-4340

January 11, 2013

Re: Comment—Tentative Order No. R9-2013-001, Regional MS4 Permit,
Place ID: 786088Wchiu

Dear Vice Chair Strawn:

BIOCOM is responding the San Diego Regional Water Quality Control Board's Tentative Order R9-2012-0011 ("Permit") dated October 31, 2012. After reviewing the proposed Permit, BIOCOM is concerned it will impose expensive, onerous, and untested regulations on local governments, businesses, and residents.

BIOCOM is the largest regional life science advocacy organization representing more than 550 companies; including biotech, medical device, basic research institutions; universities; biofuels and service providers. We understand the importance of clean, safe water to the region and are interested in improving San Diego's water. It is important, however, that we use our limited resources wisely, and ensure that our efforts produce the desired outcome of improving water quality.

We commend the Board's inclusion of Water Quality Improvement Plans (WQIP) as a first step in developing a cost-effective approach to improving our water. Analysis remains a critical component of a successful strategy, and we are glad to see that the Board is committed to finding the best possible solution to water quality improvement.

However, we are concerned that the costs associated with enforcing and implementing the permit will have a negative impact on the local life science industry and San Diego's economy. The three primary areas of concern include: 1) the strict liability for exceeding water quality objectives; 2) the preemption of WQIPs by new and changing regulatory requirements prior to allowing the WQIPs to be developed and implemented; and 3) the lack of reliable funding sources to implement these regulatory changes.

It is necessary to hold individuals, businesses and governments accountable, but it is critical that accountability measures are practical with demonstrable, positive effects on water quality. Due to our concerns, we respectfully request that the Permit focus on the timely development of effective and enforceable WQIPs, and that each of the WQIPs be developed through a process that ensures public participation. We ask also that the designation of appropriate Best

Management Practices in each watershed be determined through the WQIP process rather than the one size fits all strategy currently being proposed in the Permit. We ask further that until the Board adopts a WQIP for a watershed that the provisions of the existing Permit remain in place for that watershed. Finally, in order to avoid unnecessary litigation we request that the Board adopt the WQIPs as Orders implementing the proposed Permit.

We strongly urge you to adopt final permit language that is evidence-based and both environmentally and economically sustainable. Thank you for your consideration. If you have any questions please me at fpicking@biocom.org or (858) 455-0300 x113.

Sincerely,

Faith Picking
Associate Director of Local Government Affairs
BIOCOM

COASTAL ENVIRONMENTAL RIGHTS FOUNDATION

Environmental HEALTH COALITION

SAN DIEGO COASTKEEPER

January 11, 2013

Wayne Chiu, P.E.
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

via Electronic Mail
wchiu@waterboards.ca.gov

RE: **Comment – Tentative Order No. R9-2013-0001, Regional MS4 Permit**
Place ID: 786088Wchiu
Monitoring Requirements Should Be Strengthened

Please accept these comments on behalf of the Coastal Environmental Rights Foundation (CERF), Environmental Health Coalition (EHC), and San Diego Coastkeeper (SDCK). These San Diego organizations act through community involvement, regulatory participation, and legal action to ensure the protection restoration of San Diego Bay, Mission Bay, and the region's coastal waters.

CERF, EHC and SDCK support and hereby join in the comments submitted by the Keepers (San Diego, Orange County, and Inland Empire), and specifically reiterate the need for more stakeholder input in the development of Water Quality Improvement Plans, especially the monitoring component. CERF submits this comment letter to specifically focus on the water monitoring requirements within the Regional MS4 Permit.

As the Regional Water Quality Control Board (Regional Board) is likely aware, the United States Supreme Court recently issued a very narrow opinion in *L.A. County Flood Control Dist. v. NRDC, Inc*., 2013 U.S. LEXIS 597 (U.S. Jan. 8, 2013), reviewing a portion of the Ninth Circuit's decision in *NRDC, Inc. v. County of Los Angeles*, 673 F.3d 880 (9th Cir. Cal. 2011). The Supreme Court's ruling did not reach a portion of the Ninth Circuit's ruling related to the question of whether "exceedances detected at the instream monitoring stations are by themselves sufficient to establish the District's liability under the CWA for its upstream discharges." (*L.A. County Flood Control Dist,* 2013 U.S. LEXIS 597, 8-10).[1] (*NRDC, Inc*., 673 F.3d at 901). Therefore, it remains to be seen whether the Ninth Circuit's admonishment to citizen complainants that they must "spotlight how the flow of water from an ms4 'contribute[s]' to a water-quality exceedance detected at the Monitoring Stations" will stand.

In light of this potential new evidentiary hurdle, and more importantly the longstanding requirement that all NPDES permits contain monitoring provisions sufficient to assess compliance, CERF urges the Regional Board to require more robust, frequent, and widespread monitoring in the Regional MS4 Permit. (See Permit Attachment F, Fact Sheet, p. F-16). As reiterated by the Ninth Circuit, "Congress intended the Clean Water Act to function by self-monitoring and self-reporting violations to avoid the necessity of lengthy fact-finding,

[1] Environmental citizen plaintiffs still believe the water-quality exceedance itself is enough to establish Clean Water Act liability.

investigations, and negotiations at the time of enforcement." (*Id*. at 896, quoting S. Rep. No. 414, 92d Cong., 1st Sess. 64, reprinted in 1972 U.S.C.C.A.N. 3668, 3730).

Notwithstanding the aforementioned requirements, as amended from the previous, more expansive, administrative version of the permit, the current Regional MS4 Permit takes a more lax approach to monitoring. Pursuant to the proposed Regional MS4 Permit, the copermittees are not required to perform *any* transitional dry weather outfall monitoring, instead relying on field screening only. (D.2.a.(1)-(2)). In addition, the longterm monitoring plan for non-storm water persistent flow MS4 outfall discharge monitoring frequency is "at least semi-annually", while it was a monthly requirement in the previous draft. Most significantly, the currently proposed Regional MS4 moved away from the grid system, whereby the copermittees would monitor at least one station in each cell containing a segment of the copermittees' MS4. Now, copermittees will only have to monitor the ten highest priority non-storm water persistent flow outfalls. (D.2.b.(2)(b)).

This monitoring approach is insufficient for achieving the stated goal of informing copermittees about the "nexus between the health of receiving waters and the water quality condition of the discharges from their MS4." (Permit, p. 33). Equally important are the Regional Board's need to assess compliance and the public's ability to stay informed of the copermittees' compliance and progress:

> The monitoring and assessment information that will be reported to the San Diego Water Board is necessary to determine if the Copermittees are making progress toward achieving compliance with the discharge prohibitions, receiving water limitations, and effluent limitations under Provision A of the Order. (Permit Attachment F, Fact Sheet, p. F-16).
>
> Implementation of the monitoring and assessment requirements of Provision D will allow the Copermittees to demonstrate that the requirements of the CWA to effectively prohibit non-storm water discharges to the MS4 and reduce pollutants in storm water discharges from the MS4 to the MEP are being achieved. (*Id*. at p. F-58).

The required semi-annual dry weather outfall monitoring does not adequately serve any of these functions. EPA *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters* (*NPS Management Guidance*) provides some insight on the need for more frequent sampling:

> Coastal waters, estuaries, ground water, and lakes will typically have longer response times than streams and rivers. Thus, sampling frequency will usually be greater for streams and rivers than for other water resource types. Some parameters such as total suspended solids and fecal coliform bacteria can be highly variable in stream systems dominated by nonpoint sources, while nitrate levels may be less volatile in systems driven by baseflow from ground water. The highly variable parameters would generally require more frequent sampling, but parameter variability should be evaluated on a site-specific basis rather than by rule of thumb. (*NPS Management Guidance*, Chapter 8, section 5a.).

Thus, the proposed semi-annual monitoring frequency is unlikely to capture the variability of most inland receiving waters and many parameters.

The EPA further recognizes that *monthly* sampling is suitable to detect the annual pattern of changes with time. (*Id.*). Indeed, the original administrative version of the permit contained a monthly monitoring requirement. This more appropriate frequency was replaced with the current semi-annual monitoring provision apparently in response to comments by the San Diego copermittees.[2] The copermittees' reasoning, however, provides little justification for this change. The copermittees relied in part on their poor results in detecting and eliminating illicit discharges through the current permit's monitoring requirements. (San Diego Copermittee Supporting Documentation and Rationale for Alternative Provision II.D Monitoring and Assessment Requirements ("Supporting Rationale"), September 14, 2012, p. 26). The copermittees' inability to detect and eliminate non-storm water flows is more likely an enforcement issue rather than a monitoring problem. Indeed, if the copermittees need more data in order to trace the source of the non-storm water flow, *more* monitoring should be required, not less.

The copermittees also point to the effectiveness of their industrial and commercial inspections to justify less frequent monitoring. However, their own data shows that from 2009 to 2011, <u>no ICIDs were detected</u>, and therefore <u>none were stopped</u>. Rather than representing an effective ICID detection program, this data shows that inventoried commercial and industrial uses are not the source of ICIDs. In other words, this constitutes an exercise in the process of elimination, not detection.

Lastly, the copermittees argue the complaint process is the most effective means of detecting and eliminating ICIDs, and therefore should be relied upon more heavily. While CERF, EHC and SDCK applaud the copermittees for their success in complaint responses, and in ICID elimination as a result, the fact remains that dry weather flows continue, and copermittees have failed to adequately determine their source and effectively eliminate them. This is evident in the copermittees data. In response to dry weather monitoring, only 174 site visits were made, while the successful complaint procedure resulted in 939 visits – five times more visits. (*Id*. at p. 27). It appears copermittees are simply not *using* the dry weather monitoring data. Rather than reward the copermittees for their failure, the Regional Board should require more data in order to enable to copermittees to more effectively <u>trace</u> dry weather flows to their source.

[2] The copermittees argued: " <u>The approach outlined in the Administrative Draft Tentative Order would generate a great deal of water quality data for dry weather flows and identify some IC/IDs.</u> However, *since the purpose of the program is to eliminate dry weather flows and IC/ID flows entirely*, <u>there is little value to collecting extensive dry weather</u> water quality data for MS4 sites. Very little of the water quality data collected would support assessment of the stated program management objective to effectively prohibit non-storm water discharges to the MS4s." (San Diego Copermittee Comments on Tentative Order No. R9-2012-0011, September 14, 2012, p. 31, emphasis added).

Importantly, while the copermittees focus on the ICID detection and elimination aspect of dry weather monitoring, of equal importance is the compliance aspect. More frequent monitoring is integral to demonstrating active compliance with the prohibition against non-storm water flows in the MS4.

In addition to lax dry weather monitoring, the current permit requires minimal wet weather monitoring, as the copermittees are to monitor wet weather MS4 outfalls at "an **appropriate frequency** to identify sources of pollutants in storm water discharges from the MS4s causing or contributing to the highest priority water quality conditions...". (D.2.c.(2), emphasis added). As has been the case historically, when given the option copermittees will monitor as *infrequently* as possible.

Further, as provision B.4. of the Regional MS4 Permit requires, at a minimum, that Water Quality Improvement Plans (WQIPs) include the requirements of Provision D as part of the water quality improvement monitoring and assessment program for the WQIPs, it is very likely the copermittees will do no more monitoring than required in Provision D.[3] Thus, if the public, the Regional Board, and the copermittees are to truly assess compliance and the success of their iterative approach, the Regional MS4 Permit itself must require more monitoring.

We urge the Regional Board to reconsider its revised monitoring requirements in the draft Regional MS4 Permit in light of the stated goals of the monitoring program, and the potential compliance and enforcement issues that may result if adequate monitoring is not made part of the new permit.

Thank you in advance for your consideration of our comments. Should you have any questions, please feel free to contact us directly.

Sincerely,

Marco Gonzalez
Coastal Environmental Rights Foundation
marco@cerf.org

Livia Borak
Coastal Environmental Rights Foundation
livia@cerf.org

Nicole Capretz
Environmental Health Coalition
nicole@environmentalhealth.org

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[3] Monitoring for TMDLs and ASBS is also required, but these provisions only apply to those copermittees where TMDLs have been adopted and ASBS are located. (See Attachment E).

April 10 and 11, 2013
Item No. 8
Supporting Document No. 5

CITY OF CHULA VISTA **Public Works Department**

January 11, 2013
File # 0780-85-KY181
Via: Email and Hand Delivery

Mr. Wayne Chiu, P.E.
California Regional Water Quality Control Board, San Diego Region
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

Subject: **Comment – Tentative Order No. R9-2013-0001, Regional MS4 Permit Place ID: 786088Wchiu**

The City of Chula Vista appreciates the opportunity to provide comments on the Tentative Order No. R9-2013-0001 (NPDES General Permit No. CAS0109266). City staff has carefully reviewed the Tentative Order, and has specific comments that are presented in Attachment A to this letter. Additionally, the City of Chula Vista supports the comments and proposed revisions to the Tentative Order submitted by the County of San Diego on behalf of the San Diego Copermittees.

We trust that the San Diego Regional Board will give full consideration to our comments and recommendations in order to facilitate continued compliance, and to increase effectiveness of the MS4 Permit for the San Diego Region.

Should you have any questions or if you need further information, please call me at (619) 397-6111. Thank you.

K. Aminpour

KHOSRO AMINPOUR
SENIOR CIVIL ENGINEER

Attachment

C: Richard A. Hopkins, Director of Public Works
William S. Valle, Assistant Director of Public Works Engineering
Silvester Evetovich, Principal Civil Engineer

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ATTACHMENT A – City of Chula Vista Comments on Tentative Order No. R9-2013-0001

Comment No.	Page No.	Comment
1	73	II.E.3.a – Change "all development projects" to "all non-exempt development projects." An exempt-projects category should be created to include projects such as tenant improvements, traffic signals, utility work, road resurfacing, and projects similar to those exempted under the definition of Redevelopment (Attachment "C").
2	74	II.E.3.a.(1)(b) – By definition, all water in the state is considered to be a Waters of the State. Permanent BMPs require to be connected to drainage systems by conveyance systems that are also considered Waters of the State. Therefore, permanent BMPs inevitably are located within waters of the state. Please consider deleting "or waters of the state" similar to Order No. R9-2007-0001.
3	77	II.E.3.b.(3) – Add maintenance access roads to the list of potentially exempt categories, since this type of project results in insignificant pollutant discharge.
4	77	II.E.3.b.(3)(a) – Directing runoff from sidewalks to vegetated areas may result in localized flooding, standing water, degradation/damage to sidewalks, and excessive infiltration into electrical and other utility trenches. It is recommended to provide categorical exemption for sidewalks from SUSMP requirements, similar to Order No. R9-2007-0001.
5	78	II.E.3.c.(1)(a) – Examples of LID BMPs that retain runoff should be provided. Retention facilities typically include retention basins, rain barrels, or underground vaults. Can these facilities be considered LID BMPs? What should be done with the retained water in situations where soils are impermeable and there is a lack of demand for irrigation water during the rainy season?
6	78	II.E.3.c.(1)(a)(i) and (ii) – Please add "runoff" to read "The volume of storm water runoff…"
7	79	II.E.3.c.(1)(c) and throughout the Permit – Please provide a definition for "conventional treatment control BMPs".
8	79	II.E.3.c.(2) – Compliance with hydromodification control requirements on small projects is often infeasible and inefficient. It is recommended to adopt a lower threshold of one acre of impervious area (addition or replacement) for hydromodification control compliance, in line with the San Francisco Bay Area NPDES Municipal Permit.
9	80	II.E.3.c.(2)(a)(iii) – Monitoring data from Provision II.D.1.a.(2) will not provide necessary information to re-define the range of flows causing erosion.
10	80	II.E.3.c.(2)(b) – The Permit should provide guidelines to calculate sediment loss and the methods by which sediment loss can be compensated.

ATTACHMENT A – City of Chula Vista Comments on Tentative Order No. R9-2013-0001

Comment No.	Page No.	Comment
11	80	II.E.3.c.(2)(d) - The Copermittees spent about four years to develop the Final HMP, which includes exemptions based on sound technical justifications. The exemptions mainly deal with projects that discharge directly to depositional reaches of major rivers or large water bodies; small infill projects located within highly developed impervious drainage basins; or discharge to stabilized or hardened channels. Implementation of the Final HMP started in January of 2011 and many issues still remain to be resolved. Eliminating those exemptions at this time would create one size fits all regulations for all projects without regard to technical considerations. It is requested that the exemptions in the Final HMP remain in the Tentative Order until such time that further technical studies prove that they are no longer justified.
12	81	II.E.3.c.(3)(b) – Sizing criteria have not been provided for some alternative compliance options such as offsite retrofitting projects; offsite channel, stream, or habitat restoration; or offsite regional water supply augmentation. Sizing criteria is required to determine the size of alternative options that would provide the same level of water quality protection as would have been achieved by implementing provisions II.E.3.c.(1) and II.E.3.c.(2).
13	88	II.E.3.e.(2)(a) – Implementation of local SUSMPs in San Diego County started on 12/12/2002. Inventories of Priority Development Projects prior to that date are not available. Please revise the date.
14	91	II.E.4.a.(4) – This requirement is already included in other environmental regulations and its inclusion in this Permit is redundant.
15	95	II.E.5.a. – The permit should allow the Copermittees to use more than one data management system (inventory) to track the required information. For example, a GIS system can be used to identify and track the names and locations of existing facilities, while another system such as a business license database or a custom made industrial/commercial database can provide the SIC codes, WDID Nos., etc.
16	96	II.E.5.a.(2)(g) – Pollutants generated and potentially generated by existing facilities or areas can only be identified for typical land uses and not individual facilities or areas.
17	98	II.E.5.b.(1)(c)(iii) – Freeways are under the jurisdiction of Caltrans and that agency is responsible for their operation and maintenance. Please remove freeways from the list.

City of Del Mar

January 11, 2013

Mr. Wayne Chiu, P.E.
California Regional Water Quality Control Board, San Diego Region
9174 Sky Park Court, Suite 100
San Diego, California 92123-4340

SUBJECT: **Comment – Tentative Order No. R9-2013-0001, Regional MS4 Permit**
Place ID: 786088Wchiu

Dear Mr. Chiu:

The City of Del Mar would like to take the opportunity to provide written comments for Tentative Order R9-2013-0001. As stated in previous correspondence, the City appreciates the Order reissuance process to date. The process has allowed stakeholders to participate in shaping the Tentative Order by providing ideas and concepts that support an MS4 Permit that moves us towards our goal – improved water quality and receiving water conditions.

The City of Del Mar has participated in the process for development of the San Diego County Regional Copermittees' comments. Those comments, including an electronic version of recommended changes (e.g., redline/strikeouts), are to be submitted under separate cover by the County of San Diego on behalf of the San Diego County Regional Copermittees. The City of Del Mar supports the comprehensive comments and recommended edits to the Tentative Order.

In addition to supporting the comprehensive comments noted above, the City of Del Mar is providing two specific comments related to Attachment E (provisions for TMDLs) and applicability of hydromodication requirements.

Attachment E – Specific Provisions for Total Maximum Daily Loads Applicable to Order No. R9-2013-0001
The Bacteria TMDL[1] states that for watersheds where there are no longer any impairments listed on the 2008 303(d) List (for REC-1 water quality standards), the Phase I MS4s are not required to submit a load reduction plan and are not subject to any further action under the TMDL as long as monitoring continues to support compliance with REC-1 water quality standards. However, if the impairment returns for REC-1 water quality standards, the Responsible Parties will be required to submit a load reduction plan to the RWQCB.

The City of Del Mar and other Responsible Parties in the San Dieguito and Los Peñasquitos watersheds demonstrated to the RWQCB that the two watersheds are within this scenario where the Pacific Ocean Shoreline of the two watersheds are no longer listed as impaired for indicator bacteria under REC-1 water quality standards. The Responsible Copermittees received written confirmation that they are "not subject to further action under Resolution No. R9-2010-0001 as long as monitoring data continues

[1] Revised TMDL for Indicator Bacteria, Project I – Twenty Beaches and Creeks in the San Diego Region (Including Tecolote Creek) adopted by SDRWQCB Resolution No. R9-2010-0001

to support compliance with the REC-1 water quality standards." This scenario essentially places our two watersheds in a *dormant* TMDL condition, unless the Pacific Ocean shoreline of the one or both of the watersheds are relisted on future 303(d) lists for indicator bacteria[2].

Attachment E, Section 6[3] of the Tentative Order requires, amongst other provisions, the compliance with Water Quality Based Effluent Limitations (WQBELs). The WQBELs as described in the Tentative Order are expressed as Receiving Water Limitations, Effluent Limitations and as Best Management Practices requirements. As written, the Responsible Copermittees in the two watersheds are required to meet the listed WQBELs even while under the *dormant* TMDL condition.

There is a conflict between relisting of the Pacific Ocean shoreline and the more strict WQBEL limitations. Relisting of the Pacific Ocean shoreline would be done under the criteria established in the 2004 SWRCB Listing Policy[4] which allows for a certain number of water quality standard exceedances prior to listing. The WQBEL limitations allow **zero** water quality standard exceedances under dry weather conditions – a much higher bar with which to comply.

If the WQBELs are included in the final adopted Permit, at a minimum, the WQBEL compliance should only apply when the TMDL is in an *active* phase – i.e., the waterbody is impaired and listed on the 303(d) list as specified in the Bacteria TMDL (SDRWQCB Resolution R9-2010-0001). Otherwise, the Copermittees will be required to focus intense resources to address bacteria at the Pacific Ocean shorelines where water quality monitoring has demonstrated that it is not an issue. This ironic paradox would be contradictory to the watershed based adaptive management process where the objective is to focus limited resources on the highest water quality issues.

Comment – Based on the supporting information included in this letter and in SDRWQCB Resolution No. R9-2010-0001, correct the conflict between the Bacteria TMDL and Attachment E of the Tentative Order so that the WQBEL requirements are applicable when the TMDL is in an *active* phase, i.e., the waterbody is impaired and listed on the 303(d) list as specified in the Bacteria TMDL. Implied with correction of this conflict is that watersheds in a *dormant* TMDL condition, i.e., no longer listed as impaired for indicator bacteria under REC-1 water quality standards, are not subject to the WQBEL requirements of Attachment E of the Tentative Order.

Provision E.3.c.(2) Hydromodification Management BMP Requirements

The Tentative Order defines hydromodification as:

> The change in the natural watershed hydrologic processes and runoff characteristics (i.e., interception, infiltration, overland flow, and groundwater flow) caused by urbanization or other land use changes that result in increased stream flows and sediment transport. In addition, alteration of stream and river channels, such as stream channelization, concrete lining, installation of dams and water impoundments, and excessive streambank and shoreline erosion are also considered hydromodification, due to their disruption of natural watershed hydrologic processes.

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[2] Page A66 of SDRWQCB Resolution No. R9-2010-0001

[3] Attachment E, Section 6 of the Tentative Order is the Specific Provisions for Total Maximum Daily Loads Applicable to Order R9-2013-0001 for the Revised TMDL for Indicator Bacteria, Project I – Twenty Beaches and Creeks in the San Diego Region (Including Tecolote Creek)

[4] State Water Resources Control Board – Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List, adopted September 2004

The Tentative Order requires that priority development projects, including redevelopment projects, are required to control post-project runoff flow rates and durations so as not to result in increased potential for erosion, or degraded instream habitat conditions downstream of the projects. There are several explicit exemptions for these requirements identified in the Tentative Order. However, these exemptions are not inclusive of many of the exemptions identified in the San Diego Regional Copermittees Final Hydromodification Management Plan[5] (HMP). The exemptions identified in the HMP include, but are not limited to, projects that discharges to an exempt river reach, or a tidally-influenced area and other areas where there was little or no increased potential for erosion, or degraded instream habitat conditions downstream of the projects.

Over 95% of the City of Del Mar's MS4 system drains directly to either the Pacific Ocean or to tidally influenced areas of the San Dieguito estuary and river. The areas that drain to the Pacific Ocean will remain exempt per the Tentative Order, however, those areas that drain to tidally influenced areas of the San Dieguito estuary and river will not be exempt even though they have no Hydromodification impacts. The City will be forced to require priority development projects to mitigate for impacts they will not have, e.g., mitigation with no nexus to impacts.

Comment – Based on the definition of hydromodification, correct the hydromodification management requirements in the Tentative Order to be applicable for project sites that have the potential to create hydromodification impacts downstream of the project sites. At a minimum, this can be achieved by reinstating appropriate exemptions in the Order requirements.

The City looks forward to continuing our dialog with Regional Water Quality Control Board staff during the next phases of the permit reissuance process. If you have any questions, please contact me at (619) 994-7074.

Sincerely,

Mikhail Ogawa, P.E.
Clean Water Manager

c: Kathleen A. Garcia, Planning and Community Development Director
File

[5] Approved on July 14, 2010 by San Diego RWQCB Resolution No. 2010-0066

City of
Encinitas

January 11, 2013

Wayne Chiu, P.E.
California Water Quality Control Board, San Diego Region
9174 Sky Park Court, Suite 100
San Diego, California 92123-4340

SUBJECT: Comment – Tentative Order No.R9-2013-0001, Regional MS4 Permit, Place ID: 786088Wchiu

Dear Mr. Chiu,

Thank you for the opportunity to comment on *Tentative Order No. R9-2013-0001 Regional NPDES Permit and Waste Discharge Requirements for Discharges of Urban Runoff from Municipal Separate Storm Sewer Systems (MS4s) Draining the Watersheds within the San Diego Region* (Tentative Order).

The intent of this comment letter is to first offer that the City of Encinitas has participated in and is in support of the comprehensive comments and suggested permit language edits (e.g., red-line/strikeout) as submitted under separate cover by the San Diego County Copermittees on January 11, 2013.

In addition, consistent with the City's ongoing appeal to both Board Members and Staff related to *Attachment E – Specific Provisions for Total Maximum Daily Loads Applicable to Order No. R9-2013-0001*, *Section 6,* it is prudent and logical to distinguish the San Marcos HA as a 303(d) de-listed Pacific Ocean shoreline segment. This request has been captured in suggested language included in the San Diego County Copermittees submittal, premised upon the principles of the Tentative Order to focus resources on the highest water quality problems within a watershed, and supported by comprehensive technical analysis provided to RWQCB staff. As currently drafted without the necessary regulatory distinction, San Marcos HA Copermittees will be unreasonably constrained through an assessment of receiving water conditions (as prescribed in Provision B.2.a) to prioritize a water quality condition (indicator Bacteria) in a receiving water (Pacific Ocean) with unsupported beneficial use (REC-1) impairments.

Reasoned as such, the City of Encinitas requests the following update to *Attachment E, Section 6.a(5):*

> (5) Water Bodies: See Table 6.0; Consistent with Basin Plan Amendment (Resolution No. R9-2010-0001, p. A-2); specific beach segments from some of the Pacific Ocean shorelines listed in Table 6.0 have been delisted from the 2008 (sic 2010) 303(d) list that was approved by the San Diego Board on December 16, 2009, and therefore are not subject to the requirements of Attachment E as long as monitoring data continues to support compliance with water quality standards.

Thank you for your consideration of these comments and your evaluation of the significant matters presented above.

Sincerely,

Erik Steenblock,
Stormwater Program Manager, City of Encinitas

CITY OF LAGUNA HILLS

January 11, 2013

Wayne Chiu, P.E.
California Regional Water Quality Control Board, San Diego region
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

SUBJECT: COMMENT – TENTATIVE ORDER NO. R9-2013-0001, REGIONAL MS4 PERMIT, PLACE ID: 786088WCHIU.

Dear Mr. Chiu:

The City of Laguna Hills appreciates the opportunity to provide comments on Tentative Order No. R9-2013-0001, which is intended by the Regional Board to serve as the basis for stormwater regulation in the City following the expiration of current Order R9-2009-0002. The City has been actively involved in the development of the comprehensive set of comments submitted by the County of Orange. The City of Laguna Hills supports those comments and incorporates them herein by reference.

The City appreciates the efforts put forth by the Regional Board staff to revise certain provisions of the prior Administrative Draft. However, there is a need to implement further significant changes in the Permit to make it feasible to implement. These changes are included in redline format in the County submitted comments. A number of key issues have been extensively discussed in the focus meetings and Board workshops and, despite some changes, still remain a significant concern to the City. These include:

- The Receiving Water Limitations provisions in the Tentative Order could expose the City to Clean Water Act liabilities for discharges that cause or contribute to an exceedance of a water quality standard. A clear linkage between the compliance provisions and prohibitions, receiving water limitations, and effluent limitations must be established.

- The provisions dealing with Land Development, Low Impact Development (LID) and Hydromodification control have been arbitrarily tightened even while existing permit programs are only just being implemented and/or are pending approval and have not been able to be evaluated for success. The City is particularly concerned with the elimination of all exemptions for the hydromodification control requirements, including for discharges to channels that have been engineered to prevent erosion. Exemptions for hydromodification management should include discharges to certain types of receiving waters and certain types of projects.

- The provisions implementing the Beaches and Creeks Total Maximum Daily Load (TMDL) bacteria requirements are inconsistent with the TMDL as it was developed and pose additional significant liabilities. Permit provisions must be consistent with the corresponding Basin Plan amendments.

- The provisions requiring the development and implementation of a Water Quality Improvement Plan need to be aligned with the Jurisdictional Runoff Management Program requirements so that the programs are complimentary and prioritized instead of additive.

Thank you, for the opportunity to provide comments. The City would like to request the opportunity to meet with you, other Regional Board staff and the County of Orange to review the changes requested in the County letter.

Sincerely,

Kenneth H. Rosenfield, P.E.
Director of Public Services

January 11, 2013

Dave Gibson, Executive Director
Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123

Wayne Chiu
Regional Water Quality Control Board
9174 Sky Park Court
San Diego CA 92123-4340

COMMENTS - TENTATIVE ORDER NO. R9-2013-0001, REGIONAL MS4 PERMIT, PLACE ID: 786088Wchiu

Dear Mr. Gibson:

The City of Laguna Niguel appreciates this opportunity to comment on the draft Regional MS4 Permit for the San Diego Region (Tentative Order No. R9-2013-0001 – NPDES No. CAS0109266). The City is generally very supportive of the proposed re-organization of the Permit and the consolidation of programs within the Water Quality Improvement Plan framework. Your staff is to be commended for their extensive re-writing and outreach efforts.

However, there are still significant unresolved issues, and the City continues to believe that the Draft Permit should be considered a work in progress. The County of Orange, as the Principal Permittee for South Orange County, is addressing key issues in a letter being forwarded separately, and is providing detailed redline text edits. The City of Laguna Niguel has reviewed the legal, technical and monitoring comments being submitted by the County of Orange as Lead Permittee. The City of Laguna Niguel concurs with, adopts and incorporates into this letter the comments, concerns, and recommended deletions and modifications to the Draft Permit that are being submitted by the County of Orange.

New Bacteria Data and Implications

As Laguna Niguel's urban runoff program manager, I have actively participated as South Orange County's representative to the San Diego Region's Beaches & Creeks Bacteria TMDL Stakeholder Advisory Group (SAG) since 2002. I would like to bring to your attention the fact that **some critical new information, specifically related to the Bacteria TMDLs provisions, has become available in the last two weeks.** The new information strongly supports the understandings reached through 10 years of workshops, hearings, drafts and re-drafts of the Bacteria TMDL I for Beaches and Creeks, and for the Bacteria TMDL Implementation Provisions, both of which have been formally incorporated as Basin Plan Amendments. Your staff, the Permittees, the environmental groups, the Federal EPA, and the Regional Board put extensive work into to negotiating specific ideas and delicately-phrased language into the Basin Plan Amendment (BPA), to which all parties could commit. **The new information demonstrates the wisdom and prescience of the existing Basin Plan Amendment language**.

Our concern is that the TMDL Provisions in Attachment E of the Draft Regional Permit do not honor that hard-won consensus, and instead are contrary, in critical ways, to the Board-approved assumptions and requirements of the Basin Plan Amendments. In essence, **Attachment E sets several bars in wrong places**. If the language is not corrected, the net results are highly likely to be:

- It will be infeasible for us as Permittees to get or stay in compliance with the TMDLs.
- We will violate Numeric Effluent Limitations, which have been built into the Draft MS4 Permit as Water Quality Based Effluent Limitations.
- Under Porter-Cologne, local city governments will therefore be subject to potentially enormous Mandatory Minimum Penalties, and the Regional Board may not have discretionary authority to circumvent the situation.

Some parties have questioned whether these assertions, which have already been raised in several workshops, have been more melodramatic than technically accurate. Much of the quandary surrounds the question of whether it is or is not, in fact, reasonably feasible for Permittees to achieve the indicator bacteria concentration objectives as consistently as the Draft Permit requires (i.e., 100% of the time in dry weather, and at least 78% of the time in wet weather). Fortunately, within the last two weeks, new sets of bacteria data have become available that help answer this question, specifically for San Diego Region creeks. In short, the answer is: *no*.

Attached to this letter is a copy of the Year 1 Data Summary from the San Diego Regional Stream Reference Study. This study, which is still in progress, is being conducted, compiled and analyzed by the highly-respected non-partisan scientific organization, the Southern California Coastal Waters Research Project (SCCWRP), in cooperation with the Permittees, the Regional Board, and Federal EPA. The Study was undertaken as a direct procedural outcome of provisions incorporated into the Bacteria TMDL I and Implementation Provisions Basin Plan Amendments (BPAs), both of which stipulate that "*it is not the intent of these bacteria TMDLs to require treatment of natural sources of indicator bacteria";* the BPA-defined purpose of the Study was to find out whether, how often, and by how much *"natural sources cause exceedances of indicator bacteria water quality [concentration] objectives on their own, without contributions from anthropogenic sources."* **The preliminary Study data demonstrated that *natural***

bacteria exceedance frequencies in creeks were up to 71% in dry weather (versus the 0% required in the Draft Permit), and up to 100% in wet weather (versus the 22% allowed in the Draft Permit). ***Natural*** **creek bacteria concentrations jump around a lot, ranging up to 15 times higher than the concentration objectives in both wet and dry weather.** In other words, the indicator bacteria concentration objectives and "allowable" exceedance frequencies currently proposed in the Draft Permit are *unnatural* for San Diego Region creeks. Requiring Permittees to achieve them is asking us to do battle with Mother Nature herself. It would be a battle we would almost certainly lose.

Waste Loads vs. Concentrations

Understanding this reality provides insight into why determining impacts or compliance through concentration objectives, as proposed in the Draft Permit, is not feasible: such an approach only takes into account how many bacteria might happen to be caught in a random sampling vial, regardless of whether there is only a trickle of water or a flood. The Waste Load Allocations in the TMDLs Basin Plan Amendments, in contrast, describe the total number of *controllable anthropogenic* bacteria that are allowed to be discharged from an MS4 over the course of a specified time period (i.e. monthly for dry weather, and annually for wet weather). The Waste Load Allocations are determined as a function of total flow volume and bacteria concentrations that *on average overall* meet the concentration objectives.

Compliance Determination

For an MS4 manager trying to stay in compliance with the Permit, the difference between being judged on grab-sample concentrations and Waste Load Allocations is really insurmountable. Aside from the inherent jumpiness and high exceedance frequency of *natural* bacteria populations that the Permittees (pursuant to the Basin Plan Amendments) aren't supposed to have to control, the International Stormwater BMP Database, which compares the performance of various stormwater BMP types in achieving wet-weather effluent concentrations of indicator bacteria, identifies *no* BMPs that can achieve the effluent bacteria concentrations required for creeks under the draft Permit. The Database does, however, identify several stormwater BMPs that could feasibly achieve significantly more than the currently-required -22% as a bacteria *load* reduction in treated stormflows from individual sites. With respect to dry weather, several Permittee-implemented projects have demonstrated the ability to achieve 90% or greater reductions in anthropogenic dry weather bacteria *loads* through a combination of BMP treatments and flow reduction techniques; but none are consistently perfect in terms of bacteria concentrations. Achieving the implementation of Waste Load Allocations through appropriately-designed and appropriately-distributed systems of prevention, treatment and volume reduction BMPs targeting overall anthropogenic flow volumes and bacteria sources over time will be really the only feasible way for Cities to comply with the TMDLs – and is exactly what was envisioned in the approved Basin Plan Amendments. TMDL compliance determination needs to be based on load reductions achieved through BMP programs.

Water Quality Based Effluent Limits

The calculated TMDL Waste Load Allocations were incorporated directly into the TMDL Basin Plan Amendments. Federal law requires that Water Quality Based Effluent Limits set forth in an MS4 Permit, which make the TMDLs enforceable, have to be consistent with any available TMDL Waste Load Allocations. By leaving the Waste Load Allocations out of the Draft Permit and instead defining bacteria concentrations as Water Quality Based Effluent Limits, the Draft Permit contradicts Federal law, and establishes the concentrations as Numeric Effluent Limits under Porter-Cologne. **Exceedance of a Numeric Effluent Limit established in an MS4 Permit triggers Mandatory Minimum Penalties under Porter-Cologne.** Because natural bacterial exceedances and BMP performance limitations mean that the bacteria objective concentrations cannot feasibly be attained with adequate consistency, the **Permittees are being set up for failure and exposure to Mandatory Minimum Penalties, which the Regional Board would not have discretion to modulate.** Mandatory Minimum Penalties, which could easily run into hundreds of thousands of dollars daily, serve no good purpose for MS4s Permittees, the Board or the environment. Even the State Water Board's own Blue Ribbon Panel has concluded that incorporating Numeric Effluent Limits in MS4 Permits is *not feasible*. The WQBELs need to be *load-based*, and compliance needs to be based on implementing BMPs that achieve *load reductions.*

Provision for Re-Opener

When the Board approved the Bacteria TMDL Basin Plan Amendment in 2009, it committed specifically to a 5 year re-opener. The Board made that commitment because it recognized the TMDL had inherent flaws, principally because there were large gaps in the data used to inform the TMDL calculations. The plan was, that the Permittees would use the 5 years to do research to flesh out the local data, do some number-crunching, and bring back more locally appropriate Waste Load Allocations and exceedance frequency targets. With the re-opener, the updated allocations and frequencies would re-set the bar that Permittees would have to jump over – whether it was higher or lower. The Permittees are doing their part: we put funding together and started the research last winter to close the data gap, in conjunction with the Southern California Coastal Waters Research Project. Already, we have preliminary data demonstrating just how necessary that re-setting of the bar is likely to be. But the Permit, as currently drafted, doesn't keep the Board's part of the bargain, and doesn't recognize the course-correction that this Board had agreed was appropriate and necessary. An explicit commitment to the re-opener is needed.

Baseline for Improvement

Adding to the problem, the Draft Permit changes our starting line for measuring dry weather compliance. The Bacteria TMDL BPA specifically states that the "*available historical monitoring data from the years 1996-2002 shall be used to calculate the "existing" dry weather exceedance frequency of the 30-day geometric mean REC-1*

WQOS for each watershed." The Draft Permit proposes changing the baseline to between 2002 and 2011. The Permittees have already spent millions of dollars between 2002 and 2011 on efforts to reduce anthropogenic bacteria waste loads. In some cases, Permittees are already close to achieving the final percent waste load reductions defined as numeric targets in the TMDLs, and some Permittees have attained 303(d) de-listings as a result of their efforts. Think about the math of it: if the final load reduction target was set at 75% in the approved TMDL BPA, and a Permittee had achieved a 70% bacteria load reduction prior to 2011, changing the starting date to 2011 would effectively change the overall load reduction needed from 75% to 92.5% - which would be a huge amount of unjustified additional work. Permittees have spent the last 2 years developing Bacteria Load Reduction Plans, based on the percent reductions that were agreed to in the TMDL Basin Plan Amendments. The Draft Permit needs to honor the agreed-upon starting date.

In summary: the City of Laguna Niguel requests correction of all the Attachment E TMDL provisions in the Draft Permit that are inconsistent with Federal law, contrary to the intent of the Basin Plan Amendments, and will result in non-discretionary Mandatory Minimum Penalties. The necessary corrections are all delineated in the redline/strike-out Permit text that the County of Orange is attaching to its comment letter on behalf of the Co-Permittees.

Thank you for the opportunity to provide comments. I would be happy to meet with you to discuss any of these issues. I can be reached at (949)362-4384 or npalmer@cityoflagunaniguel.org.

Sincerely,

Nancy R. Palmer
City Landscape Architect/Environmental Programs Manager

Attachment: San Diego Regional Stream Reference Study – Monitoring Progress Report #3 and Year 1 Data Summary (October 2011 through November 2012)

`SAN DIEGO REGIONAL STREAM REFERENCE STUDY
MONITORING PROGRESS REPORT #3 AND YEAR 1 DATA SUMMARY
OCTOBER 2011 THROUGH NOVEMBER, 2012

This Monitoring Progress Report is a summary of work completed from October 1, 2011 to November 31,2012. A data summary is provided and represents results based on calculation of Year 1 data. These will change as Year 2 data are included and are considered to be preliminary.

1 QAPP Approval and Amendment

The QAPP was submitted to the San Diego Regional Board in October 2011 and approved in December 2011.
A QAPP amendment was submitted and approved by the San Diego Regional Board in February 2012. The QAPP was amended to reflect the following changes:

- Laboratories and responsibilities (i.e. mobile lab)
- Updated sites including Prima Deschecha sediment basin and storm drain study
- Toxicity sampling approach
- Analyte list
- Sample volumes

2 Summary of Wet Weather Monitoring Activities:

Site installations were completed at all selected wet weather monitoring locations in late-January 2012 and as of February 2012, the project team was prepared for mobilization. To mobilize for a storm, AMEC reviews National Weather Service (NWS) San Diego, Los Angeles and other weather predictions and communicates with SCCWRP to assist in a go-no-go decision to mobilize. Additional site reconnaissance was conducted during the December and March timeframe to gain a better understanding of flow conditions at a particular site.

Six wet weather locations were finalized for stream monitoring (Table 1). Two of the original wet weather monitoring locations were rejected due to access issues: (1) San Clemente Canyon located within the Rose Canyon Watershed and (2) Cedar Creek located within the San Diego River Watershed. Two additional locations in the Prima Deschecha subwatershed will be monitored during wet weather only to isolate potential inputs to Cristianitos Creek.

Table 1 – Monitoring Locations. IM – Igneous/Metamorphic, SED – Sedimentary; Size: S – Small, M – Medium, and L – Large

Station Code	Stream Name	Watershed	Size	Geology	County
LCC	Long Canyon Creek	Tributary to Kitchen Creek	S	IM	San Diego
KC	Kitchen Creek	Kitchen Creek-Cottonwood Creek	M	IM	San Diego
SJC	San Juan Creek	Upper San Juan Creek	L	IM	Orange
BCC-1	Bell Canyon Creek-1	Middle San Juan Creek	S	SED	Orange
JC	Jardine Creek	San Onofre Creek	M	SED	Orange
CCCP	Cristianitos Creek	Lower San Mateo Creek	L	SED	Orange

2.1 Summary of Monitored Wet Weather Events

Since the inception of sampling, four storm events (February 13, 2012, March 17, 2012, March 25, 2012, April 26, 2012) have met the mobilization criteria and project field crew mobilized for each event. Cumulatively, since the program began in December 2010, project staff have monitored one wet weather event 1 at 3 sites (Cristianitos Creek+Prima Deschecha Golf Course+ Sediment Basin, San Juan Creek, and Long Canyon Creek).This section provides a summary of the monitored events, false-start events, and hydrographs for each monitored event.

Table 2 provides a summary of the wet weather event data including site, event date, total rainfall, flow, and total number of primary samples collected per site. The event hydrographs for Cristianitos Creek, Prima Deschecha, Golf Course, and Prima Deschecha, Sediment Basin and San Juan Creek are provided in Figures 1-5, respectively.

Table 2: Wet Weather Event Monitoring Summary

Date	Event Number	Site	Total Event Rainfall (inches)	Flow (cf)	Flow Start Time (MM/DD/YYYY hh:mm)	Flow End Time (MM/DD/YYYY hh:mm)(1)	Storm Size Category	Season	Total Primary Samples	Comment
2/13/2012	False Start	KC	0.56	N/A	N/A	N/A	Medium	Late	0	Forecast rain resulted in snow. Due to safety concerns, field crews stood-down. Rainfall data as measured at Cameron Fire Station. Accuracy of rainfall total may have been affected by snow melt.
2/13/2012	False Start	LCC	0.56	N/A	N/A	N/A	Medium	Late	0	Forecast rain resulted in snow. Due to safety concerns, field crews stood-down. Rainfall data as measured at Cameron Fire Station. Accuracy of rainfall total may have been affected by snow melt.
2/14/2012	Recon.	JC	N/A	N/A	N/A	N/A	N/A	Late	0	Post storm reconnaissance conducted.
2/14/2012	Recon.	CCCP	N/A	N/A	N/A	N/A	N/A	Late	0	Post storm reconnaissance conducted.
2/14/2012	Recon.	BCC-1	N/A	N/A	N/A	N/A	N/A	Late	0	Post storm reconnaissance conducted.
3/17/2012	Wet Event 1	CCCP	0.81	17,392,876	3/17/2012 13:38	3/18/2012 09:43	Medium	Late	9	Successfully completed.
3/17/2012	Wet Event 1	PDGC	0.81	57,079	3/17/2012 08:23	3/18/2012 10:31	Medium	Late	1	Successfully completed. AMEC needs to verify concurrent sampling approach with CCCP.
3/17/2012	Wet Event 1	PDSB	0.81	394,277	3/17/2012 07:32	3/18/2012 09:42	Medium	Late	1	Successfully completed. AMEC needs to verify concurrent sampling approach with CCCP.
3/17/2012	False Start	SJC	2.15	N/A	N/A	N/A	Large	Late	0	Equipment Malfunction – SCCWRP was not charged for this event.
3/17/2012	False Start and Recon.	JC	1.21	N/A	N/A	N/A	Large	Late	0	Creek was dry; therefore a sample could not be collected. Post storm reconnaissance conducted.
3/17/2012	False Start	BCC-1	1.63	N/A	N/A	N/A	Large	Late	0	Creek did not have sufficient flow within approximately 16 hours of mobilization. SCCWRP and AMEC agreed to stand-down. Additional verification from Starr Ranch and visual observation recon.
3/25/2012	Wet Event 1	SJC	1.05	892,288	3/25/2012 16:08	3/29/2012 08:49(2)	Large	Late	13	Successfully completed.
4/26/2012	False Start	KC	0.46	N/A	N/A	N/A	Medium	Late	0	Creek did not have sufficient increase in stage to initiate sampling.
4/26/2012	Wet Event 1	LCC	0.46	226,095	4/26/2012 00:20	4/29/2012 09:20	Medium	Late	11	Successfully completed.

Note:
Flow stop time based upon completion of sampling event when storm flow returned to approximately 25% above pre-storm base flow.
Storm Category: Trigger 0.1-0.2 inches of rainfall; Medium 0.2-1 inch of rainfall; Large >1 inch of rainfall.
Season: Early (before December) or Late (after December).
N/A = Flow data not generated for false start events.
Recon. = Reconnaissance.
Site IDs: BCC-1-Bell Canyon Creek, CCCP- Cristianitos Creek, JC Jardine Creek , KC-Kitchen Creek, LCC-Long Canyon Creek, PDGC -Prima Deschecha Golf Course, and PDSB -Prima Deschecha Sediment Basin

Figure 1: Cristianitos Creek (CCCP) – Wet Weather Event 1 Hydrograph (March 17 – 20, 2012)

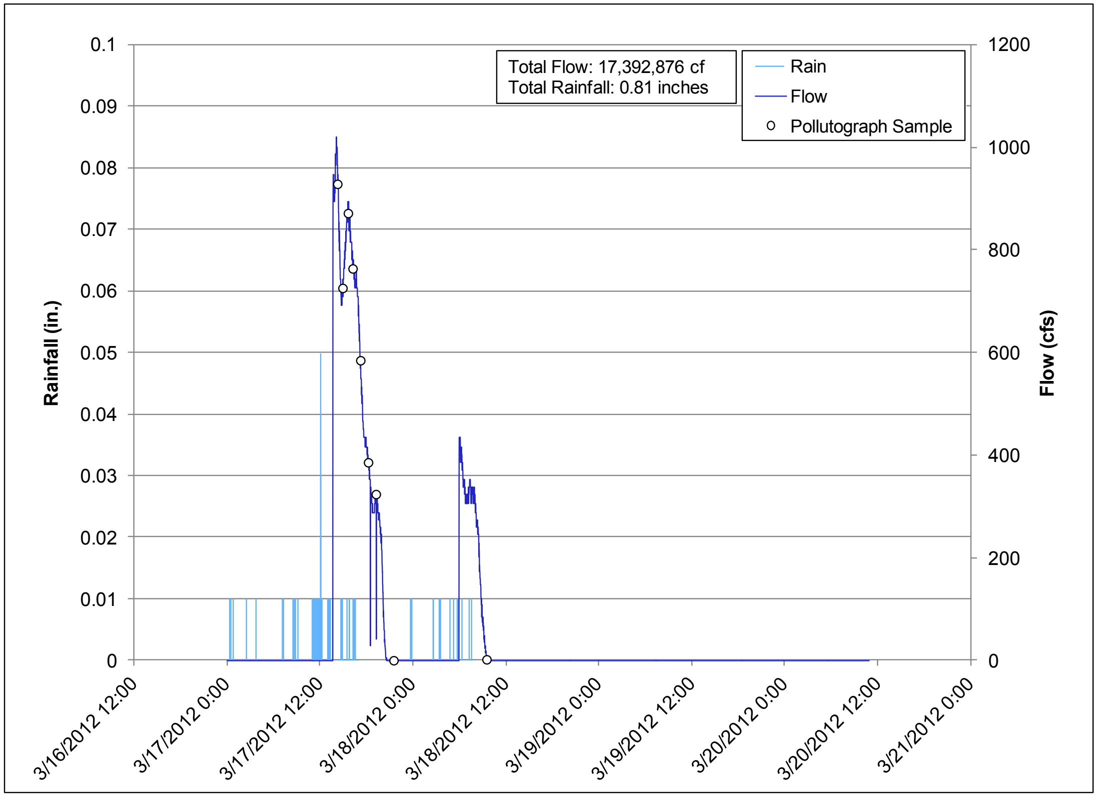


Figure 2: Prima Deschecha Golf Course Outlet (PDGC) – Wet Weather Event 1 (March 17, 2012)

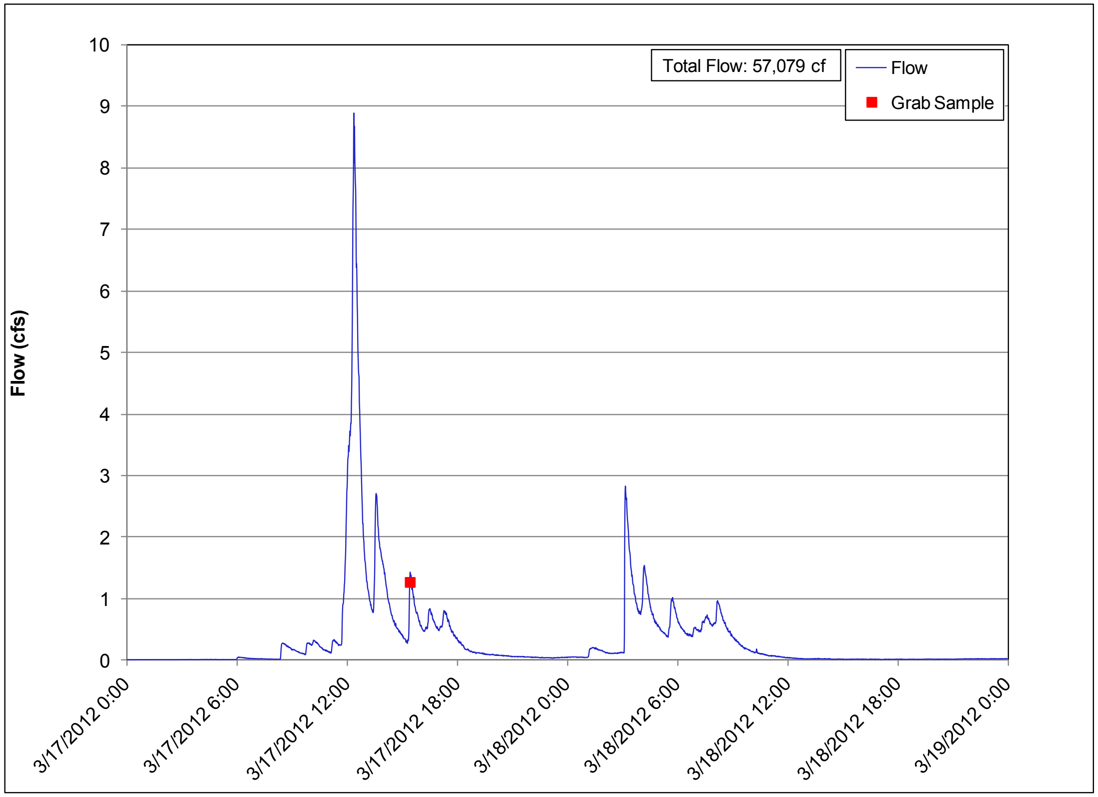


Figure 3: Prima Deschecha Sediment Basin (PDSB) – Wet Weather Event 1 Hydrograph (March 17, 2012)

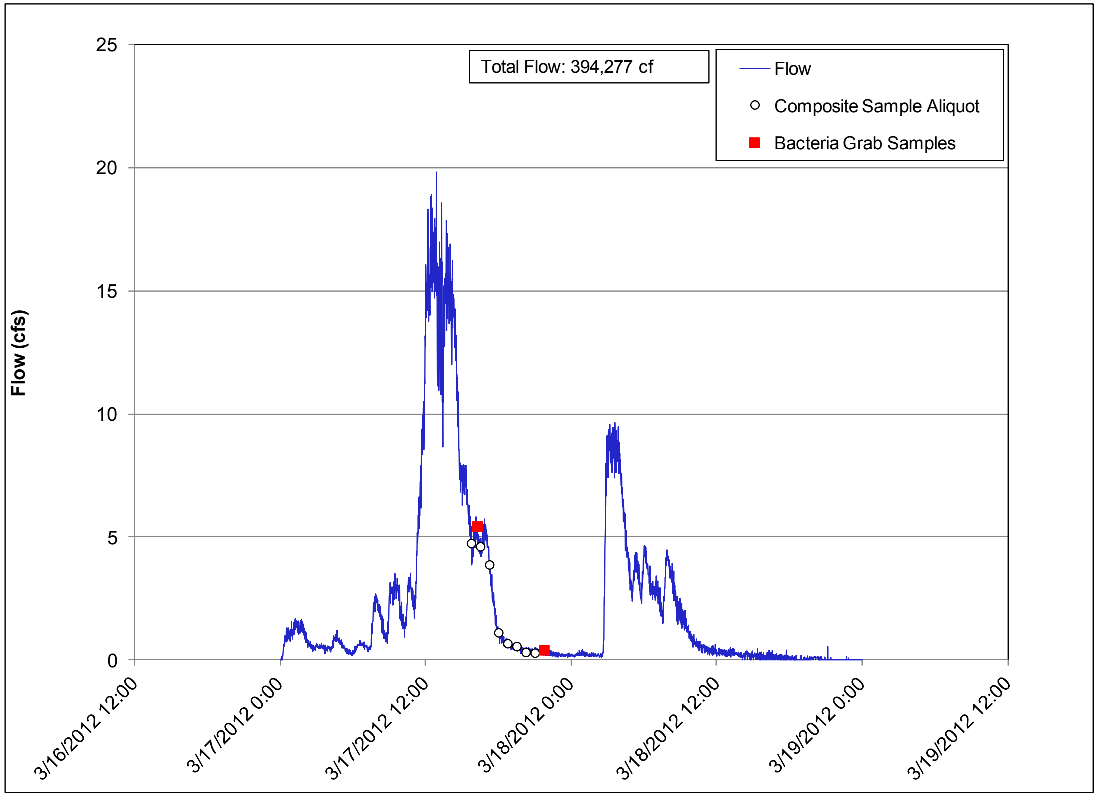


Figure 4: San Juan Creek (SJC) – Wet Weather Event 1 (March 25 – 28, 2012)

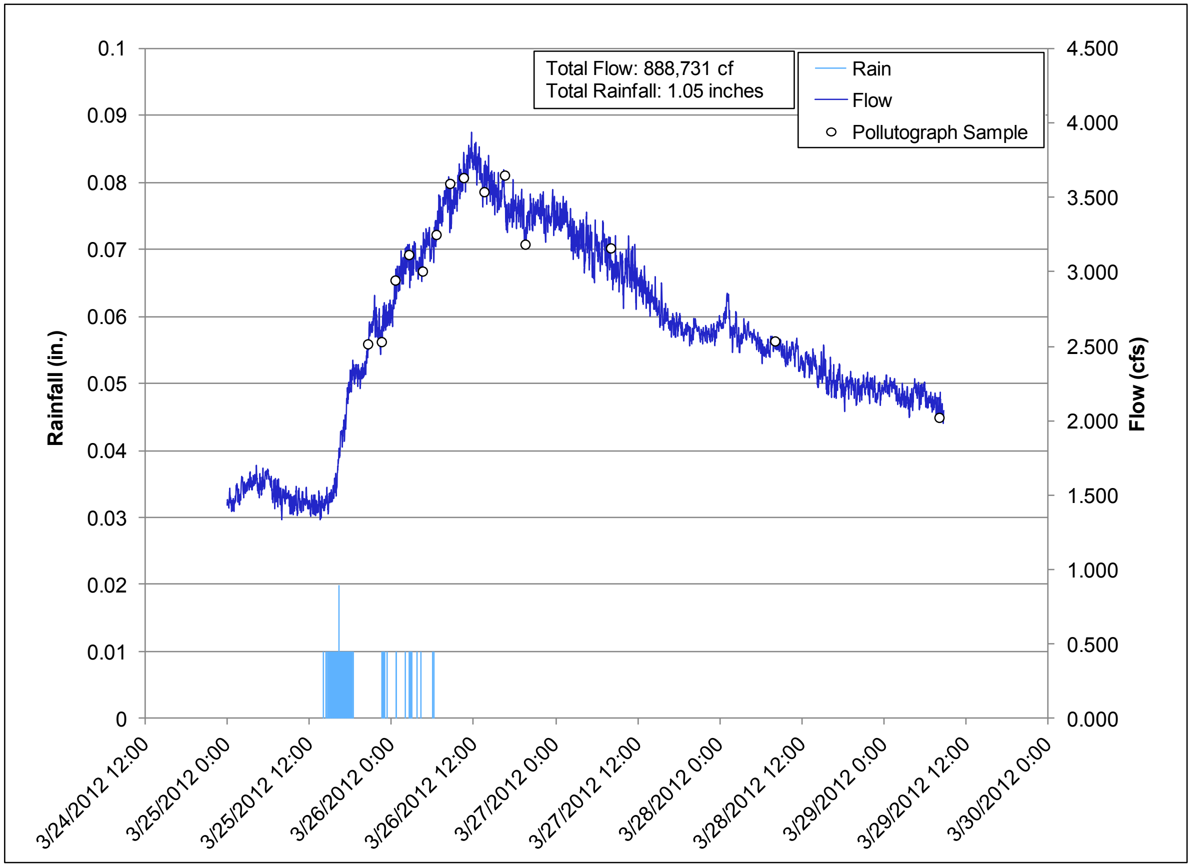
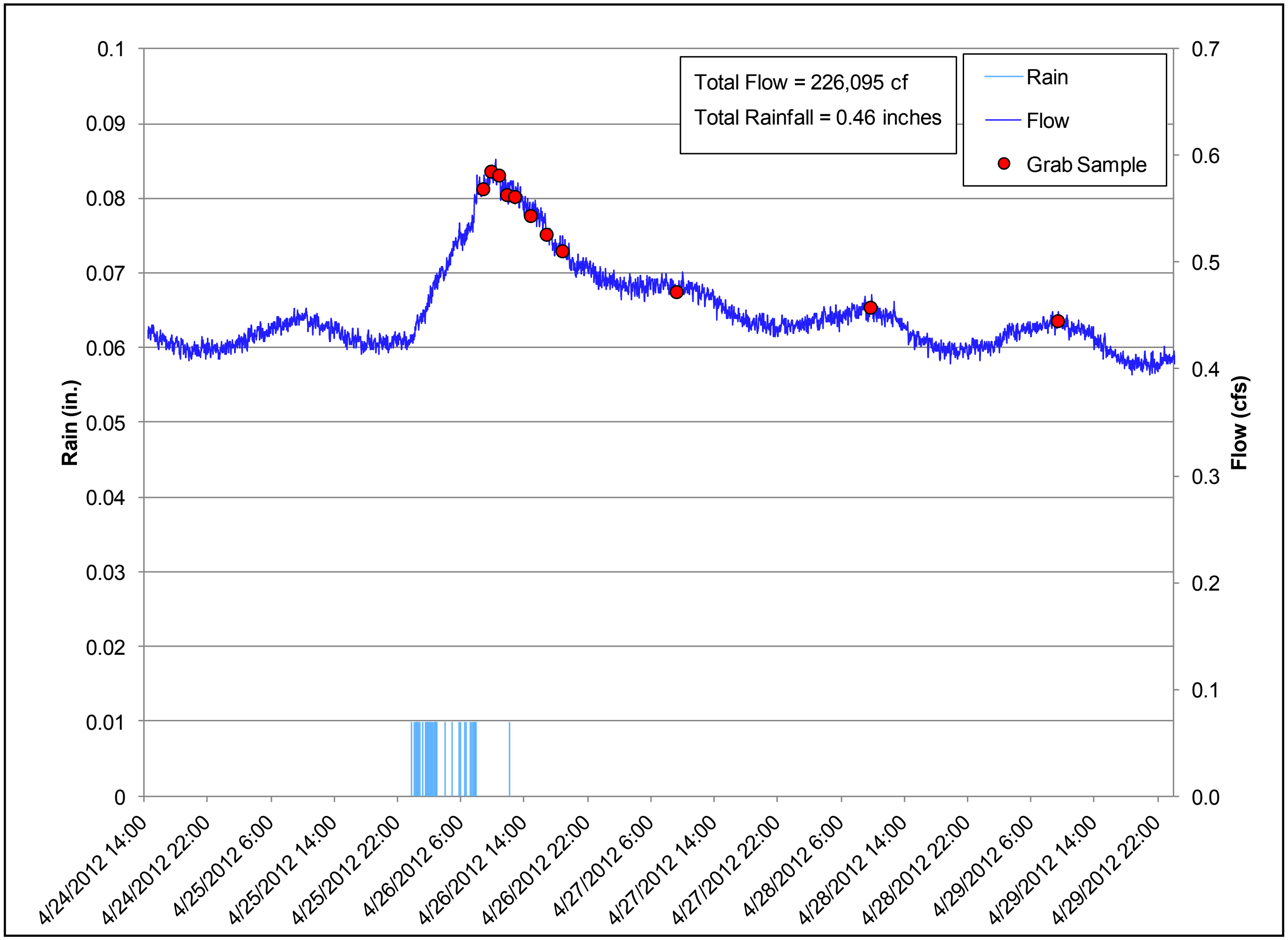


Figure 5: Long Canyon Creek (LCC) – Wet Weather Event 1 Hydrograph (April 26 – 29 2012)



3 Summary of Dry Weather Monitoring Activities and Events

3.1 Sampling Sites

Recon of dry weather sites selected in Fall 2011 began in March 2012. Of these initial set of sites, 6 were dry and 3 were considered not to be reference because of evidence of human disturbance (Table 3). The sites that were dry will be observed beginning next fall and sampling reinitiated if flow returns.
Dry weather sampling was initiated the first week of April 2012 at seven reference streams located in both Orange and San Diego counties (Table 4). Further site reconnaissance was conducted during the April - May timeframe to target additional reference streams that met the San Diego Reference Stream monitoring program criteria. During this reconnaissance, two new streams located in San Diego, CA were added to the dry weather sampling regime (Agua Caliente Creek and Conejos Creek located in the El Capitan Reservoir) (Table 4). **No additional sedimentary sites were found within the study area.** Dry weather sampling commenced the third week of May at Conejos Creek and the fourth week of May at Agua Caliente Creek.

Reconnaissance on additional sedimentary and replacement dry weather sites have been conducted outside of the current study area. The decision on whether to add these sites to dry weather sampling was discussed with stakeholders in a meeting held September 26, 2012. During this meeting four streams were accepted to be added to the dry weather sampling regime: Fremont Canyon Creek and Santiago Creek in Orange County, Aliso Canyon Creek in Riverside and Dazur Creek in San Diego, CA. (Table 5).

3.2 Sampling Activities

For dry weather sampling, a site was eligible for sampling if it had not received measurable rainfall for at least 24 h and flow was no more than 20% above baseflow. Weekly sampling continued as long as there was measurable stream flow. For intermittent streams (i.e. Conejos Creek), sampling was suspended once the stream was too low to sample or ceased flowing (i.e. dry creek bed). Based on these criteria, the duration of sampling at the six reference sites and 3 non-reference sites has ranged from 4 to 19 weeks.

Currently, weekly dry-season bacteria and bi-weekly sampling for nutrients, trace metals and conventional constituents (i.e. total suspended solids (TSS)) has ceased at all sites; Table 6). Six to 18 weekly primary FIB samples were collected, 2 to 9 bi-weekly nutrient, trace metals, and conventional samples were collected, and 1 to 2 algal assessments have been measured at each natural stream with an overall total of 129, 58 and 9 primary samples collected respectively (Table 6). Mean stream flow during the sampling period for all sites combined was 0.013 ± .009 SD (Table 6).

Table 3: Original Dry Weather Reference Stream Monitoring Locations

Station Code	Stream Name	HUC_12_ Watershed	Latitude	Longitude	Area (Km2)	Size	Geology	Types	County
BCC-1[a]	Bell Canyon Creek-1	Middle San Juan Creek	33.6359	-117.5558	18.2	S	SED	Wet/dry	Orange
ATC[b]	Arroyo Trabuco	Arroyo Trabuco	33.6745	-117.5469	31.0	S	SED	Dry	
JC[a]	Jardin Creek	San Onofre Creek	33.39991	-117.4983	33.0	M	SED	Wet/dry	Orange
BCC-2[a]	Bell Canyon Creek-2	Middle San Juan Creek	33.56420	-117.5640	48.8	M	SED	Dry	Orange
BCC-3[a]	Bell Canyon Creek-3	Middle San Juan Creek	33.54489	-117.5613	52.2	M	SED	Dry	Orange
ASC[a]	Arroyo Seco Creek	Arroyo Seco Creek	33.45752	-116.9708	33.6	M	IM	Dry	Riverside
CCCP[a]	Cristianitos Creek	Lower San Mateo Creek	33.42739	-117.5698	80.0	L	SED	Wet/dry	Orange
SJC[b]	San Juan Creek	Upper San Juan Creek	33.58799	-117.5165	96.9	L	IM	Wet/dry	
LPC[b]	La Posta Creek	La Posta Creek	32.7002	-116.4801	115.3	L	IM	Dry	

(a) Six streams (BCC-1, JC, BCC-2, BCC-3, ASC & CCCP) were dry prior to the onset of dry season sampling in April 2012.
(b) Three locations (ATC, SJC and LPC) were considered not to be reference because of evidence of human disturbance (HWY 74 repaved) and/or grazing, however, sampling was initiated & continued at these sites to verify the validity of this assessment.

Table 4. April - July 2012 Dry Weather Monitoring Locations. IM – Igneous/Metamorphic, SED – Sedimentary; Size: S – Small, M – Medium, and L – Large

Site Code	Stream Name	Watershed	Size	Geology	County
USJ	Upper San Juan Creek	Upper San Juan Creek	S	IM	Orange
LCC	Long Canyon Creek	Tributary to Kitchen Creek	S	IM	San Diego
KC	Kitchen Creek	Kitchen Creek-Cottonwood Creek	M	IM	San Diego
PVC	Pine Valley Creek	Upper Pine Valley Creek	M	IM	San Diego
ACC	Agua Caliente Creek	Laguna Creek/ San Luis Rey River	M	IM	San Diego
LPC	La Posta Creek	La Posta Creek	L	IM	San Diego
CONC	Conejos Creek	San Diego River	L	IM	San Diego
SJC	San Juan Creek	Upper San Juan Creek	L	IM	Orange
ATC	Arroyo Trabuco Creek	Arroyo Trabuco	S	SED	Orange

Table 5. Additional Sedimentary and Replacement Dry Weather Monitoring Locations Accepted by Stakeholders in September 2012. IM – Igneous/Metamorphic, SED – Sedimentary; Size: S – Small, M – Medium, and L – Large

Site Code	Stream Name	Watershed	Size	Geology	County
SANT	Santiago Creek	Santiago Canyon Creek	S	SED	Orange
FCC	Fremont Canyon Creek	Fremont Canyon Creek	M	SED	Orange
ALIS	Aliso Canyon Creek	Aliso Canyon Creek	M	SED	Riverside
DULZ	Dulzura Creek	Otay River	L	IM	San Diego

Table 6. Dry season (2012) event monitoring summary including site, sampling start and end dates, total number of primary fecal indicator bacteria (FIB), trace metals, nutrients, conventionals (i.e. total suspended solids) and total number of algal assessments collected per site.

Site Code	Dry Weather Sampling Start Date	Dry Weather Sampling End Date	Total Sampling Weeks/yr	Total Bacteria Samples Collected (includes 30 d geomean)	Total Nutrient, Trace Metals and Conventional Samples Collected	Total No. Algal Assessments	Mean flow (m^3/sec)	Comment
LCC	4/2/2012	7/30/2012	18	19	9	2	0.0159	
LPC	4/2/2012	7/30/2012	18	19	9	0	0.0264	Evidence of grazing observed at site
KC	4/2/2012	6/25/2012	13	15	6	2	0.0369	
PVC	4/2/2012	7/2/2012	14	17	7	2	0.0242	
ACC	5/22/2012	6/12/2012	4	6	2	1	0.0013	
CONC	5/16/2012	6/14/2012	5	6	2	2	0.0006	
USJ	4/30/2012	7/3/2012	10	11	5	0	0.0024	
SJC	4/2/2012	7/31/2012	18	18	9	0	0.0032	Road repaved, sampling suspended
ATC	4/2/2012	7/31/2012	18	18	9	0	0.0066	Evidence anthropogenic disturbance
	Overall Total		**18**	**129**	**58**	**9**	0.0131 ± 0.0087	**Mean ± SD**

San Diego Reference Stream Study
Quarterly Monitoring Progress Report

4 Quality Assurance/Quality Control (QA/QC) of Year 1 Monitoring Data

The primary goal of the quality assurance/quality control (QA/QC) effort was to ensure that the sediment chemistry, nutrient and bacteria data generated by the three study participants were complete and met common data quality objectives (DQOs) for criteria pertaining to sensitivity, accuracy, and precision.

4.1 Reporting Limits

To achieve study goals, minimum target reporting limits (RLs) for each analyte were set forth in the San Diego Regional Reference Stream QAPP (Table 6-1). These RLs were set to achieve the Surface Waters Ambient Monitoring Program (SWAMP) target thresholds. Overall, participant-specific minimum RLs were lower than the target RLs, indicating that the analyses performed provided adequate sensitivity.

4.2 QA/QC Goals and Success

The sample storage conditions and maximum hold time requirements and success achieved are summarized in Table 7. Except for 25 grain size samples, all participating labs performed their analyses within the specified holding times.

The remaining criteria and corresponding DQOs, along with the degree of project success in attaining these goals, are summarized in Tables 8-9. Of the 125 samples delivered to the laboratories, over 97% of the samples were analyzed and data reported attaining our completeness DQO of 90%. Of the 85 laboratory analyses run for chemical contamination, approximately 99% had no detectable chemical measurements in blank samples. Of the remaining samples with detectable blanks values, no batch had a value more than three times the detection limit. Laboratories also attained success in accuracy DQOs for blank spiked samples (100.0% for trace metals and nutrients), matrix spiked samples (100% for trace metals and nutrients), and CRMs (96.0% for trace metals and 98.5% for nutrients). Finally, laboratories attained success in precision DQOs for laboratory duplicate samples (97.4% for trace metals, 98.0% for nutrients, and 100% for bacteria, TOC, TDS and TSS) and matrix spike duplicate samples (98.5% for trace metals and 97.6% for nutrients).

Overall, the majority of QA/QC criteria were met with greater than 90% success and completeness. For those few instances where specific criteria were not met, deviations did not impart additional uncertainty in the measurements and therefore did not warrant removal or exclusion of any data from the study database. All of these deviations, however, were noted in the study database for individual users to make their own decisions regarding data quality.

San Diego Reference Stream Study
Quarterly Monitoring Progress Report

Table 7: Achievement of sample storage conditions and maximum holding time criteria.

Parameter	Storage Condition	Maximum Holding Time	Actual Hold Times (days)	Percent Success
Alkalinity (Total Alkalinity as CaCO3)	< 6°C and store in the dark	14 days	3-14	100%
Chloride		28 days	3-25	100%
Hardness (Total Hardness as CaCO3)		6 months	3-25	100%
Sulfate		28 days	3-25	100%
TDS		7 days	3-30	94%
TSS		7 days	3-30	94%
Enterococcus	< to 6°C in the dark[b]	8 hours[a]	8	100%
E. coli			8	100%
Total Coliform			8	100%
Bacteroides			8	100%
M. smithii			8	100%
Bacteria community			8	100%
Nitrate + Nitrite (as N)	Cool to 4°C, store in the dark, filter and freeze at -20°C	48 hours; 28 days if frozen	10-26	100%
Ammonia (as N)		48 hours; 28 days frozen	10-26	100%
Total Dissolved Nitrogen	Cool to 4°Cand store in the dark, filter and freeze at -20°C	28 days if frozen	10-26	100%
Orthophosphate (dissolved; Soluble Reactive Phosphorus)	Cool to 4°C and store in the dark	48 hours	48 hours	100%
TDP		28 days	10-26	100%
Particulate Nitrogen & Carbon (PN, POC)	Keep at 4°C, dark, but must filter within 24 hours, freeze until dried	12 months after drying at 80°C for 24 hours	10-26	100%
Particulate Phosphorus (PP)	Keep at 4°C, dark, but must filter within 24 hrs, freeze until dried	12 months after drying at 80°C for 24 hours	10-26	100%
Dissolved Organic Carbon (DOC)	< to 6°C and store in the dark	28 days	10-26	100%
Trace Metals	< 6°C; Acidify to pH<2 with pre-tested nitric acid (HNO_3) w/in 48 h	6 months at room temperature following acidification	7-26	100%

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Table 8: Summary of performance-based QC criteria and project success in performing within those criteria for trace metals and nutrients.

	Trace Metals		Nutrients	
Quality Control Parameter	**DQO**	**Success**	**DQO**	**Success**
Completeness	100%	100.0%	100%	100%
Blanks				
Frequency	10% of total samples	100%	10% of total samples	100%
Accuracy	< RL	100%	< RL	100%
Precision	RPD<25%	100%	RPD<25%	100%
Spiked Blanks				
Frequency	10% of total samples	100%	10% of total samples	100%
Accuracy	Recovery within 75-125%	100%	Recovery within 80-120%	100%
Precision	RPD<25%	98.0%	RPD<25%	98.0%
CRM[1]				
Frequency	10% of total samples	100%	10% of total samples	100%
Accuracy	within lab specified limits	96.0%	within lab specified limits	98.5%
Matrix Spikes				
Frequency	10% of total samples	100%	10% of total samples	100%
Accuracy	Recovery within 75-125%	100%	Recovery within 80-120%	100%
Precision	Within ± 25% RPD[2]	98.5%	RPD<25%	96.7%
Sample Duplicates				
Frequency	10% of total samples	100%	10% of total samples	100%
Precision	Within ± 25% RPD	97.4%	Within ± 25% RPD	98.0%

[1]N/A=no DQO set, data are for evaluation purposes only as part of ongoing QA/AC efforts

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Table 9: Summary of performance-based QC criteria and project success in performing within those criteria for bacteria, total dissolved and total suspended solids (TDS/TSS).

	Bacteria		TDS/TSS	
Quality Control Parameter	**DQO**	**Success**	**DQO**	**Success**
Completeness	100%	100%	100%	100%
Blanks				
Frequency	10% of total samples	100%	10% of total samples	100%
Accuracy	Positive control within 80-120% recovery; Negative control = no growth on filter	100%	NA[1]	NA[1]
Precision	Lab Replicate RPD<25%	100%	Lab Replicate RPD<25%	100%
Spiked Blanks				
Frequency	NA[1]	NA[1]	NA[1]	NA[1]
Accuracy	NA[1]	NA[1]	NA[1]	NA[1]
Precision	NA[1]	NA[1]	NA[1]	NA[1]
CRM[1]				
Frequency	NA[1]	NA[1]	NA[1]	NA[1]
Accuracy	NA[1]	NA[1]	NA[1]	NA[1]
Matrix Spikes	-	-	-	-
Frequency	NA[1]	NA[1]	NA[1]	NA[1]
Accuracy	NA[1]	NA[1]	NA[1]	NA[1]
Precision	NA[1]	NA[1]	NA[1]	NA[1]
Sample Duplicates	-	-		
Frequency	10% of total samples	100%	10% of total samples	100%
Precision	Within ± 25% RPD	100%	Within ± 25% RPD	100%

[1]N/A=no DQO set, data are for evaluation purposes only as part of ongoing QA/AC efforts

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5 Preliminary Data Summary

A summary of exceedances are given for provided for bacterial indicators, trace metals, and nutrients for Year 1 sampling.

5.1 Wet Weather Data Summary

Table 10 provides a comparison of median constituent event mean concentration (EMCs) at open space sites during the 1983 Nationwide Urban Runoff Program (NURP, U.S. EPA 1983a), to the 1990 National Stormwater Quality Database (NSQD, Pitt et al. 2003) monitoring study, the San Diego Regional Reference Stream Study 2011-2012 wet season results and to the San Diego Regional Water Quality Control Board (SD RWQCB) Basin Plan. Comparison of bacteria, trace metals and nutrient concentrations in stormwater from reference streams from this study reveal overall median *E. coli*, total cadmium, copper, lead, nickel and zinc, nitrate + nitrite, total nitrogen and total phosphorus EMCs that are lower to current U.S. averages reported in the NSQD and SD RWQCB Basin Plan. The exception is that median constituent values from Cristianitos Creek are substantially higher than those observed in the rest of the U.S. Table 11 provides a comparison of exceedences of single sample maximum standards at reference stream sites for the three storms.

Figures 6-8 show the results of FIB pollutagraphs for each of the three storms captured during the 2011-2012 wet season.

5.2 Dry Weather Data Summary

5.2.1 Fecal Indicator Bacteria

Two analyses were used to characterize FIB levels from natural streams. First the 30-d geomeans, variances, and ranges of concentrations, were calculated to provide an estimate of expected baseline bacterial levels. Second, dry weather FIB concentrations were compared with the state of CA standards for single-sample and 30-d geomean maximum allowable densities (Table 12). Cumulative density frequency plots (CDFs) were produced to compare observed bacterial concentrations to the CA quantitative standards and to calculate accumulated relative exceedance percentages.

A total of 36.3% of the indicator bacteria dry season samples (for all three indicators) from the natural sites exceeded daily (single sample) water quality standards. Approximately 34.1% of enterococci exceeded the daily threshold of 104 MPN/100 ml (Figure 9). The average enterococci level of these exceedances was 141 MPN/100 ml, with a maximum of 1553 MPN/100 ml (La Posta Creek) and a minimum of 2 MPN/100 ml (Arroyo Trabuco Creek). For *E. coli*, 4.2% of the measurements exceeded the single sample standard of 235 MPN/100 ml with a maximum and a minimum of 727 MPN/100 ml and 1 MPN/100 ml, respectively (La Posta Creek; both Kitchen and Long Canyon Creeks). For total coliforms, no sites exceeded the single sample standard of 10,000 MPN/100 ml.

A total of 71.0% of enterococci samples from the natural sites exceeded the 30-d geomean water quality standard of 33 MPN/100 ml. The average enterococci level of these exceedances was 107 MPN/100 ml, with a maximum of 843 MPN/100 ml and a minimum of 7.2 MPN/100 ml (Table 13; Appendix A1). For *E. coli*, approximately 3.3% exceeded the 30-d geomean threshold of 126 MPN/100 ml with a maximum and a minimum of 261 MPN/100 ml and 2 MPN/100 ml, respectively (Table 12; Appendix A2). For total coliforms, 61.3% exceeded the 30-d geomean of 1000 MPN/100 ml with a maximum and a minimum of 2419.6 MPN/100 ml and 345 MPN/100 ml, respectively (Table 13; Appendix A3).

Water temperature varied by about 5-10°C at each of the sites, increasing during the summer months reaching a mean of 17.3°C and a maximum of 19°C on warm sunny afternoons (Figure 10a). A negative correlation was observed between dissolved oxygen and stream temperature (Figure 10a and Appendix B, Table B1). Bacteria levels for all three indicators were substantially higher during the month of July than during all other months (Figures 10-13). For example, 30-d geomeans for enterococci at Long Canyon Creek were near the water quality standard in April 2012 with levels approximately 28.7 MPN/100 ml ± 3.2 SD, increased substantially during the summer, exceeding the criterion, peaking in July at 311.7 MPN/100 ml ± 3.1 SD as streams stopped flowing (Figure 10b). Similar enterococci exceedance patterns were observed for all streams with the exception of Upper San Juan Creek (Figure 8). Observed *E. coli* concentrations responded similarly to enteroccoci however none of the streams sampled showed exceedances for *E. coli* during the summer months (Figure 12). A similar exceedance pattern was observed for total coliforms (Figure 13).

5.2.2 Trace Metals Results

Metals occurred predominantly in the dissolved phase during the 2012 dry season, although the dissolved fraction varied by metal (Figure 14). Upper San Juan Creek had the highest mean dissolved copper concentration at 4.0 µg/L ± .06 followed by Arroyo Trabuco and Pine Valley at 0.38 ± .05 and 0.36 ± .01 µg/L respectively (Figure 14). Mean total and dissolved metals concentrations for each reference stream are provided in Appendix C. Reference stream metals concentrations varied considerably both spatially and temporally. Results indicate that for copper reference stream mean dissolved concentrations were substantially higher in April (0.3 ± .1 µg/L) than during the other three sampling events (Figure 15). Mean dissolved copper for all reference streams for the entire 2012 dry season was 0.3 ± .1 µg/L.

Comparison of reference stream samples to standards can be instructive in estimating the likelihood that inherent variability of reference concentrations may result in periodic exceedences. The concentrations of metals from filtered storm water and dry season samples were evaluated using the California State Water Quality Standards for Surface Waters (Federal Register, EPA Part III, 40 CFR Part 131). Toxicity of many metals is dependent upon the hardness of the water. Hardness of each water

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sample was calculated from its calcium and magnesium concentrations and, using the calculated hardness, calculations for chronic toxicity of the sampled metals were then done. Equations for calculating hardness and chronic toxicity criteria are as follows (Federal Register, EPA Part III, 40 CFR Part 131):

- **Hardness**:
  using the values for calcium (mg/L) and magnesium (mg/L): Hardness = (2.497*Ca)+(4.1189*Mg).

- **Chronic toxicity criteria**:
  Copper $\leq (.960)(e^{(.8545(\ln(\text{hardness}))-1.702)})$ Freshwater
  $\leq (.830)(e^{(.8545(\ln(\text{hardness}))-1.702)})$ Saltwater

  Lead $\leq (.791)(e^{(1.237(\ln(\text{hardness}))-4.705)})$ Freshwater
  $\leq (.791)(e^{(1.237(\ln(\text{hardness}))-4.705)})$ Saltwater

  Zinc $\leq (.986)(e^{(0.8473(\ln(\text{hardness}))+0.884)})$ Freshwater
  $\leq (.946)(e^{(0.8473(\ln(\text{hardness}))+0.884)})$ Freshwater

Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California; Rule. *Federal Register* Vol. 65, No. 97/ May 2000 Rules and Regulations.

Concentrations of dissolved copper, and zinc in reference streams were generally below the freshwater and saltwater chronic toxicity standards established under the California Toxics Rule (Figures 15 and 17). Of the 121 individual reference stream samples for each dissolved metal, four copper samples (2 dry weather; one in early April and one in early May; and 2 wet weather), and one dry weather zinc sample exceeded the CTR standards. Reference stream dissolved copper concentrations exceeded CTR standards in 4.1% and 11.2% of the wet and dry weather samples, respectively. In contrast, only 2.9% of dry weather reference stream samples exceeded CTR standards for zinc. No wet weather samples exceeded the CTR standards for zinc.

5.2.3 Total Solids Results

Increased levels of total dissolved solids (TDS) and/or suspended solids (TSS) can block out light and thus reduce photosynthetic activity and, depending on the amount of surface agitation (oxygenation), gradually decrease the amount of oxygen produced by the plants and lead to an increase in water temperature. Mean total dissolved solids exceeded the drinking water quality standard in June at both Arroyo Trabuco and La Posta creeks (548 and 564 mg/L, respectively; Figure 18). San Juan Creek had the highest TDS exceedance observed during the 2012 dry season (in July) with a concentration of 1066 mg/L. The source of this exceedance was probably due to soil erosion caused by the road construction on Ortega HWY above the sampling site. None of the reference stream sites exceeded the TSS water quality threshold of 100 mg/L (Table 12).

5.2.4 Nutrient Results

For this discussion total nitrogen (TN) and total phosphorus (TP) were selected as the factors representing the water quality of the reference streams. Based upon ninety samples collected between April and July 2012, the mean total phosphorus (TP) concentration in all reference streams was 0.03 mg/L and the mean total nitrogen (TN) concentration was 0.16 mg/L (Table 14). Exceedance frequency of SD RWQCB basin plan standards of 1 mg TN L-1 and 0.1 mg TP L-1 was 0% and 11% respectively. The mean TN:TP (by weight) was 7.6:1 (Table 14).

Similar to metals, nutrients occurred predominantly in the dissolved and particulate phase during the 2012 dry season, although the dissolved and particulate fraction varied by nutrient (Figures 19 and 20; Tables D1-D3).

There was a slight positive relationship between the concentration of total nitrogen and the concentration of total phosphorus in the rivers (r^2 = 0.3) (Figure 21). Both TN and TP showed a negative relationship (r^2 = 0.6 and 0.2, respectively) when compared with proportion of underlying watershed geology (%) during the 2012 dry season (Figure 21).

Dissolved oxygen (DO) concentrations in reference streams averaged 7.9 mg/L. The mean value for Upper San Juan Creek was considerably less (5.3 mg/L) but higher than the minimal DO criteria of 5.0 mg/L established for class III (intermediate) waters.

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6 References

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Table 10. Comparison of median event mean concentrations (EMCs) for Open/ Non-Urban Land Uses. ND = not detected; NA = not analyzed. Note that Cristianitos Creek (CCCP) results are not adjusted for inputs from Prima Deschecha and Golf Course storm drain inputs.

	Reference Stream			Open/Non-Urban Land Use			SD RWQCB Basin Plan
	CCCP[1]	LCC[2]	SJC[3]	SDRS[4] Overall	NSQD[5]	NURP[6]	
Constituant	**EMC**			**Median EMCs**			
TSS (mg/L)	**619**	0.8	0.3	0.8	78	70	100
Bacteria (MPN/100 mL)							
E. coli	2,212	36	193	193	7,200	NA	235
Enterococi	8,577	124	314	314	NA	NA	104
Total coliforms	**24,176**	1163	1746	1746	NA	NA	10,000
Trace Metals (mg/L)							
Total Cadmium	**2.1**	ND	0.01	0.01	0.50	NA	0.05
Total Copper	**22**	0.5	0.8	0.8	5.3	NA	0.01
Total Lead	4.3	0.04	0.05	0.05	5.0	30	0.02
Total Nickel	25	0.2	0.4	0.4	ND	NA	0.10
Total Zinc	**169**	0.6	1.6	1.6	39	195	0.02
Nutrients (mg/L)							
Nitrate + Nitrite	0.57	0.06	0.00	0.06	0.60	0.54	10
Total Nitrogen	**1.1**	0.21	0.09	0.21	1.9	NA	1.0
Total Phosphorus	**0.18**	0.04	0.01	0.01	0.25	0.12	0.1

Reference Streams: [1]CCCP = Cristianitos Creek, [2]LCC = Long Canyon Creek, [3]SJC = San Juan Creek

Source: [4]SDRS = San Diego Reference Stream study;

[5]NSQD = The National Storm water Quality Database, Pitt et al. (2003)

[6]NURP = Nationwide Urban Runoff Program (US EPA 1983)

Table 11. Comparison of exceedences of single sample maximum standards at reference stream sites for the three storms during the 2011-2012 wet season.

	% Exceedance		
	E. coli	Enterococci	Total Coliforms
Stream	(MPN/100 ml)		
Cristianitos Creek	89	100	100
Long Canyon Creek	33	89	0.0
San Juan Creek	7.1	71	0.0

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Table 12. State of California water quality standards for fecal indicator bacteria, trace metals and nutrients as established in Assembly Bill 411, the California Basin Plan and SD RWQCB Basin plan biostimulatory objectives for flowing waters.

Constituent	Reference Stream									CA Basin Plan/ Water Quality Threshold
	ACC[1]	ATC[1]	CONC[1]	KC[1]	LCC[1]	LPC[1]	PVC[1]	SJC[1]	USJ[1]	
	Mean Result									
Total Suspended Solids (mg/L)	0.7	2.5	2.2	1.5	4.5	1.2	1.2	10.6	9.7	**100**
Total Dissolved Solids (mg/L)	226	410	360	224	235	451	265	499	295	**500**
Bacteria										
E. coli	115	81	14	74	37	102	42	65	28	**235**
Enterococci	**283**	67	32	80	**169**	**298**	38	116	19	**104**
Total Coliforms	1,886	2,098	1,548	2,078	1,302	2,420	1,683	1,058	828	**10,000**
Total Metals (ug/L)										
Cadmium	nd[2]	0.03	nd[2]	nd[2]	nd[2]	0.02	nd[2]	0.06	0.03	**5.0**
Chromium	0.02	0.05	0.05	0.07	0.09	0.05	0.05	0.07	0.03	**50**
Copper	0.21	0.52	0.29	0.26	0.25	0.14	0.37	0.59	0.30	**5.83**
Iron	103	29.3	178	57.7	221	82.5	94.5	**596**	28.1	**300**
Lead	0.03	0.05	0.02	0.02	0.02	0.02	0.01	0.11	0.02	**15**
Manganese	14.3	2.3	**98.53**	5.25	44.7	32.6	9.52	**152**	0.74	**50**
Nickel	0.80	0.29	0.27	0.21	0.10	0.12	0.57	0.36	0.15	**100**
Selenium	0.10	1.1	0.15	0.07	0.04	0.19	0.18	0.20	0.42	**50**
Zinc	0.80	1.2	0.51	25.9	18.5	16.2	37.2	2.3	1.2	**16.91**
Dissolved Metals (ug/L)										
Copper	0.27	0.39	0.27	0.24	0.19	0.17	0.36	0.19	0.42	**5.6**
Zinc	0.46	0.53	0.29	**17.5**	15.9	**16.1**	**34.0**	0.64	0.86	**16.0**

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Table 12 continued.

Constituent	Reference Stream ACC[1]	ATC[1]	CONC[1]	KC[1]	LCC[1]	LPC[1]	PVC[1]	SJC[1]	USJ[1]	SD RWQB Basin Plan/ Water Quality Threshold
	Mean Result									
Nutrients (mg/L)										
Total Nitrogen	0.19	0.04	0.29	0.15	0.11	0.27	0.24	0.07	0.05	**1.0**
Nitrate (as NO3)	1.3E-03	1.1E-02	1.9E-03	2.3E-03	1.1	1.2E-01	1.5E-03	6.2E-03	3.2E-03	**45**
Nitrate + Nitrite (sum as Nitrogen)	1.6E-03	1.1E-02	2.0E-03	2.4E-03	1.1	1.2E-01	1.7E-03	6.5E-03	3.6E-03	**10**
Nitrite (as Nitrogen)	3.0E-04	1.0E-04	8.8E-05	1.5E-04	4.9E-04	8.6E-04	2.3E-04	2.8E-04	4.0E-04	**1.0**
Total Phosphorus	0.03	0.01	0.02	0.08	0.02	**0.10**	0.01	0.02	0.01	**0.1**

[1]Agua Caliente Creek; Arroyo Trabuco; Conejos Creek; Kitchen Creek; Long Canyon Creek; La Posta Creek; Pine Valley Creek; San Juan Creek; Upper San Juan

[2]nd = not detected

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Table 13. List of natural stream sampling sites, characteristics and their median monthly fecal indicator bacteria densities (MPN/100 ml). 30-d geomean exceedances are bolded.

Site Name	Watershed	County	Catchment size (km^2)	Mean flow (m^3/sec)	Geomean					
					E. coli		Enterococci		Total coliforms	
					(MPN/100 ml)	SD	(MPN/100 ml)	SD	(MPN/100 ml)	SD
Long Canyon Creek	Tributary to Kitchen Creek	San Diego	23.3	0.0159	8.8	81.0	**116.1**	35.3	**1,131.9**	325.9
Kitchen Creek[a]	Kitchen Creek-Cottonwood Creek		39.9	0.0369	13.0	22.1	**64.1**	36.1	**1,999.3**	273.9
Pine Valley Creek[a]	Upper Pine Valley Creek		43.1	0.0242	16.9	31.3	30.6	21.2	**1,486.9**	359.7
Agua Caliente Creek[a]	Laguna Creek/ San Luis Rey River		46.1	0.0013	15.6	108.3	**131.5**	219.0	**2,419.6**	0.0
La Posta Creek	La Posta Creek		115.3	0.0264	47.2	14.2	**133.0**	216.4	**1,685.9**	345.9
Conejos Creek[a]	San Diego River		116.0	0.0006	10.8	7.8	26.7	22.9	**1,993.1**	481.7
Upper San Juan Creek[a]	Upper San Juan Creek	Orange	19.3	0.0024	14.3	14.7	21.3	12.3	691.9	350.2
San Juan Creek	Upper San Juan Creek		96.9	0.0032	16.1	14.3	**59.9**	76.2	856.1	364.0
Arroyo Trabuco	Arroyo Trabuco		31.0	0.0066	30.5	92.7	**37.9**	92.1	**1,392.4**	342.6
[a]Intermittent stream		**Mean**	59.0	0.0130	19.3	42.9	**69.0**	81.3	**1,517.4**	316.0
		SD	39.2	0.0087	6.1	20.0	23.2	41.3	287.7	66.0
			Overall Geomean		18.0		**56.9**		**1,231.2**	
				SD	17.8		40.3		142.4	

Table 14. Water quality results at reference streams during the 2012 dry season.

Reference Stream	DO	TN	TP	TN:TP
	Mean (mg/L)			
Agua Caliente	8.2	0.19	0.03	6.3
Arroyo Trabuco	8.7	0.05	0.01	5.0
Conejos	6.4	0.29	0.02	15
Kitchen Creek	9.7	0.15	0.08	1.9
Long Canyon	9.0	0.11	0.02	5.5
La Posta	7.7	0.27	0.10	2.7
Pine Valley	8.5	0.24	0.01	24
San Juan	7.8	0.07	0.02	3.5
Upper San Juan	5.3	0.05	0.01	5.0
Mean	**7.9**	**0.16**	**0.03**	**7.60**

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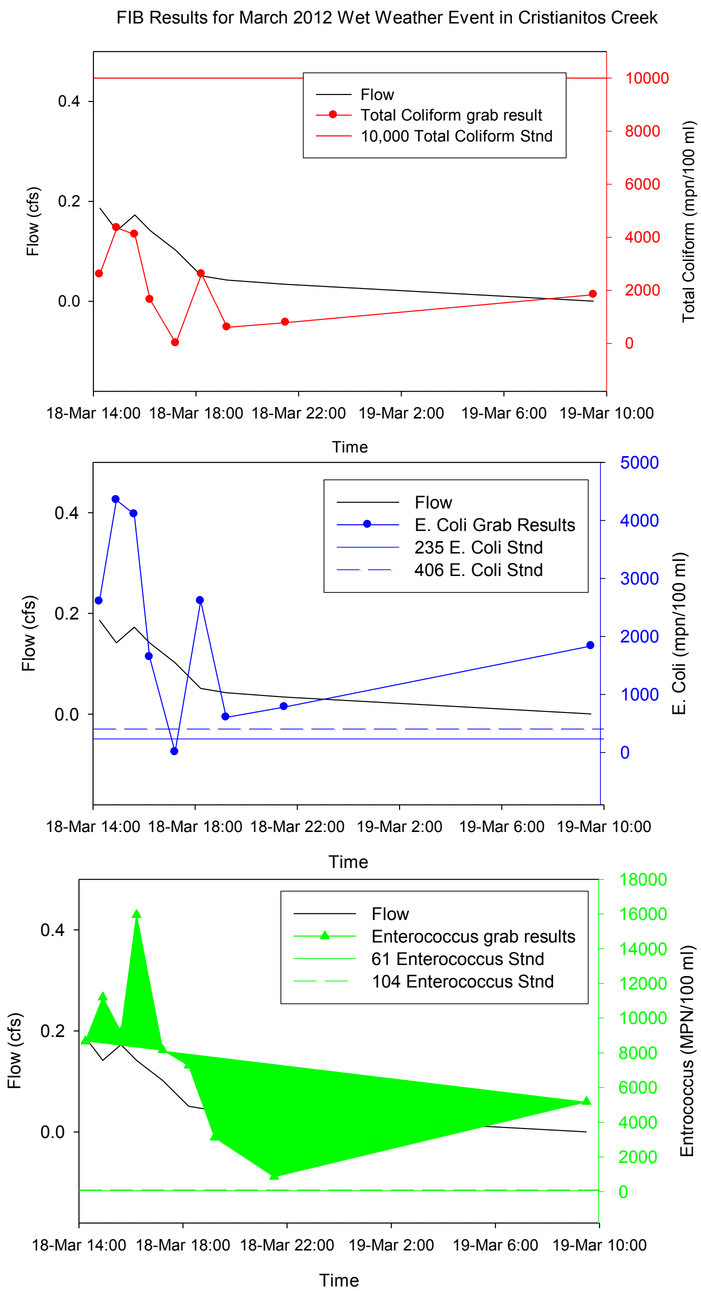

Figure 6. Pollutagraph of flow and FIB grab sample results relative to California standards for single grab samples for Cristianitos Creek March 18, 2012 wet weather event.

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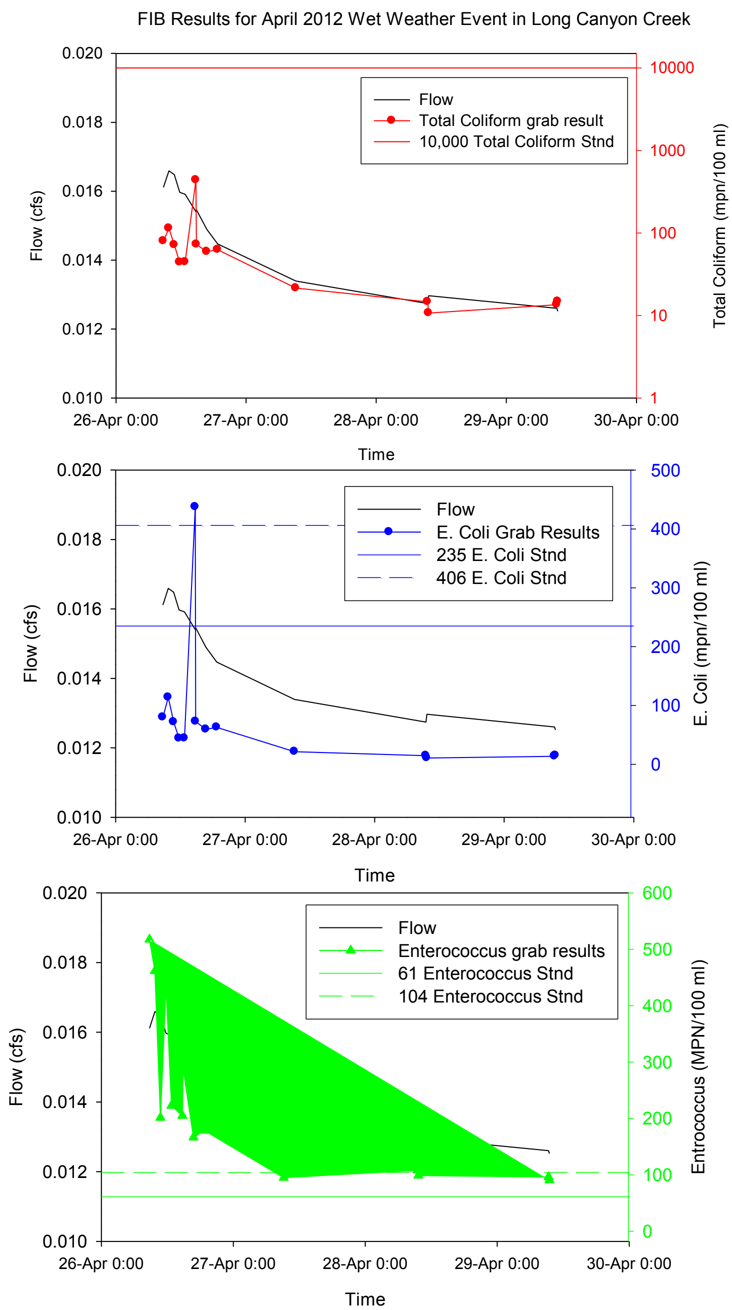

Figure 7. Pollutagraph of flow and FIB grab sample results relative to California standards for single grab samples for Long Canyon Creek April 26, 2012 wet weather event.

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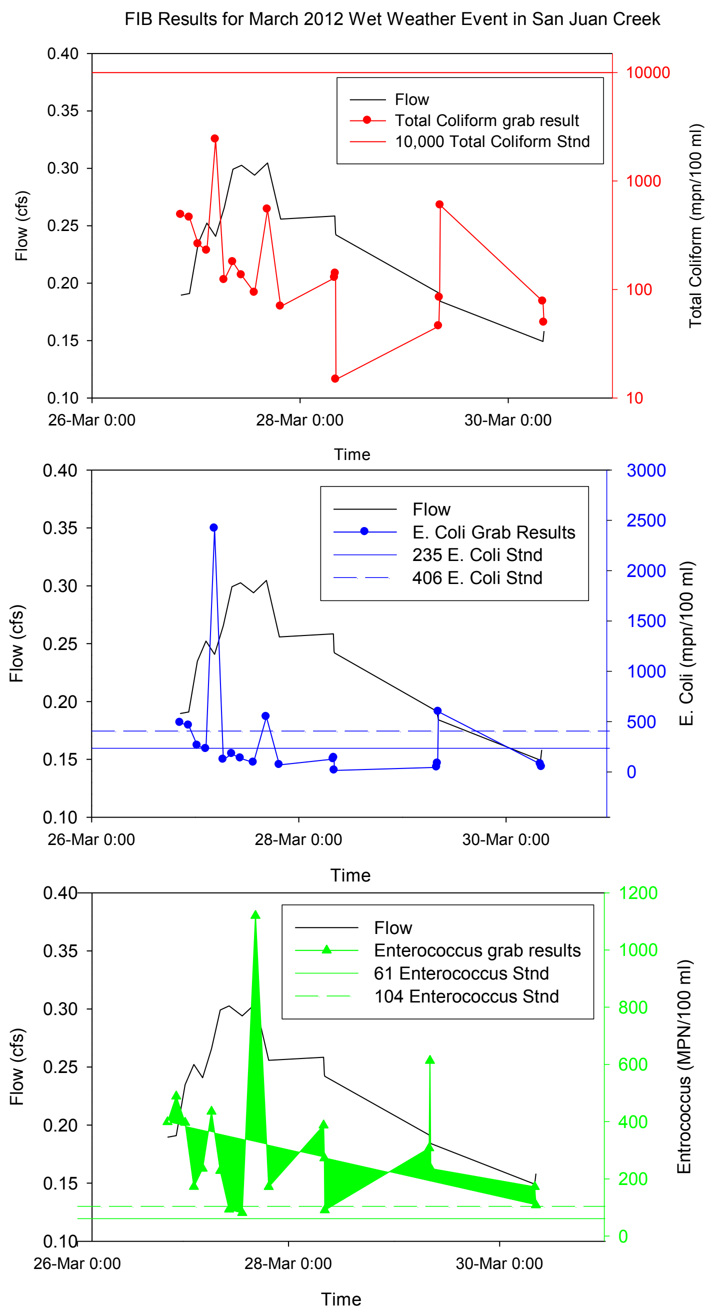

Figure 8. Pollutagraph of flow and FIB grab sample results relative to California standards for single grab samples for San Juan Creek March 20, 2012 wet weather event.

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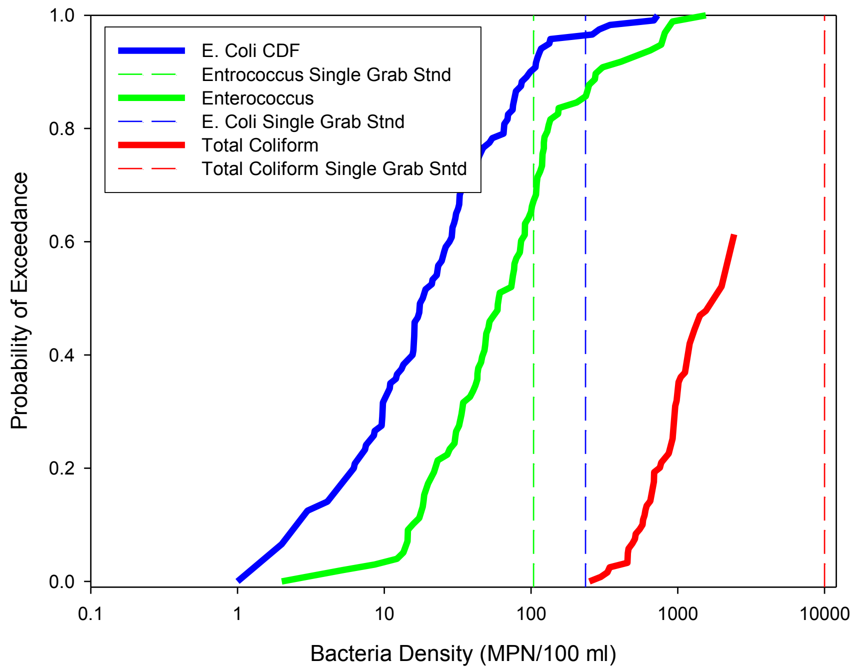

Figure 9. Cumulative density frequency plot (CDF) of dry weather FIB in natural streams relative to State of California marine water quality standards (dotted lines).

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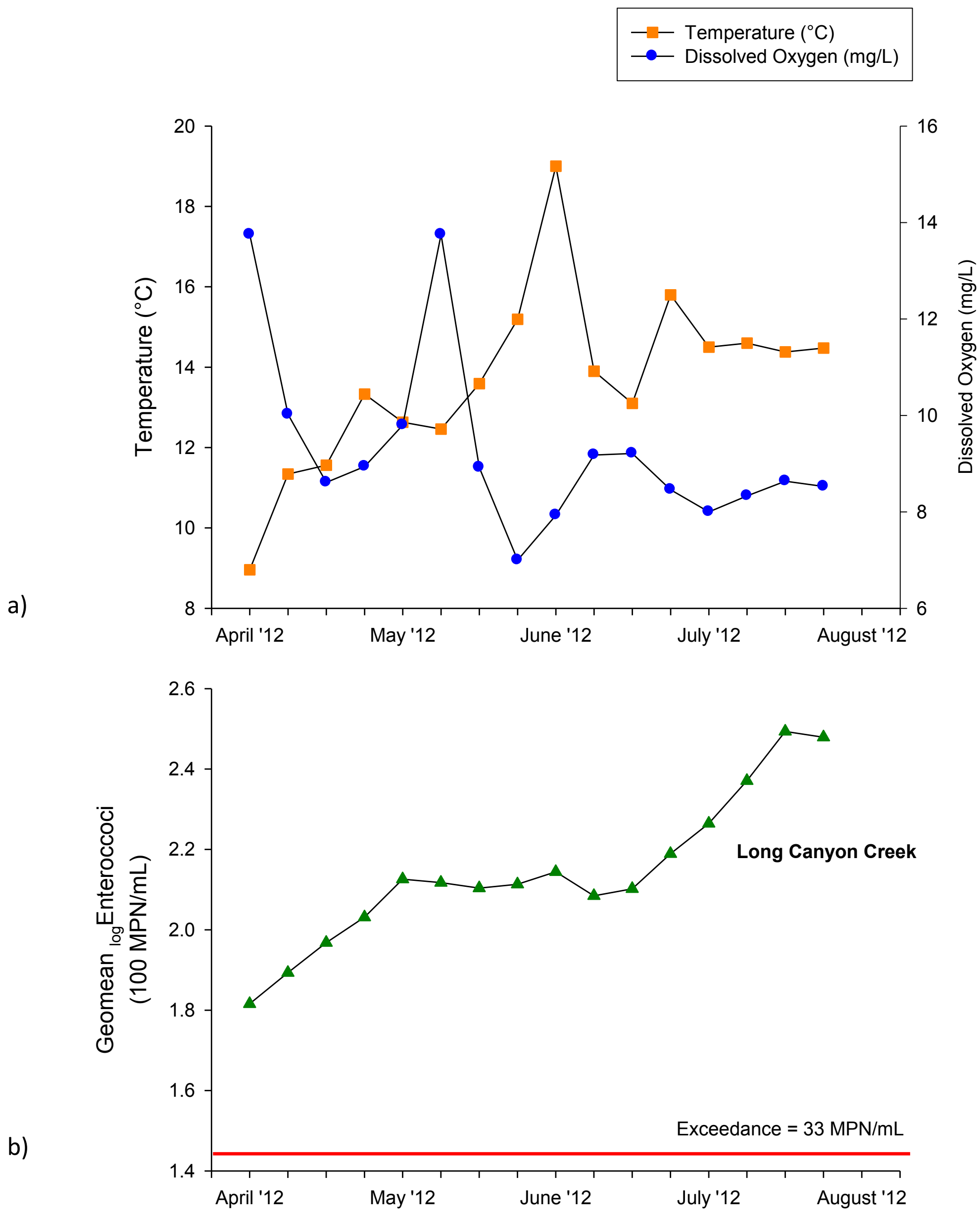

Figure 10. Monthly temperature (°C) and dissolved oxygen (mg/L) comparison (top pane, (a)) and geomean enterococci densities in natural streams in southern California (bottom panel, (b)) between April 2012 and July 2012. May-July were substantially higher than April. The solid line indicates the 30-d geomean for enterococci equal to 33 MPN/100 mL. All points above the line represent bacteria water quality exceedances.

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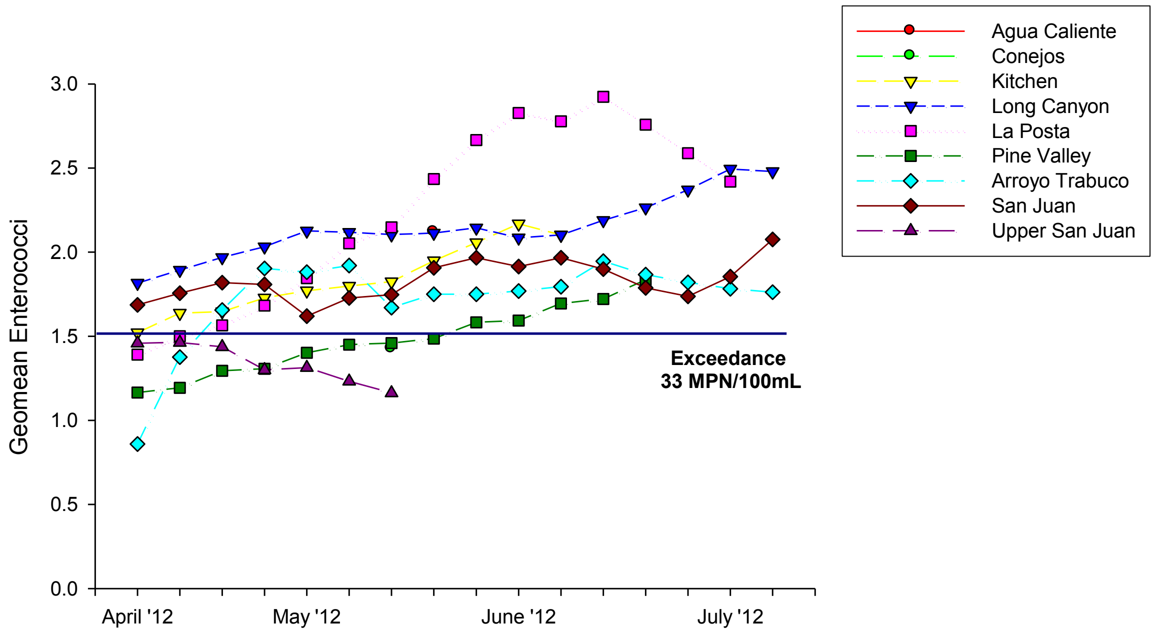

Figure 11. Geomean enterococci densities in natural streams in southern California between April 2012 and July 2012. The solid line indicates the 30-d geomean for enterococci equal to 33 MPN/100 mL. All points above the line represent bacteria water quality exceedances.

San Diego Reference Stream Study
Quarterly Monitoring Progress Report

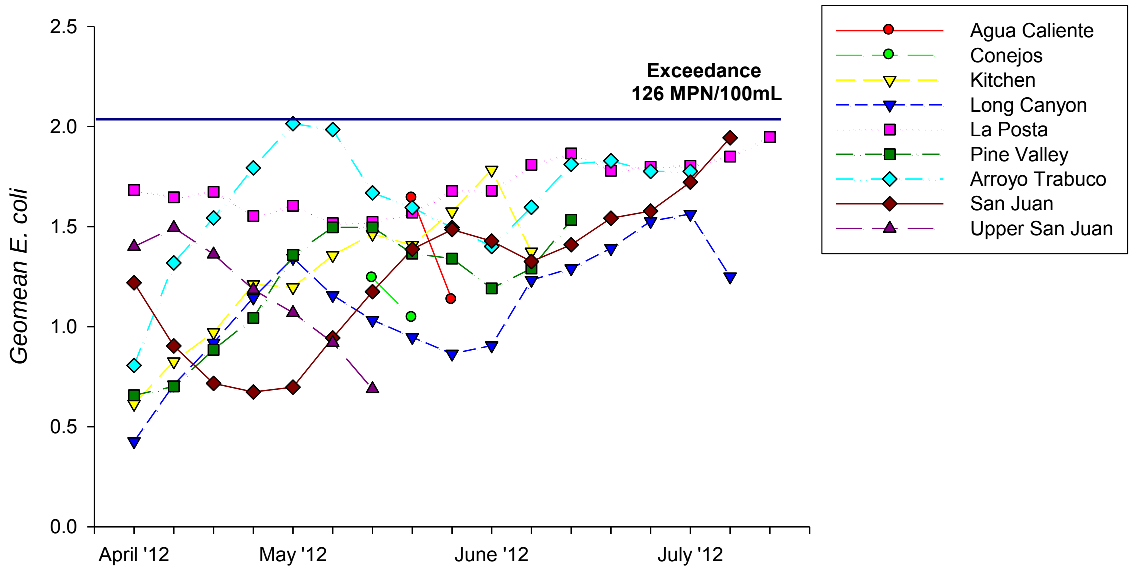

Figure 12. Geomean *E. coli* densities in natural streams in southern California between April 2012 and July 2012. None of the streams exceeded water quality standards. The solid line indicates the 30-d geomean for *E. coli* equal to 126 MPN/100 mL. All points above the line represent bacteria water quality exceedances.

San Diego Reference Stream Study
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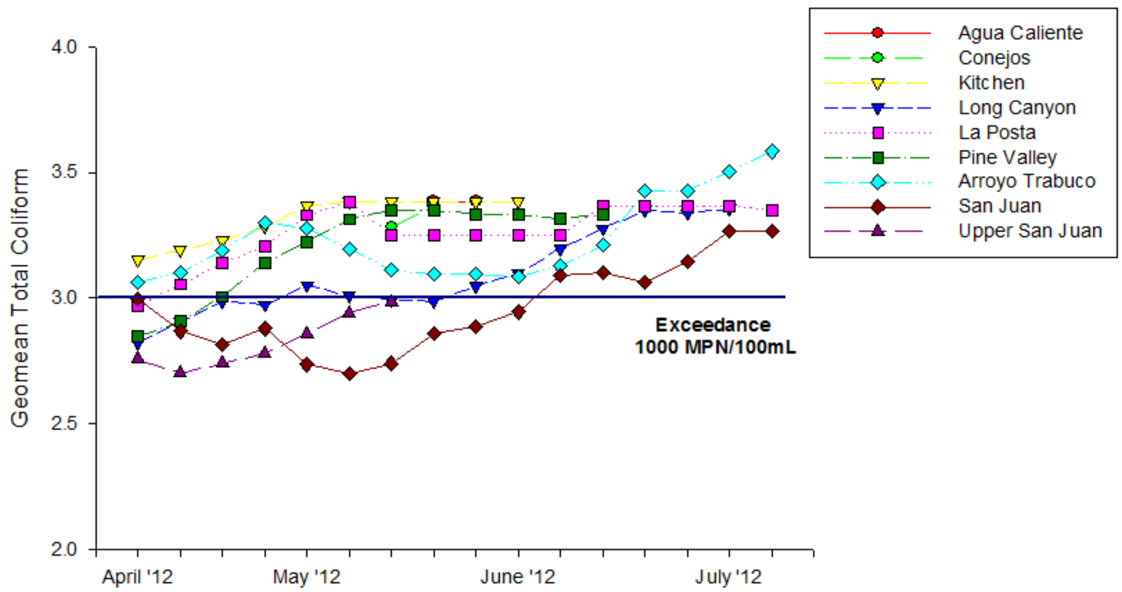

Figure 13. Geomean total coliform densities in natural streams in southern California between April 2012 and July 2012. The solid line indicates the 30-d geomean for total colifom equal to 1000 MPN/100 mL. All points above the line represent bacteria water quality exceedances.

San Diego Reference Stream Study
Quarterly Monitoring Progress Report

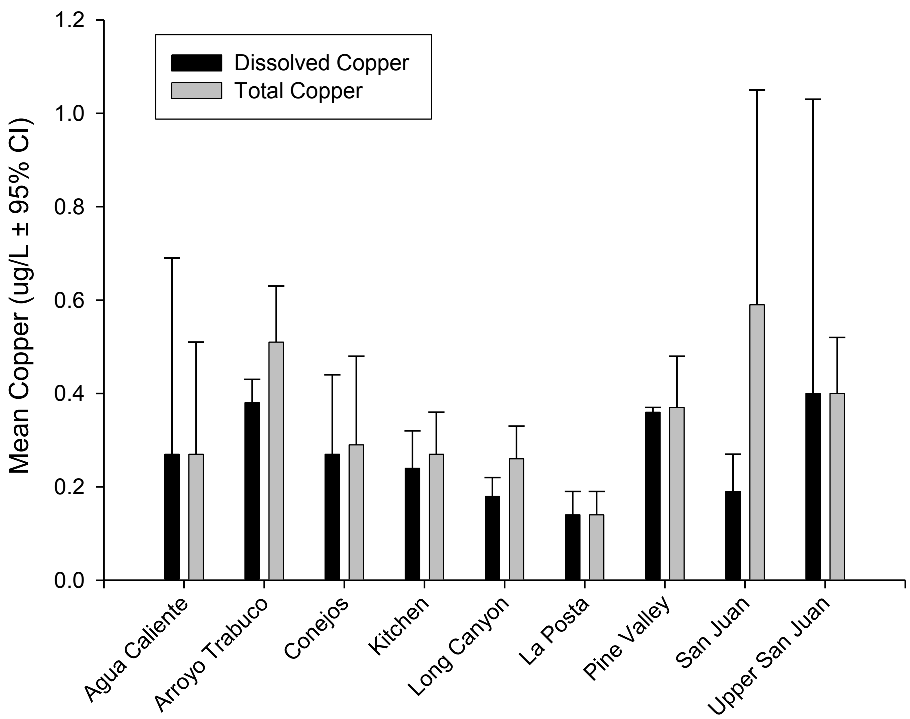

Figure 14. Comparison of dissolved and total copper concentrations in reference streams during the 2012 dry season, n = 68.

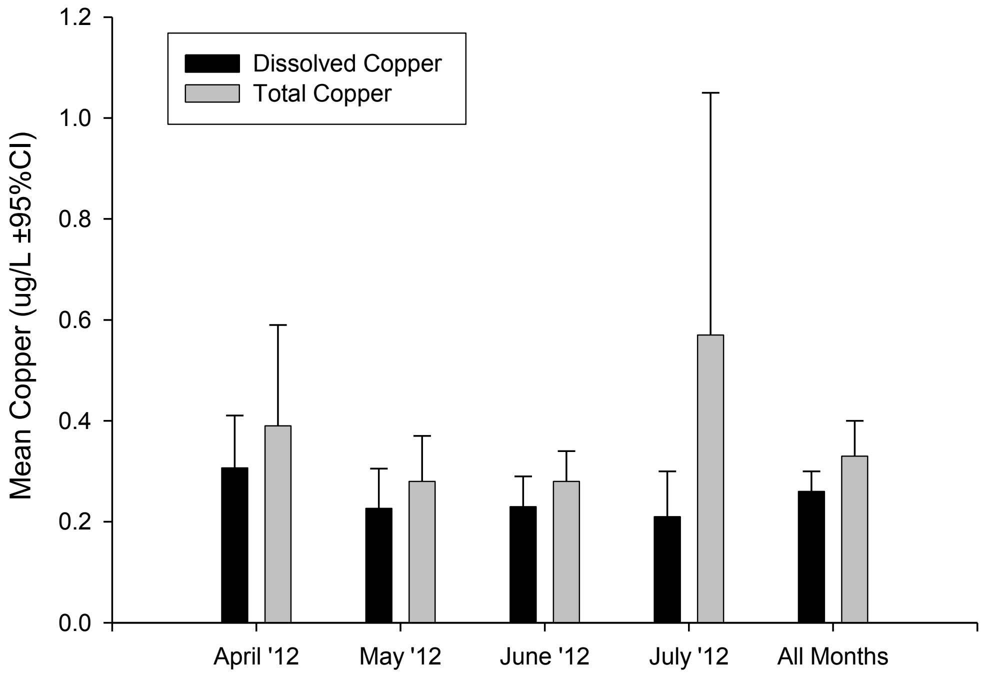

Figure 15. Inter-annual variability in copper concentrations in reference streams during the 2012 dry season. For the month of April n=12, May n=30, June n = 17, and July n=8.

San Diego Reference Stream Study
Quarterly Monitoring Progress Report

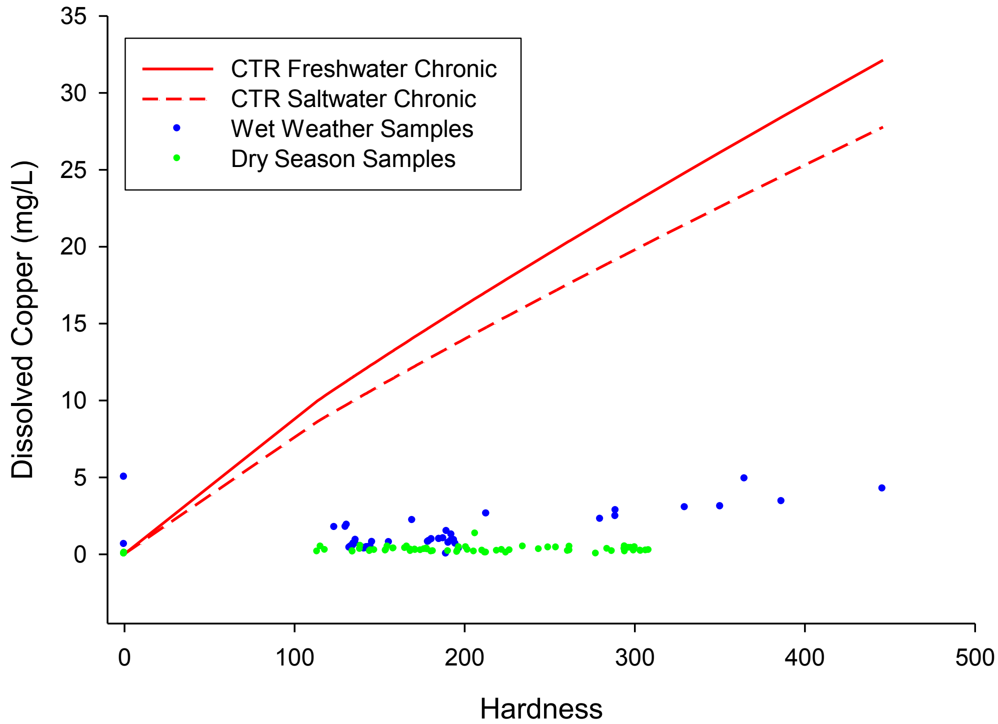

Figure 16. Comparison of reference stream dissolved copper concentrations to the California Toxics Rule (CTR). Concentrations relative to CTR standards for both wet weather and dry weather reference stream samples.

San Diego Reference Stream Study
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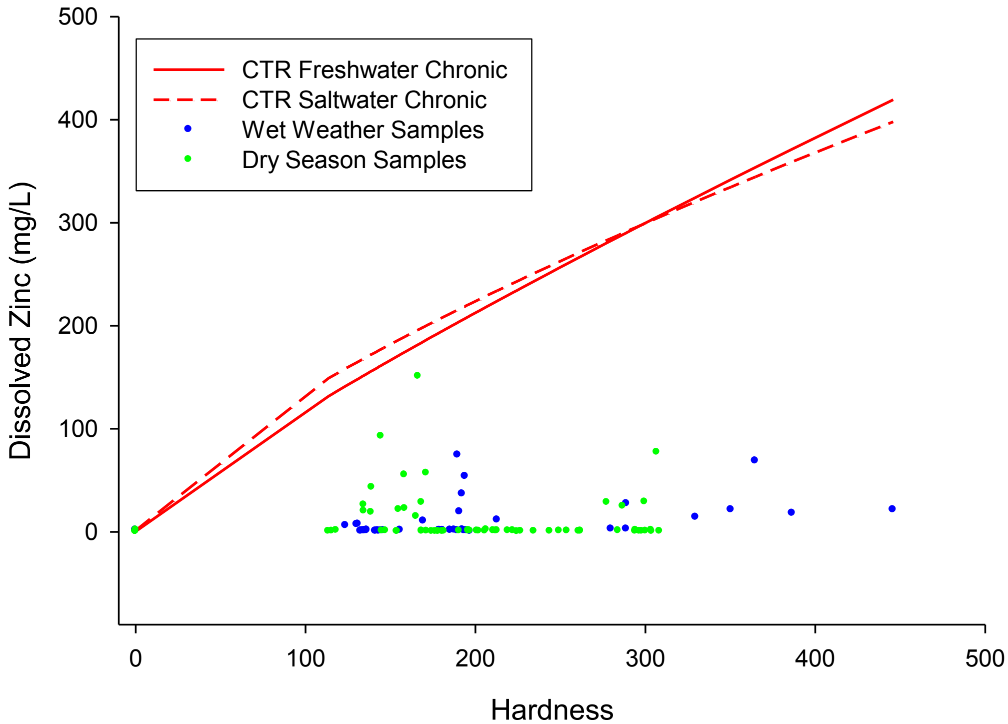

Figure 17. Comparison of reference stream dissolved zinc concentrations to the California Toxics Rule (CTR). Concentrations relative to CTR standards for both wet weather and dry weather reference stream samples.

San Diego Reference Stream Study
Quarterly Monitoring Progress Report

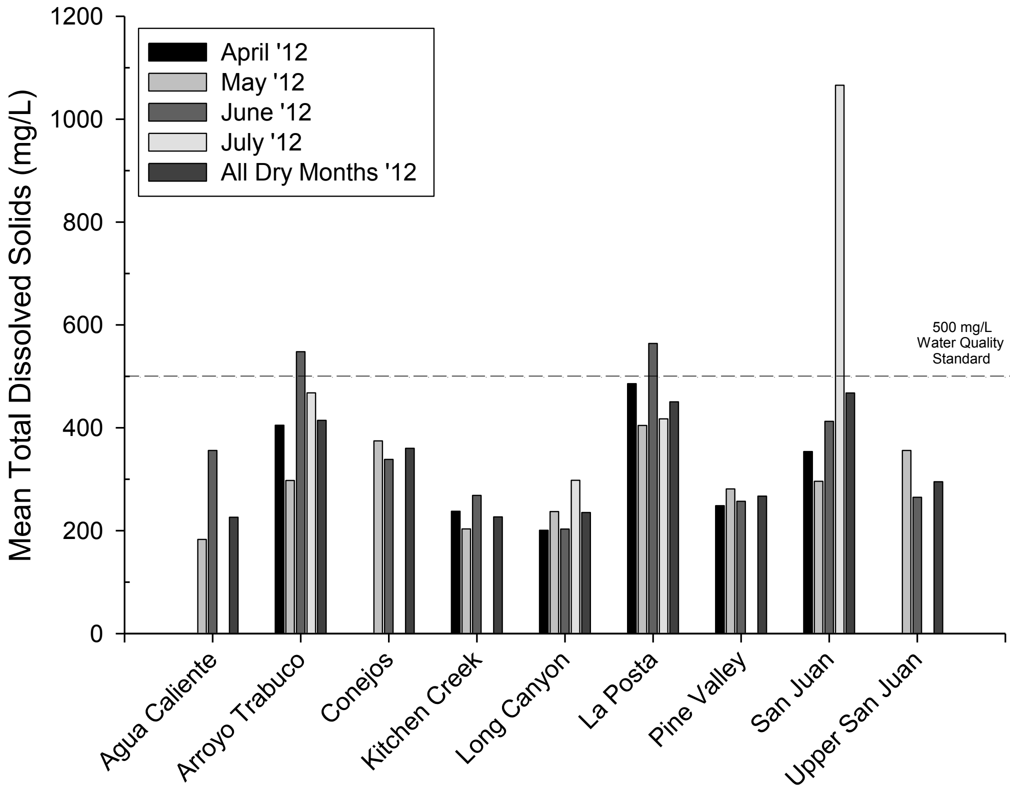

Figure 18. Comparison of mean concentrations of reference steam total dissolved solids for the four dry season sampling months and all months combined in 2012. Units are in mg/l. For the month of April n=12, May n=30, June n = 17, and July n=8.

San Diego Reference Stream Study
Quarterly Monitoring Progress Report

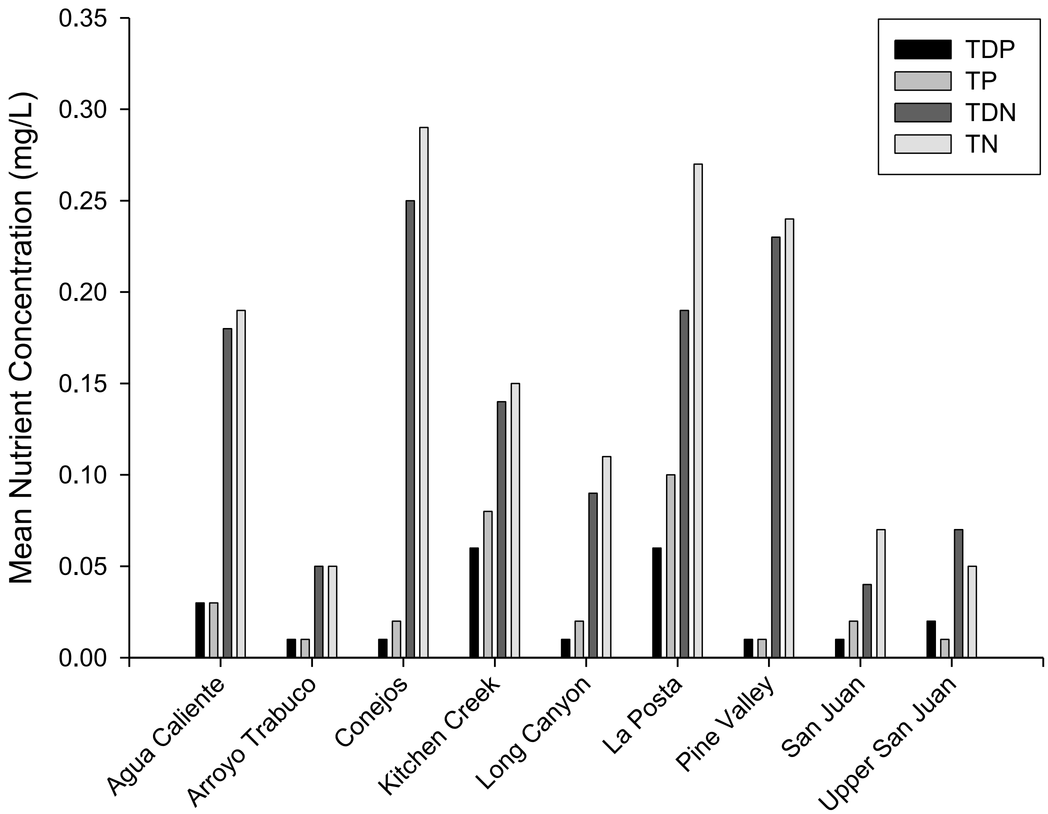

Figure 19. Comparison of reference stream nutrient concentrations (total dissolved phosphorus (TDP), total phosphorus (TP), total dissolved nitrogen (TDN), and total nitrogen (TN)) during the 2012 dry season. Units are mg/L.

a)
b)
c)

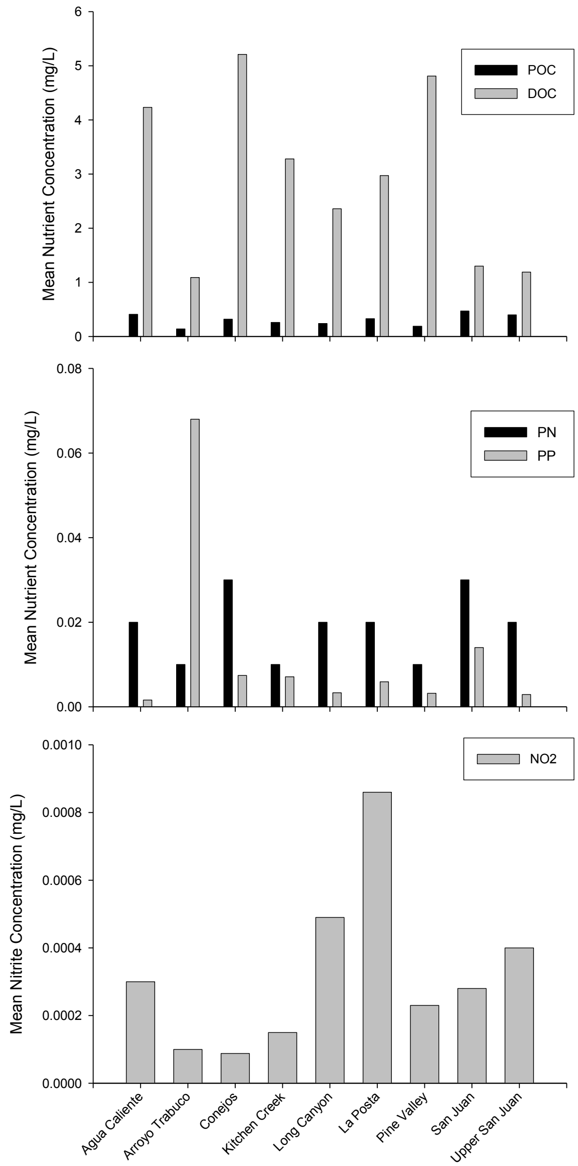

Figure 20. Comparison of reference stream nutrient concentrations a) particulate organic carbon (POC) and dissolved organic carbon (DOC); b) particulate nitrogen (PN) and particulate phosphorus (PP); and c) nitrite (NO_2) during the 2012 dry season. Units are mg/L.

San Diego Reference Stream Study
Quarterly Monitoring Progress Report

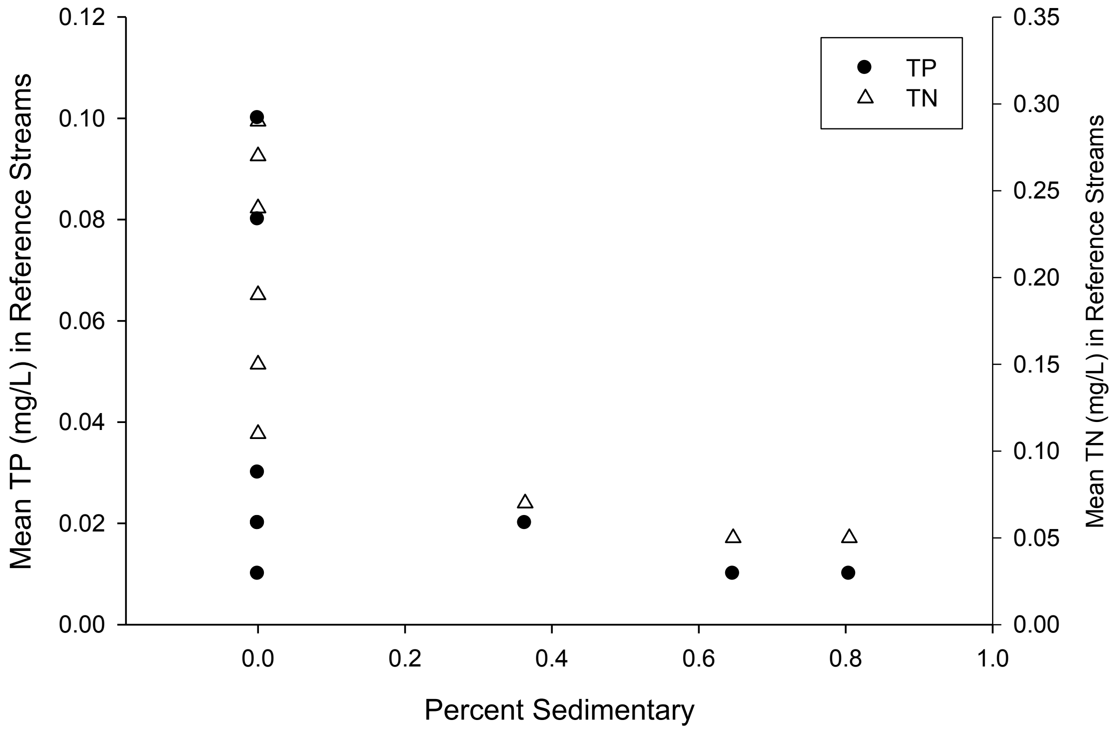

Figure 21. Relationship between total nitrogen (TN) and total phosphorus (TP) to proportion (%) sedimentary geology in reference streams during the 2012 dry season. Units are mg/L.

San Diego Reference Stream Study
Quarterly Monitoring Progress Report

APPENDIX A - SUMMARY BACTERIA DATA FOR ALL REFERENCE STREAM SITE

San Diego Reference Stream Study
Quarterly Monitoring Progress Report

Table A1. Monthly Enterococci geomeans (MPN/100 ml) in natural streams during April 2012-July 2012 in southern California, USA. State of California water quality standards exceedances are bolded. [a] = intermittent stream. NA = not analyzed.

			Enterococci Geomean							
Site Name	Watershed	County	April (MPN/100 ml)	SD	May (MPN/100 ml)	SD	June (MPN/100 ml)	SD	July (MPN/100 ml)	SD
Long Canyon Creek[a]	Tributary to Kitchen Creek		**72.3**	27.7	**127.0**	50.0	**133.7**	14.6	**291.1**	31.5
Kitchen Creek[a]	Kitchen Creek-Cottonwood Creek		**38.1**	26.1	**66.8**	36.9	**132.7**	96.5	NA	NA
Pine Valley Creek[a]	Upper Pine Valley Creek	San Diego	15.0	2.5	28.8	13.9	**52.7**	16.2	**195.6**	-
Agua Caliente Creek[a]	Laguna Creek/ San Luis Rey River		NA	NA	**150.8**	348.1	**100.0**	-	NA	NA
La Posta Creek	La Posta Creek		27.8	22.1	**140.6**	323.1	**843.0**	436.9	**315.9**	680.3
Conejos Creek[a]	San Diego River		NA	NA	**38.0**	57.2	21.1	15.9	NA	NA
Upper San Juan Creek[a]	Upper San Juan Creek		30.5	-	29.0	24.6	14.6	2.2	14.5	-
San Juan Creek	Upper San Juan Creek	Orange	**48.6**	222.5	**53.4**	12.4	**88.8**	88.3	**61.1**	73.9
Arroyo Trabuco	Arroyo Trabuco		7.2	15.8	**83.3**	282.2	**67.0**	38.9	**107.3**	197.7
San Diego Geomean ± SD			32.7	13.9	**74.2**	75.2	**121.5**	161.2	**277.8**	295.7
Orange Co. Geomean ± SD			19.6	112.1	**50.5**	95.1	**77.2**	37.3	**57.4**	83.3
Overall Geomean ± SD			27.8	35.8	**63.5**	58.6	**101.1**	107.1	**126.3**	153.4

Table A2. Monthly *E. coli* geomeans (MPN/100 ml) in natural streams during April 2012-July 2012 in southern California, USA. State of California water quality standards exceedances are bolded; [a] = intermittent stream. NA = not analyzed.

			E. coli Geomean							
Site Name	**Watershed**	**County**	**April (MPN/100 ml)**	**SD**	**May (MPN/100 ml)**	**SD**	**June (MPN/100 ml)**	**SD**	**July (MPN/100 ml)**	**SD**
Long Canyon Creek[a]	Tributary to Kitchen Creek	San Diego	3.9	39.8	12.3	2.3	6.8	5.3	47.9	440.4
Kitchen Creek[a]	Kitchen Creek-Cottonwood Creek	San Diego	5.9	9.6	29.0	48.7	15.9	50.0	NA	NA
Pine Valley Creek[a]	Upper Pine Valley Creek	San Diego	5.6	4.0	31.4	28.5	20.5	7.6	**261.3**	-
Agua Caliente Creek[a]	Laguna Creek/ San Luis Rey River	San Diego	NA	NA	22.0	8.8	11.1	224.0	NA	NA
La Posta Creek	La Posta Creek	San Diego	42.0	22.0	33.3	15.9	82.1	21.5	50.8	47.4
Conejos Creek[a]	San Diego River	San Diego	NA	NA	10.4	1.5	11.2	24.3	NA	NA
Upper San Juan Creek[a]	Upper San Juan Creek	Orange	9.7	-	31.2	8.0	10.5	34.1	2.0	-
San Juan Creek	Upper San Juan Creek	Orange	16.5	24.6	8.8	6.7	30.0	32.2	19.8	68.8
Arroyo Trabuco	Arroyo Trabuco	Orange	6.4	12.7	96.5	260.8	33.4	20.9	70.9	268.1
San Diego Geomean ± SD			8.56	13.5	22.6	12.4	27.0	31.4	62.6	182.6
Orange Co. Geomean ± SD			10.2	15.7	29.8	91.8	18.8	16.7	20.8	107.4
Overall Geomean ± SD			9.6	10.3	25.1	35.3	23.8	20.6	39.6	114.0

Table A3. Monthly total coliforms geomeans (MPN/100 ml) in natural streams during April 2012-July 2012 in southern California, USA. State of California water quality standards exceedances are bolded; [a] = intermittent stream. NA = not analyzed.

			Total Coliforms Geomean							
Site Name	Watershed	County	April (MPN/100 ml)	SD	May (MPN/100 ml)	SD	June (MPN/100 ml)	SD	July (MPN/100 ml)	SD
Long Canyon Creek[a]	Tributary to Kitchen Creek		732.3	316.1	981.8	168.5	**1,418.3**	551.2	**2,419.6**	0.0
Kitchen Creek[a]	Kitchen Creek-Cottonwood Creek		**1,550.1**	419.4	**2,419.6**	0.0	**2,419.6**	0.0	NA	NA
Pine Valley Creek[a]	Upper Pine Valley Creek	San Diego	778.5	225.5	**2,236.0**	208.0	**2,086.7**	212.3	**2,419.6**	-
Agua Caliente Creek[a]	Laguna Creek/ San Luis Rey River		NA	NA	**2,419.6**	0.0	**2,419.6**	0.0	NA	NA
La Posta Creek	La Posta Creek		**1,094.2**	512.4	**1,776.5**	746.1	**2,419.6**	0.0	**2,265.6**	283.1
Conejos Creek[a]	San Diego River		NA	NA	**1,753.4**	979.2	**2,265.6**	283.1	NA	NA
Upper San Juan Creek[a]	Upper San Juan Creek		648.8	-	501.8	266.0	**1,098.2**	792.4	**1,524.6**	1,429.8
San Juan Creek	Upper San Juan Creek	Orange	991.4	711.3	500.9	131.7	**1,038.0**	807.1	**1,540.2**	1,410.4
Arroyo Trabuco	Arroyo Trabuco		**1,152.8**	326.5	**1,566.1**	767.8	**1,454.4**	721.9	579.4	-
San Diego Geomean ± SD			991.6	225.0	**1,864.6**	259.1	**1,486.5**	260.2	**2,352.3**	121.3
Orange Co. Geomean ± SD			**1,021.6**	354.3	732.9	400.0	876.4	418.0	**1,261.5**	771.1
Overall Geomean ± SD			**1,001.0**	187.5	**1,313.7**	270.7	**1,233.6**	265.5	**1,814.4**	401.7

CITY OF LAKE FOREST

CITY OF LAKE FOREST
DECEMBER 20, 1991

Mayor
Scott Voigts

Mayor Pro Tem
Kathryn McCullough

Council Members
Peter Herzog
Adam Nick
Dwight Robinson

City Manager
Robert C. Dunek

January 11, 2013

Via US Mail and E-mail

Mr. David Gibson
Executive Officer
California Regional Water Quality Control Board,
San Diego Region
C/O Mr. Wayne Chiu, P.E.
9174 Sky Park Court, Suite 100
San Diego, CA 92123

Subject: **Comments - Tentative Order No. R9-2013-0001, Regional MS4 Permit, Place ID: 786088Wchiu.**

Dear Mr. Gibson:

The City of Lake Forest ("City") submits this letter to the California Regional Water Quality Control Board, San Diego Region ("SDRWQCB") to convey the City's formal written comments on Tentative Order No. R9-2013-0001/NPDES Permit No. CAS0109266 ("Draft Permit"). The Draft Permit is intended by the SDRWQCB to serve as the basis for stormwater regulation for the City upon the expiration of current Order R9-2009-0002. The City appreciates the efforts of the SDRWQCB staff in the development of the Draft Permit including the most recent revisions from the former Administrative Draft; however, significant concerns remain.

The City is aware that the County of Orange ("County") is submitting a comment letter documenting comprehensive technical and legal concerns identified during the review of the Draft Permit. The County's submittal also includes proposed revisions to the Draft Permit provided via "red line" format per SDRWQCB staff request. City staff have participated closely in the collaborative development of this comprehensive set of comments and the City has requested to be named as a concurring entity in the County's letter. The City would like to express its full support for the County's comments and proposed revisions. While detailed comments are provided within the County's submittal, the City would like to note and specifically highlight several key issues of concern as follows:

- The Receiving Water Limitations provisions in the Tentative Order could expose the City to Clean Water Act liabilities for discharges that cause or contribute to an exceedance of a water quality standard. A clear linkage between the compliance provisions and prohibitions, receiving water limitations, and effluent limitations must be established.

The provisions dealing with land development, Low Impact Development (LID) and hydromodification control are significantly ratcheted up while existing permit programs are only just being implemented and/or pending approval. The City is particularly concerned with the elimination of all exemptions for the hydromodification control requirements, including for discharges to channels that have been engineered to prevent erosion. Exemptions for hydromodification management should include discharges to certain types of receiving waters and certain types of projects. The City additionally questions the Regional Board's authority to impose *any* flow related limitations in an NPDES permit following the District Court's decision in Virgina Dept. of Transportation v. EPA, No. 1:12-CV-775, slip op. (E.D. Va. Jan. 3, 2013).

- The provisions implementing the Beaches and Creeks Total Maximum Daily Load (TMDL) bacteria requirements are inconsistent with the TMDL as it was developed and pose additional significant liabilities. Federal law does not require NPDES permits for municipal discharges to include TMDLs. (*Defenders of Wildlife v. Browner* 191 F.3d 1159 (9th Cir. 1999); 40 C.F.R. § 122.44(d).) Pursuant to state law, permit provisions must be consistent with the corresponding Basin Plan amendments (Cal Water Code § 13263), and may only be included after consideration of "the beneficial uses to be protected, the water quality objectives reasonably required for that purpose, other waste discharges, the need to prevent nuisance, and the provisions of Section 13241." (*Id.*)

- The provisions requiring the development and implementation of a Water Quality Improvement Plan need to be aligned with the Jurisdictional Runoff Management Program requirements so that the programs are complimentary and prioritized instead of additive.

Thank you for your attention to our comments. The City is committed to the goal of water quality improvement and wants to work with the SDRWQCB in developing the most prudent and cost effective permit possible. If you should have any questions, please contact Devin Slaven, Water Quality Administrator, at (949) 461-3436, or dslaven@lakeforestca.gov.

Sincerely,

CITY OF LAKE FOREST

FOR

Thomas Wheeler, P.E.
Director of Public Works/City Engineer

cc: Robert C. Dunek, City Manager
Devin E. Slaven, CPSWQ, QSD/QSP, Water Quality Administrator
Scott Smith, City Attorney, Best Best & Krieger, LLP
Mary Anne Skorpanich, County of Orange, OC Watersheds

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CALIFORNIA
NATIONAL CITY
1887
INCORPORATED

January 11, 2013

Wayne Chiu, P.E.
California Regional Water Quality Control Board, San Diego Region
9174 Sky Park Court, Suite 100
San Diego California 92123-4340

Subject: Comment – Tentative Order No. R9-2013-0001, Regional MS4 Permit, Place ID: 786088Wchiu.

Dear Mr. Chiu:

The City of National City (City) appreciates the opportunity to comment on the proposed revision to the San Diego Regional Municipal Storm Water Permit, Tentative Order No. R9-2013-0001 (Tentative Order). The City generally supports the consensus comments prepared and submitted by the San Diego Copermittees. Two groups of comments are included in this letter: (1) Copermittee consensus comments for which the City wishes to provide additional, City-specific rationales in support of the proposed changes and (2) proposed changes that are different than the Copermittee consensus comments.

Additional City-specific rationales supporting selected Copermittee consensus comments are provided below to supplement the rationales provided in the overall Copermittee document.

- **Hydromodification management requirements for redevelopment projects, Tentative Order section E.3.c.(2)(a).** Requiring hydromodification management controls to match pre-development rather than pre-project conditions effectively has no impact on new development, for which pre-project and pre-development conditions are the same. However, requiring a redevelopment project to match runoff characteristics for the project area as it would have been before any development occurred on the property rather than based on the existing condition of the property dramatically increases requirements and cost for redevelopment projects. Redevelopment projects are important sources of jobs and economic development to cities like the City of National City. The proposed changes to the hydromodification requirements create a disincentive for redevelopment, which is particularly harmful to economically disadvantaged areas with contaminated sites due to past industrial activity that rely on redevelopment for economic improvement.
- **Non-storm water discharge requirements related to groundwater, Tentative Order section E.2.a.(1).** Tracking down locations of foundation and footing drains and crawl space pumps in the City, as well as records of prior approvals and plans and site-specific groundwater history, would be extremely time-consuming without a commensurate benefit in water quality. If any of

these types of drains or pumps are identified as a persistent source of pollutants to the City's MS4, the City will perform the necessary follow-up investigation and research for the particular drain of concern as required by other provisions of the Tentative Order.

- **Assessment requirements, Tentative Order section D.4.** Revisions to these requirements as proposed by the Copermittees will still provide jurisdictional accountability while removing calculations and reporting requirements that would take up a proportionally large amount of program resources for a smaller jurisdiction like the City of National City and that would be unlikely to provide information useful for managing storm water programs. The proposed revisions would help minimize the extent to which reporting efforts would pull resources away from field implementation components of the City's program that reduce storm water pollution.

The City differs with Copermittee consensus comments with respect to the following sections of the Tentative Order:

- **Non-storm water discharge requirements for air conditioning condensate, Tentative Order section E.2.a.(4)(a).**
    - **Proposed revised language:** "The discharge of air conditioning condensation should be directed to landscaped areas or other pervious surfaces where feasible."
    - **Rationale and discussion:** The proposed language change would provide the City with more flexibility to target key sources of pollutants with program resources. If this recommendation is not acceptable, the City would prefer the existing Tentative Order language to the proposed consensus Copermittee language because the Tentative Order language more clearly recognizes that directing air conditioning condensate to landscaping or other pervious areas, while desirable, may not be feasible at all sites. The existing Tentative Order language also does not unnecessarily introduce the complexity of sanitary sewer diversions, as the Copermittee consensus language does. The City has required sanitary sewer diversions for air conditioning condensate discharges in site-specific circumstances, but these diversions are generally not suitable or desirable for widespread use.
- **Requirements for pretreatment for infiltration BMPs, Tentative Order section E.3.c.(5)(a)(vi).**
    - **Proposed revised language:** "Infiltration BMPs must not be used for high threat to water quality land uses and activities as designated by each Copermittee, unless sufficient permanent source control BMPs to prevent exposure of high threat activities are proposed or runoff from high threat land uses or activities is first treated or filtered to remove pollutants prior to infiltration; and"
    - **Rationale and discussion:** In some cases, developments with industrial or light industrial land use may not have significantly different pollutant generating activities than commercial properties. For example, current designs for most light industrial developments have virtually no exposed areas of industrial activities. It makes more sense to base requirements for additional measures to protect groundwater on the specific proposed activities at a development rather than general land use categories, which may or may not indicate a potential threat of groundwater contamination if

infiltration BMPs are used. Also, permanent source control BMPs that prevent exposure of high threat activities, such as structural canopies, may be more effective and require less maintenance for continued long-term effectiveness than filtration or other pretreatment approaches and should be allowed.

The City appreciates the Regional Board's consideration of our comments. Should you have any questions about any of the comments contained in this letter, please contact John Quenzer at (858) 586-6600 or Barby Tipton at (619) 336-4583.

Sincerely,

Stephen Manganiello
City Engineer

April 10 and 11, 2013
Item No. 8
Supporting Document No. 5

32400 PASEO ADELANTO
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City of San Juan Capistrano · California · Established 1776 · Incorporated 1961

January 11, 2013

Wayne Chiu, P.E.
California Regional Water Quality Control Board, San Diego region
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

Subject: Comment – Tentative Order No. R9-2013-0001, Regional MS4 Permit, Place ID: 786088Wchiu.

Dear Mr. Chiu:

The City of San Juan Capistrano appreciates the opportunity to provide comments on Tentative Order No. R9-2013-0001, which is intended by the Regional Board to serve as the basis for stormwater regulation in the City upon the expiration of current Order R9-2009-0002. The City has been actively involved in the development of the comprehensive set of comments submitted by the County of Orange and supports those comments and attaches them by reference.

The City appreciates the revisions made by Regional Board staff since the prior Administrative Draft but believes that further changes are necessary, which are included in redline format in the County letter. A number of key issues have been extensively discussed in the focus meetings and Board workshops and, despite some changes, still remain a significant concern to the City. These include:

- The Receiving Water Limitations provisions in the Tentative Order could expose the City to Clean Water Act liabilities for discharges that cause or contribute to an exceedance of a water quality standard. A clear linkage between the compliance provisions and prohibitions, receiving water limitations, and effluent limitations must be established.

- The provisions dealing with land development, Low Impact Development (LID) and hydromodification control are significantly ratcheted up while existing permit programs are only just being implemented and/or pending approval. The City is particularly concerned with the elimination of all exemptions for the hydromodification control requirements, including for discharges to channels that have been engineered to prevent erosion. Exemptions for hydromodification management should include discharges to certain types of receiving waters and certain types of projects.

- The provisions implementing the Beaches and Creeks Total Maximum Daily Load (TMDL) bacteria requirements are inconsistent with the TMDL as it was developed and pose additional significant liabilities. Permit provisions must be consistent with the corresponding Basin Plan amendments.

- The provisions requiring the development and implementation of a Water Quality Improvement Plan need to be aligned with the Jurisdictional Runoff Management Program requirements so that the programs are complimentary and prioritized instead of additive.

Thank you for the opportunity to provide comments. The City would like to request the opportunity to meet with you, other Regional Board staff and the County of Orange to review in detail the changes requested in the County letter.

Please direct any questions regarding this letter to Ziad Mazboudi, Senior Civil Engineer, at zmazboudi@sanjuancapistrano.org or 949-234-4413

Yours sincerely,

Keith Van Der Maaten, PE
City of San Juan Capistrano
Utilities Director

CITY OF SANTEE

January 11, 2013

Mr. Wayne Chiu, P.E
Regional Water Quality Control Board San Diego Region
9174 Sky Park Court, Suite 100
San Diego, Ca 92123

SUBJECT: DRAFT REGIONAL MUNICIPAL PERMIT

Dear Mr. Chiu,

I am writing to express the City of Santee's general support for the revised comments being submitted on behalf of the San Diego County Copermittees.

One issue that we would like to highlight is the inference from the inventory requirements (E.5.a.1(vii)) that mobile home parks can be regulated by the City. The Mobile Home Parks Act preempts the City's ability to regulate within a mobile home park, except for specifically enumerated areas where regulation is allowed. (Health & Safety section 18500: County of Santa Cruz v. Waterhouse (2005) 127 Cal.App.4th 1483, 1495.) The City is allowed to regulate, pursuant to its police powers, only the following:

(1) Zones where parks may be located,
(2) Park perimeter walls or enclosures on public street frontage,
(3) Signs,
(4) Access
(5) Vehicle parking,
(6) Certain uses for parks,
(7) Construction and use of equipment and facilities located outside of manufactured home or mobile home used to supply gas, water, or electricity thereto
(8) Permit to use a manufactured home or mobile home outside a park,
(9) Local building permit to construct an accessory structure for a manufactured home or mobile home when the manufactured home or mobile home is located outside a mobile home park
(10) Setback and separation requirements governing the installation of a manufactured home, mobile home, or mobile home accessory structure or building installed outside of a mobile home park.

As you can see from the above summary, the City is restricted in its ability to require best management practice (BMP) implementation , or even to conduct inspections in mobile home parks. We therefore recommend that these types of development not be inventoried for inspection and BMP retrofitting.

We appreciate the opportunity to constructively participate in the development of this permit and hope that the RWQCB will continue the discussion with us as we progress towards permit approval.

Pedro Orso Delgado, P.E.
Deputy City Manager/Director of Development Services

CLEAN WATER NOW

Date: January 11, 2013

TRANSMITTED VIA E-MAIL

To: Ms. Laurie Walsh
WRC Engineer
San Diego Regional Water Quality Control Board (SDRWQCB)
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

From: Roger E. Bütow Executive Director Clean Water Now

Re: Revised Administrative Draft San Diego Regional Municipal Separate Storm Sewer System (MS4) Permit: Tentative Order No. R9-2013-0001

Ms. Walsh

Clean Water Now (hereafter referred to as CWN) **was** prepared to submit extensive comments and provide proposed revisions in regards to the NPDES (MS4) Permit noted above by the determined deadline of today, January 11, 2013.

Instead, CWN supports the San Diego Building Industry of America (SDBIA) Coalition in their respectful request that the SDRWQCB remand the Tentative Order back to staff so that it may be revised in conformity and in resonance with the United States Supreme Court's 9-0 opinion handed down this past Tuesday, January 8, 2013. This Coalition generously shared their most recent draft dated January 10, 2013 and we also find ourselves in agreement with many of their other concerns and suggested revisions.

In light of numerous recent and related court decisions, we are going to place any further comments in abeyance pending more clarity. CWN feels that it would be precipitous, even futile to go any further in the ratification process for this particular regional permit. We definitely oppose placing it on the SDRWQCB agenda until such a time as the apparent disparities and discrepancies are reviewed then determined by legal counsel to be minor, major, real or false.

CWN has been in constant contact with the San Diego BIA personnel and with several other South Orange County MS4 Copermittees for the past 3 days regarding these decisions and their potential dissonance and some disarray for our regional regulatory oversight mechanisms.

(cont.)

Many of the **Findings** and other sections of the Tentative Order now appear to be in potential contradiction or conflict, inconsistent and/or incongruent. The only thing that CWN is certain of is the auspice, the aura and appearance of general uncertainty. Even if only seen as an emotional disequilibrium, the onus and burden should be placed squarely upon the SDRWQCB staff to cure, to at minimum remedy this by remanding it pending greater specificity and subsequent clarification. We do not feel that remanding is a form of over-reaction or exaggeration.

The amount of confusion over the short, mid and long-term ramifications alone is daunting, but it is rampantly clear that a great portion of the Tentative Order may be subject to subsequent revisions by the SDRWQCB, even aspects of appropriative and riparian water rights entitlements that need other State agencies input. As presently written, it appears fragile, vulnerable, and will be exposed to extensive legal challenges if sustained as drafted.

The **Total Maximum Daily Load** (TMDL) provisions are another critically important element of the Tentative Order that we perceive to be problematic in light of the recent legal renderings.

SDRWQCB staff repeatedly embraced and implemented **"Adaptive Management"** (AM) at the stakeholder focused group meetings that took place in 2012. Staff encouraged stakeholders to follow their lead and guidance, to integrate this well-known, successful business and corporate methodology. Integral in the AM process are **"Conflict Resolution"** prescriptions.

It should be noted that this emerging conflict is in part self-inflicted by the SDRWQCB staff as it disallowed protracted yet potentially fruitful discussions about the present conundrum. A basic assertion by the facilitator noted the inherently egalitarian nature of AM, plus respect for ALL opinions and concerns yet dialogue on this subject was arguably suppressed and stifled.

To the best of our recollection during the entire focused group process and SDRWQCB rollout, at each venue, at least one significant stakeholder requested staff to clarify the State's legal position and projections, its legal counsel's perceptions regarding subsequent ramifications if the US Supreme Court over-ruled the NRDC and Santa Monica Baykeepers.

"Adaptive management (AM) is a structured, iterative process of robust decision making in the face of uncertainty, with an aim to reducing uncertainty over time via system monitoring. In this way, decision making simultaneously meets one or more resource management objectives and, either passively or actively, accrues information needed to improve future management."

In our humble opinion, this **"What if"** scenario should have been discussed to a greater length and depth per AM than allowed by staff and the facilitator who basically discouraged it. Staff appeared to lean towards irrelevance at some of these venues and at others towards confidence that ultimately the 9th Circuit Court of Appeals determination would be sustained.

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Another example of the **"What if"** speculation and significant doubt is embedded in the SDBIA pleadings regarding down-slope (declivity) relief and the nexus with certain water rights disputes. CWN would go further and introduce another random and chaotic by-product of the MS4 proposal, the Law of Unintended Consequences:

Stormwater capture and who may claim accompanying increases in groundwater production rights associated with causing increased percolation is currently a major topic in the Chino Groundwater Basin (Region 8, SARWQCB). This topic includes the question of whether increased groundwater production rights should be accorded where the capture is compelled by regulatory requirements such as MS4 permits.

Personally, I have some arguable expertise in this **"one-size-fits-all"** shortcoming in the MS4 proposal. I have been a general contractor and builder of both commercial and custom residential homes for some 40+ years in South Orange County. Onsite detention/retention of stormwater could create and/or exacerbate the very conditions that caused both of the slides, the significant and monolithic slope failures that occurred in Bluebird Canyon here in Laguna.

We are a predominantly clay-expansive soil region, subject to flocculation and de-flocculation determined by events out of our control. Droughts cycles followed by El Niños followed by yet more drought cycles create subterranean pocket, voids that make us prone to such catastrophic failures. We now require greater compaction and subterranean stabilization (caissons, etc.) during construction, but that translates into more difficulties regarding full compliance with this MS4. Here in Laguna Beach, we cannot serve the two masters, and the MS4 demands uniformity and coherence among ALL of the copermittees jurisdictions where it cannot be reasonably accomplished. Practicality seems missing.

We strongly believe in the engineering project maxim expressed via an acronym metric: **SMART: "**<u>**S**</u>pecific**,** <u>**Me**</u>asurable**,** <u>**A**</u>chievable <u>**R**</u>ealistic and <u>**T**</u>imely. Compliance in Laguna Beach is neither achievable nor realistic, and perhaps impossible to implement, putting us in chronic violation hence prone to fines by the SDRWQCB. And to impose, to initiate and assertively pursue the retrofitting elements of the Tentative Order's demands would make my city vulnerable to massive, mind-boggling private litigation. Ironically, it would also not <u>**be**</u> smart.

IF the US Supreme Court and other related decisions have no significance or bearing on this Tentative Order, need not result in remanding, then the SDRWQCB staff should mass broadcast, that is widely transmit that legally justifiable position to its stakeholder master list. Memorialize, that is codify it in some discernible and defensible manner. CWN had hoped that the AM process would streamline, would in essence triage and winnow to fast-track approval without rancor or post-ratification litigious challenges.

(cont)

At the focused meetings we were only given non-binding verbal responses and assurances about the LA County case by staff without benefit or the immediate feedback via SDRWQCB legal counsel presence. The SDRWQCB should then publicize that legally tenable/defensible brief via mass media and post prominently their reasoning at the SDRWQCB website.

IF it is of **<u>any</u>** significance that might require revisiting or reopening, then reconvene the stakeholder focused group, appropriately confirm and acknowledge the US Supreme Court decision as a **"game-changer."** If it is, that should trigger a subsequent draft process with revisions and/or editing: Then, and only then, should staff proceed accordingly.

It is far better to delay, to get the Tentative Order aligned, to deal with potential irregularities leading to endless post-adoption legal challenges preemptively and hopefully summarily (immediately) than to let it move forward as is. In this case, **"One size fits none."**

We would also add our voice, our support, to the SDBIA proposal that such a regional permit ignores the impossibility of such a water quality management document to what I consistently pointed out at focused meetings as the equivalent to Einstein's Unified Field Theory research. He never succeeded in creating one equation or series of theoretical equations that explained everything in the Universe.

It would be better to create MS4s by apparent identifiably unique topographical/geo-morphological characteristics or watershed-by-watershed bases. It was intended to cut down on staff's invaluable entanglement time, yet we feel it will only increase demands and burdens on budgets, including the copermittees. The **"case-by-case basis"** concept **<u>sounds</u>** reasonable, but this could readily de-evolve into innumerable side-bar intrigues and endless negotiations.

This MS4 tries, attempts, to accomplish the noble goals of both the Clean Water Act and Porter-Cologne Water Quality Control Act in a singularity. CWN does not believe that is possible. Laguna Beach isn't an anomaly, we believe that other steep terrain copermittees will find themselves in similar conundrums and community disputes, some having gross sum $$$ litigious expenditure impacts unaddressed in the permit.

The very morass, the uncertainty that AM was supposed to attenuate, reduce or obviate has occurred. We, as stakeholders, bought into AM as our primary negotiation tool during meetings. In lieu of more time to professionally analyze the ramifications of the US Supreme Court decision, we feel that it is impossible at this time to properly assess what deserves serious consideration and possible mid-course corrections.

We have a rule on construction sites: **"Measure twice, cut once."** Many times, if the material is expensive and/or the potential adverse $$$ impacts of error considerable, we measure or gauge numerous times in proactive, pre-emptive anticipatory avoidance.

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(cont.)

The SDRWQCB can do the same. It was the intent of the MS4 focused meetings to at least minimize and un-complicate subsequent challenges, not to protract in a continuous, post-mortem loop. Instead, the US Supreme Court decision, in conjunction with other-related ongoing legal proceedings in California, seems poised to expand and create interminable contention.

One determination of the Order regarding **Priority Development Projects** (PDP) is that ALL hillside development in Laguna Beach will necessitate, will force the City into imposing such stringent categorization and compliance oversight on its construction industry and pass the increases on to parcel owners. Compliance would equate to fiscal suicide.

These multiple development or redevelopment designations will be impossible to implement on the broad-swath, grand scale suggested, and when added to non-hillside projects laughingly, absurdly unaffordable and unobtainable.

We have been repeatedly told that funding is not a legal issue for the SDRWQCB. But if Laguna and other copermittees cannot afford the implementation necessary to achieve compliance, then this Order will create a revolving door of staff meetings and violation hearings. Even bankrupt areas already fiscally impaired, depressed and distressed.

What happened to Economically Feasibility and Technological Possibility as reasonable, fair metrics? What good does it do to demand unachievable compliance standards?

Let's remand it, retract and revise if necessary, thus getting it done right the first time when finally placed on the SDRWQCB docket. As the present, highly prescriptive existing permits under the SDRWQCB jurisdictional domain don't expire or need renewal soon, are in place until a subsequent one is ratified, what's the hurry, the rush?

Otherwise, putting it in historical perspective regarding previous MS4 Permits, it'll be like the movie **"Groundhog Day,"** or as Yogi Berra exclaimed **"déjà vu all over again."** This happened back in 2002 when due to extensive legal appeals by the South Orange County copermittees, CWN was forced to spend precious internal funds to represent itself plus the Sierra Club and the Surfrider Foundation at the SWRCB hearing in Sacramento.

Litigation over this will only line the pockets of consultants and attorneys, including those aligned with eco-NGOs .This Order will expand that emerging compliance cottage industry tremendously, and should therefore be prophylactically remanded as soon as possible.

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(cont.)

CWN sincerely believes that this remanding and return could be accomplished in 90-120 days at most and does not constitute stalling nor is it unreasonable. We're certain that the dominant majority of the stakeholders would support this front-loaded revisitation and refinement to the Order as opposed to back-end dissolution, un-subsided disorder and jumbled chaos.

Respectfully submitted,

Roger E. Bütow
Executive Director
Email: roger@clean-water-now.org

CLEAN WATER NOW is an innovative, science-based organization committed to solution-oriented collaboration as a means of developing safe, sustainable water supplies and preserving healthy ecosystems.

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January 11, 2013

Wayne Chiu, P.E.

San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

Subject: Comments on San Diego Region MS4 Permit - Tentative Order R9-2013-0001

Dear Mr. Chiu,

Thank you for the opportunity to comment on the Tentative Order R9-2013-0001, an updated NPDES permit for the San Diego region. It is encouraging to see the progress on this permit, in particular the incorporation of watershed planning and TMDL compliance sections. My comments here specifically pertain to verification of proprietary treatment controls. Attached to this letter is an additional table of specific change requests and comments.

This tentative order appropriately prioritizes runoff reduction strategies, specifically infiltration, rainwater harvesting and evapotranspiration. Contech supports this approach and the allowance of the use of biotreatment systems where runoff retention is infeasible. Where neither of these approaches is feasible, treatment controls may be used to intercept pollutants before they leave the site. Also, where retention BMPs are specified, treatment controls may be appropriate as pretreatment.

In past permit terms permittees have been required to review and rank the effectiveness of treatment controls relative to the requirement that pollutants of concern be managed by BMPs with medium or high effectiveness. This has been done at the broad BMP category level, most notably in Table 3 of the 2008 Model SUSMP. However, this broad characterization of classes of systems cannot begin to capture the myriad of specific proprietary device designs and sizing strategies. What is needed is a BMP specific verification program. The permittees should be directed to collaboratively initiate this review, or should be directed to only allow technologies that have been verified by an independent program that serves this purpose.

Until 2008, Caltrans published the Treatment BMP Technology Report which contained ratings for specific manufactured devices. The State of Washington Department of Ecology currently administers a verification program following the Technology Acceptance Protocol – Ecology (TAPE). There is a multistate collaborative that includes California called the Technology Acceptance Reciprocity Partnership (TARP) that has developed specific testing protocols and peer review processes for proprietary technologies. In California, the Sacramento Stormwater Quality Partnership has established a verification program. All of these programs are designed to ensure that the performance and operational feasibility of proprietary BMPs is known and reliable. At this point there is no equivalent program in the San Diego region that can give plan reviewers this assurance.

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Whether specified for pretreatment upstream of infiltration or standalone treatment as part of an alternative compliance approach, clear direction from the Board regarding the need for technology specific performance verification to ensure adequate performance. The comments above and attached reference several leading programs that I encourage you to consider for reciprocation of approvals.

Please contact me if you would like further discussion or clarification on any of the issues introduced here or in the attached comments.

Sincerely,

Vaikko Allen, CPSWQ, LEED-AP
Director – Regional Regulatory Management
Contech Engineered Solutions LLC
vallen@conteches.com

Suggested Changes
Tentative Order No. R9-2013-0001
Draft NPDES NO. CAS0109266
San Diego Region MS4 Permit Reissuance

Submitted by Vaikko Allen, CPSWQ, Director - Regional Regulatory Management
CONTECH Engineered Solutions, LLC
Phone:310-850-1736, e-mail: VAllen@conteches.com

Section	Page	Existing Text	Proposed Change or Comment	Justification
II.E.3.a.(1)(a)	73	"Onsite BMPs must be located so as to remove pollutants … prior to discharge … and as close to the source as possible…"	Remove "as close to the source as possible".	While it is typically advantageous to remove pollutants close to the source as possible, this should not be a requirement. Site developers and engineers should have the discretion to locate onsite BMPs wherever is most desirable as long as pollutants are removed prior to discharge from the site. For example routing all site runoff to fewer larger systems instead of installing more distributed smaller systems may allow provide economies of scale and decrease future inspection and maintenance burdens.
II.E.3.b.(3)(a)(i)	77	"..direct stormwater runoff to adjacent vegetated areas, or other non-erodible permeable areas"	The section should stipulate that the DCV must be retained by adjacent permeable areas.	If runoff is simply routed to pervious areas, but is not retained there, runoff will result. Since there are no design or performance requirements for these permeable areas, adequate treatment of runoff is not assured. Without assurance of adequate treatment or retention of runoff from the design storm, these areas should not be exempted.
II.E.3.c.(1)(a)(ii)	78	Definition of volume-based sizing requirements	This section should include an annual capture standard of 80%.	Projects pursuing runoff reduction via rainwater harvesting or with infiltration systems with drawdown times other than 48 hours may retain a significantly different amount of runoff on an annual basis than systems designed around the runoff volume from the 85th percentile storm. An annual capture compliance pathway should be added that is equivalent to the annual runoff capture percentage resulting from 85th percentile DCV based designs. In the Los Angeles and Santa Ana Regions, the equivalent average annual capture volume has been determined to be 80% based on continuous simulation modeling.
II.E.3.c.(1)(c)(iii)	79	Treatment Control Standards	Add the following language: Performance of proprietary treatment systems must be demonstrated in full scale-field laboratory or field performance monitoring following sampling protocols established by the Technology Acceptance Reciprocity Partnership, the Washington State Department of Ecology or similarly robust protocols.	Among permittees in the region, there is currently a very wide range of interpretations of requirement that BMPs must provide medium or high pollutant removal efficiency. In many cases, devices with are approved on the basis of unsubstantiated performance claims simply because they can be construed to fit within one of the broad BMP categories in Table 3 of the 2008 Model SUSMP. For proprietary BMPs, verification of specific technologies is needed to ensure that adequate treatment is provided. The permittees should either be directed to collaboratively evaluate and rate specific technologies, or should defer to one of the existing verification programs that serves this purpose.
II.E.3.c.(2)(b)	80	"…must compensate for the loss of sediment supply due to the development project, should loss of sediment supply occur as a result of the development project"	Clarity regarding the Board's expectations for maintaining the natural sediment balance in light of competing flow and pollutant mitigation demands is needed. In addition, practical examples of how to achieve this requirement are needed.	The importance of maintaining natural sediment supply is undisputed. However, at this point, no practical way has been identified that can accomplish this while concurrently controlling runoff volumes, rates, and priority pollutants. This requirement, while scientifically valid is technically unachievable. Clarity regarding the Board's expectation is needed.

Section	Page	Existing Text	Proposed Change or Comment	Justification
II.E.3.c.(2)(d)	80	Hydromodification Exemptions	Exemptions from the San Diego Hydromodification Management Plan should be included in this section.	The San Diego Hydromodification Management Plan was developed collaboratively with stakeholders representing the scientific, engineering, public interest and regulatory communities. It should serve as a guide for hydromodification management requirements in this order.
II.E.3.c.(3)(b)(i)	81	"Onsite LID Biofiltration Treatment Control BMPs"	A requirement should be added that proprietary biofiltration BMPs must achieve final approval by the New Jersey Department of Environmental Protection according to the Technology Acceptance Reciprocity Partnership (TARP) Tier II testing protocol, by the Washington State Department of Ecology according to the Technology Acceptance Protocol - Ecology (TAPE), or by the Sacramento Stormwater Quality Partnership following their Sacramento are field testing protocol prior to installation.	There are several high rate biotreatment systems commercially available that provide a significant land area savings and comparable pollutant removal performance to their larger conventional public domain systems. There are several performance verification programs designed specifically for these high rate systems. Final approval by the Washington State Department of Ecology, the New Jersey Department of Environmental Protection or the Sacramento Stormwater Quality Partnership provides assurance that systems are highly effective and are operationally robust. Adding this requirement for proprietary designs will ensure that unproven systems are not allowed.
II.E.3.c.(3)(b)(i)[c]	82	"Biofilter…the design capture volume.."	A flow-based design pathway should be added.	Many biofilters and other biotreatment systems are more properly sized to treat a specific design flow rate than a runoff volume. In previous guidance documents and permits, treatment of the runoff rate produced from the site during a sustained 0.2 inch per hour intensity has been considered to treat an equivalent runoff volume compared designing around a 0.75 inch storm depth. That design option should be retained in this section.
II.E.3.c.(5)(a)(i)	86	"Runoff must undergo pretreatment such as sedimentation or filtration prior to infiltration."	Pretreatment including filtration through at least 4 inches of media/soil or by a hydrodynamic separator approved for pretreatment by the Washington State Department of Ecology or the New Jersey Department of Environmental Protection. Catch basin inserts may be provided to control trash and other gross solids, but must not be allowed as pretreatment.	Clear pretreatment standards are required to ensure longevity of infiltration systems. As written, it is likely that catch basin inserts with a token amount of filtration media will be specified as pretreatment. There are many catch basin inserts and other devices commercially available with media depths in the range of 2" or less that at design rates have media contact times on the order of one second. Some of these devices are being marketed and accepted by permittees as media filters under the assumption that they will provide benefits similar to true media filters such as sand filters and cartridge based media filters. The result is a proliferation of systems that foul very rapidly and predominately operate in bypass mode unless very frequent maintenance is performed. In the absence of a vendor specific technology assessment by the permittees, there are several programs that can be relied on to identify those proprietary pretreatment systems with demonstrated performance and operational feasibility.
II.E.3.d.(3)	87	"Updated procedures for designing structural BMPs, including and updated performance requirements to be consistent with the requirements of Provision E.3.c…"	Specific guidance regarding evaluation of proprietary treatment systems is needed. Either the permittees need to conduct a technology specific performance and operational feasibility verification assessment or they can reference one of the existing programs that serve this purpose.	There has been a tremendous amount of work completed through the Technology Acceptance Reciprocity Partnership (TARP) and by the Washington Department of Ecology to evaluate the performance and operational feasibility of proprietary treatment systems. Due to the proliferation of designs and sizing strategies, there needs to be oversight of the specification of these treatment systems to ensure that claimed benefits are actually provided.

Section	Page	Existing Text	Proposed Change or Comment	Justification
II.E.3.e.(3)(a)	89	"All (100 percent) of the structural BMPs at Priority Development Projects that are designated as high priority…."	A definition of "high priority" should be given.	There is no definition or guidance provided to advise permittees regarding what constitutes "high priority". Specifying the types of BMPs, land uses etc. that are considered high priority or setting a % of total BMPs that must be identified as high priority would prevent permittees from characterizing none or very few of their BMPs as "high priority", thereby avoiding inspection requirements.

County of San Diego

DEPARTMENT OF PUBLIC WORKS

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January 11, 2013

Wayne Chiu, P.E.
California Regional Water Quality Control Board, San Diego Region
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San Diego, CA 92123-4340

Dear Mr. Chiu:

COUNTY OF SAN DIEGO COMMENTS – TENTATIVE ORDER NO. R9-2013-0001, REGIONAL MS4 PERMIT, PLACE ID 786088WCHIU

Thank you for the opportunity to comment on Tentative Order No. R9-2013-0001, NPDES No. CAS0109266, *National Pollutant Discharge Elimination System (NPDES) Permit and Waste Discharge Requirements for Discharges of Urban Runoff from the Municipal Separate Storm Sewer Systems (MS4s) Draining the Watersheds within the San Diego Region* (Tentative Order). These comments are offered by the County of San Diego (County) in addition to those submitted separately on behalf of the 21 Copermittees of Order 2007-0001 (San Diego Copermittee Comment Letter). In this respect, the Copermittee comments should be considered to represent a general group consensus and those below to provide additional input necessary to reflect the unique perspective of the County as Regional Principal Permittee and a large jurisdiction covering portions of eight Watershed Management Areas. Additionally, these comments build on input provided in our September 14, 2012, comment letter on the Administrative Draft, many of which we do not believe to have been sufficiently addressed in the Tentative Order.

We greatly appreciate the public process employed to date toward the development of a new and improved permit for the San Diego Region, as well as the openness of staff and Regional Water Quality Control Board (Regional Board) members in listening to the issues and concerns put forth by the County and numerous other interested parties. However, the County is unable to support adoption of the Tentative Order as currently drafted. This letter addresses our remaining issues, the three principal of which are: 1) inclusion of requirements from a scientifically flawed Bacteria Total Maximum Daily Load (TMDL) with unattainable targets and unrealistic implementation costs, 2) inclusion of receiving water limitation (RWL) language that unnecessarily exposes the County to liability from third-party lawsuits, and 3) unwarranted expansion of requirements for development and redevelopment projects.

Please also note that on November 9, 2012, Ron Roberts, Chairman of the County of San Diego Board of Supervisors, sent letters to Governor Jerry Brown and other members of the San Diego delegation explaining the Board of Supervisors' concerns over the cost and reasonability of the permit's requirements, specifically the incorporation of the Bacteria Total Maximum Daily Load (TMDL) and the unwarranted expansion of requirements for development and redevelopment projects. A subsequent comment letter echoing these same concerns was submitted by elected officials from 19 of the 21 San Diego Copermittees to Regional Board Chairman Grant Destache on November 13, 2012. Both letters are included here as Attachment 1 and should be entered into the public record on this matter.

1. Bacteria TMDL for Beaches and Creeks

The Tentative Order incorporates elements and requirements from Resolution R9-2010-0001, *the Revised Total Maximum Daily Loads (TMDLs) for Indicator Bacteria, Project I – Twenty Beaches and Creeks in the San Diego Region* (Bacteria TMDL). We specifically want to urge the Regional Board to <u>not</u> incorporate the Bacteria TMDL provisions in this permit renewal.

<u>Legal Authority to Not Incorporate the Bacteria TMDL into the Permit</u>

As documented in a letter to Catherine Hagen, Esq. (see Attachment 2), it is the legal position of our County Counsel's office that your Board has the authority to decline the demands of other interested parties to incorporate the Bacteria TMDL provisions in this permit renewal.

In 1987, Congress declared its intent to chart a different course for improving water quality flowing from MS4 systems by enacting Clean Water Act §402 (33 U.S.C.§1342). In establishing the "maximum extent practicable" (MEP) standard of CWA §402(p)(3)(B), Congress recognized and enacted a different standard than the technology-based requirements of CWA §301. The MEP standard is the legal standard for stormwater compliance.

In *Defenders of Wildlife v. Browner* 191 F.3d 1159, the Ninth Circuit held that the MEP standard of CWA §402(p)(3)(B) replaces the requirements of CWA §301(b)(1)(C) for MS4 dischargers. The Browner decision goes on to discuss the discretion vested in permitting authorities to either require strict compliance, or less than strict compliance, with water quality standards.

It is the County's belief that the November 12, 2010, United States Environmental Protection Agency (USEPA) memorandum concerning the incorporation and use of numeric water quality based effluent limitations (WQBELs) in permits is not dispositive of this issue. As acknowledged in its subsequent March 17, 2011, letter, USEPA is still considering whether to retain, reissue, or withdraw the 2010 memorandum. And, USEPA acknowledges that the 2010 memorandum "does not impose legally binding requirements on EPA, States, or the regulated community, nor does it confer legal rights or impose legal obligations on any member of the public."

<u>Scientific flaws and unattainable targets justify exclusion of the Bacteria TMDL.</u>

Serious scientific flaws and unattainable targets are the main reasons the County feels it is appropriate for the Regional Board to exclude the Bacteria TMDL from the permit at this time. The County hired Geosyntec Consultants, a nationally recognized firm with expertise in water quality engineering and the co-principal investigator on the USEPA/American Society of Civil Engineers International Stormwater BMP Database, to assess the scientific merits of the Bacteria TMDL and to analyze whether the TMDL's numeric targets are achievable in practice. There are four main concerns in this regard, which are discussed in more detail in the memorandum from Geosyntec Consultants that is attached to this letter (see Attachment 3).

First, the science used to develop the Bacteria TMDL underestimates the amount of bacteria that come from natural sources such as birds, wildlife, and natural decomposition. In doing so, it overestimates the amount of bacteria required to be controlled by the County and other responsible parties named in the TMDL. Specifically, the TMDL inappropriately applies data from a "reference" (or minimally developed) watershed in Los Angeles County, which is not representative of San Diego County. It mistakenly applies data from a "reference" beach system to fresh water inland creeks, where natural concentrations of bacteria have been shown to be much higher. The TMDL does not incorporate a body of more recent water quality data which shows that the TMDL's numeric limits are overly conservative. For example, Geosyntec's analysis in Attachment 3 clearly shows that even the reference watershed itself in Los Angeles County has exceeded the Bacteria TMDL's targets in more than half of the years monitored. It is not appropriate to set a water quality target so stringent that a watershed with little to no development cannot consistently comply. The San Diego and Orange County MS4 Copermittees, partnering with Caltrans and with technical assistance from the Southern California Coastal Water Research Project (SCCWRP), are spending close to $2 million to fund a local "reference" watershed study that will provide data much more appropriate to the water bodies regulated by the Bacteria TMDL. TMDL development should not have proceeded until this data collection was conducted. Section 1 of Attachment 3 presents more detail on this subject.

Our second concern is that the Bacteria TMDL does not adequately reflect public health protection. Recreational water quality criteria published by USEPA acknowledge that indicator bacteria are not predictive of human health risk in stormwater-dominated waters, such as those regulated by this TMDL. Moreover, urban runoff epidemiology studies show a weak correlation between bacteria concentrations and human illness. USEPA Quantitative Microbial Risk Assessment (QMRA) studies also show that the numeric objectives used in this Bacteria TMDL are overly conservative for sites with minimal human bacteria sources. Related to our first concern, many studies show that natural sources, which are not appropriately accounted for in this TMDL, contribute significantly to bacteria levels but present lower human illness risk. Section 2 of Attachment 3 presents more detail on this subject.

Third, although a scientific peer review was conducted on the Bacteria TMDL prior to its adoption, that review was much too limited in scope to provide adequate defense of the TMDL basis and approach. Section 3 of Attachment 3 presents more detail on this subject.

Fourth, after thorough review of available non-structural and structural BMP performance data, Geosyntec, USEPA's own technical investigator of the International Stormwater BMP Database, finds that the Bacteria TMDL's numeric targets are not consistently or reliably attainable even with significant investment in new infrastructure. This is not surprising given that the Bacteria TMDL essentially requires the impacts of over 100 years of urbanization to be reversed to pristine, pre-development levels. BMP technology simply does not exist to comply with the

TMDL's aggressive targets. Statistically evaluated monitoring data from the International Stormwater BMP Database indicate that all non-disinfection structural BMPs are not capable of reducing effluent concentrations that would achieve bacterial water quality objectives with the consistency, frequency, and predictability required by the TMDL. Disinfection systems are widely considered not to be suitable or cost-effective for treating wet weather MS4 discharges, which are a primary focus of this TMDL. Section 4 of Attachment 3 presents more detail on this subject.

For all of the reasons discussed above and in Attachment 3, it is appropriate for the Regional Board to use its discretion to exclude the Bacteria TMDL from the permit at this time.

Practical Considerations

From a recent summary by Regional Board staff, County of San Diego Copermittees already spend approximately $119 million per year on programs to improve water quality in the San Diego region. Those programs have improved water quality in general and at beaches specifically throughout this region. For example, according to Heal the Bay's recent beach report cards, over 90% of San Diego County beaches receive A or A+ grades during dry weather conditions, when the vast majority of recreation occurs. With ever-increasing knowledge gained through trial and error, and with the Tentative Order's Watershed Quality Improvement Plan (WQIP) concept expected to encourage existing resources to be focused in more efficient and effective ways, the County expects to continue the march toward improved water quality using its current level of resources.

By Regional Board staff estimates (see Appendix R of the Bacteria TMDL Technical Report), and as confirmed by San Diego Copermittees through recent analysis using state-of-the-art BMP forecast modeling, implementation of the Bacteria TMDL in the next permit cycle would add a magnitude of additional costs to Copermittee budgets that is unsustainable using existing methods for raising general fund monies, given California's legal constraints on taxation or fees. As your Board has heard, the range of additional costs to the region that attributable to the Bacteria TMDL alone is expected to be $144 million to $272 million per year, meaning billions of additional taxpayer dollars over the compliance period. Funding does not exist to support this additional level of investment. If, in the future, a coalition of partners, including the Regional Board, environmental groups, regulated industry, Copermittees, and other stakeholders, decided it was in the best interest of the community to ask the public to support additional revenues for such an investment, only then could the County potentially support such significant expenditures. Without a reliable funding source, compliance with the Bacteria TMDL is simply not possible at this time.

As presentations in the adoption process have shown, given the unique challenges associated with bacteria as a constituent in stormwater, the cost-benefit analysis dictates that implementing the Bacteria TMDL at this time, as written, would be bad public policy. Studies and experience show that any magnitude of controls for bacteria, up to and including disinfectant efforts, will not consistently achieve the Resolution's numeric standards, even assuming the expenditure of billions of dollars. So, the sensible and logical next step is to take a hard look at the standards and assumptions of the Bacteria TMDL and devise plans to improve water quality using existing resources and as realistically achievable with today's scientific methods.

With regard to the unique circumstances concerning bacteria, because the science shows that consistent achievement of the Bacteria TMDL numeric standards is not possible, given any level of expenditure, imposing the Bacteria TMDL as currently written would exceed the "maximum extent practicable" standard. Accordingly, we believe your Board is vested with the discretion to elect not to incorporate the Bacteria TMDL provisions at this time, and it would be justified to open a process to revisit and re-examine the Bacteria TMDL assumptions in the context of its basin planning process, instead of taking the irrevocable step of incorporating the TMDL into the permit and potentially wasting valuable taxpayer dollars that could better be spent on achievable water quality improvement goals.

If, over these objections, your Board chooses to include the Bacteria TMDL into the permit, the San Diego Copermittees have proposed alternative language that, although still not acceptable to the County, would more appropriately incorporate the TMDL into the permit in a manner consistent with the intent of the TMDL Basin Plan Amendment.

2. Receiving Water Limitations (RWL) Language

Significant concerns have been expressed by the County and other Copermittees about third-party liability risks resulting from the Ninth Circuit's interpretation of receiving water limitation (RWL) language in the Los Angeles Region's stormwater permit. While we appreciate the State Water Resources Control Board's willingness to take comment and review those concerns, it may take several months for the State Board to act. The Tentative Order retains language similar to the problematic language reviewed in the *LA v. NRDC* case. This leaves the County and other Copermittees immediately exposed to similar litigation from third parties for violations of water quality standards. We know that several varied proposals to modify RWL language have been made at the state and local levels. The San Diego County Copermittees have proposed multiple alternatives, first in response to the April 2012 Administrative Draft Permit, which were rejected, and now to this Tentative Order.

The County suggests a simple solution consistent with Congress' intent in enacting CWA §402 as discussed above: simply remove the RWL language in Provision A of the Tentative Order. Federal law does not require imposition of the RWL language for MS4 systems. There is precedent for this action; a number of USEPA issued stormwater permits throughout the country do not include this language. Your Board has the discretion under CWA §402 and *Browner* to remove the language. If USEPA does not consider the RWL language to be essential to MS4 permitting, it seems logical that your Board is not required to include it in the new permit.

State Water Board policy supports the iterative process approach to water quality improvement, and acknowledges that water quality standards for many pollutants from MS4s cannot be met immediately. Therefore, it is unrealistic and at odds with the iterative process to enact a standard that puts public entities under threat of third-party lawsuits, even when they are diligently spending significant time and public money pursuing water quality improvement. The permit could still include its prescriptive requirements and the WQIP features that all parties believe will focus resources in each watershed in the most productive fashion, through the iterative process envisioned by Congress for MS4 systems.

Removal of the RWL language would eliminate the inevitable jousting over modified language proposals and the uncertainty created by its retention in light of the *LA v. NRDC* ruling. Copermittees would simply be obligated to focus on permit condition compliance, including the tasks identified in approved WQIPs, subject to Regional Board enforcement if appropriate. Removal of the language would not create a "free pass"; to the contrary, it would encourage effective water quality monitoring that might otherwise be discouraged by the specter of third-party lawsuits like those filed in the *LA v. NRDC* case.

3. New requirements for development and re-development projects.

On-site retention requirements for Priority Development Projects

The County does not support the Tentative Order's shift from current permit requirements by requiring Priority Development Projects to "retain" rather than "treat" pollutants. We specifically request that the language in Tentative Order section E.3.c.(1)(a) be changed as follows: *"Each Priority Development Project must be required to implement LID BMPs that are designed to ~~retain~~ treat (i.e. intercept, filter, store, infiltrate, evaporate, and evapotranspire) onsite the pollutants from storm water to the MEP."* All other applicable language in the Tentative Order should be made consistent with this change.

The shift to a "retention" standard will require large stormwater controls and corresponding cost increases, and lacks a scientific peer-reviewed study that considers all possible environmental impacts. Runoff is an important water source to creeks and rivers in our semi-arid climate. Retaining more than pre-project volumes of water could result in loss of downstream habitat and subsequent channel erosion. USEPA Municipal Permit Improvement Guide, Chapter 5, Page 54, recommends retaining pre-project volumes and SCCWRP's *Hydromodification Assessment and Management in CA* recommends a water balance approach to mimic natural hydrology.

The ability to retain water is constrained by many factors, such as: soil types, space, underground utilities and water table level. The permit should not include performance standards that are not possible onsite for most projects in the San Diego region. Projects need to be provided with a means to comply onsite even when soil conditions are poor.

The County hired Rick Engineering, a highly regarded company in the field of water quality engineering, to estimate the cost increase to development projects having to implement the new retention standard. As explained in detail in Attachment 4 (Rick Engineering Cost Comparison Study, December 2012), costs are expected to increase two- to 12-fold from the current Permit standard of "infiltrate, treat or detain". The San Diego Copermittees have invested considerable time and resources to develop a technically sound, effective, and defensible Standard Urban Stormwater Mitigation Plan (SUSMP), which was approved by the Regional Board in 2010. Low Impact Development (LID) and Treatment Control BMPs are efficient at pollutant load reduction. In many priority development projects, standard LID and treatment control BMPs are more than adequate for full pollutant load reduction. Existing requirements for development and redevelopment are already designed to improve water quality; therefore, forcing all priority development projects to retain the pre-developed 85th percentile storm volume is not scientifically justified, could be harmful to the watershed, and is forcing a "one size fits all" approach on all projects.

In addition, requiring the retention standard to be based on when the site was historically undeveloped and naturally vegetated may impose mitigation beyond a project's impacts. Applying the pre-development reference condition to sites that are, in fact, developed would expose the Copermittees to litigation risk and may be unenforceable. Whereas, the pre-project standard allows the appropriate nexus to the project's impacts and is enforceable by the local jurisdiction. Please see the letter from the City of San Diego, City Attorney, to Catherine Hagen, dated December 19, 2012, for additional justification for why a "Pre-development (naturally occurring)" standard is not supported.

Offsite Mitigation / Alternative Compliance Programs

The County has serious reservations about the creation of an alternative compliance program to allow private development to mitigate for project impacts off-site. There are significant administrative costs associated with developing mitigation methodology, establishing off-site locations suitable for mitigation, and establishing outside agreements with agencies to perform perpetual maintenance. Plus, there is the cost of constructing the piping from the project sites to the mitigation area (due to Tentative Order section E.3.c.(3)(a)(iv), which prohibits the use of receiving waters to convey stormwater runoff from a development site to the location of off-site mitigation). In addition, the taxpayer (not the developer) will ultimately be responsible for the perpetual maintenance of the piping and the offsite mitigation lands. And finally, the short time frame of four years for an alternative compliance in-lieu fee does not allow enough time to leverage enough resources from multiple projects to pay for the establishment of a regional solution prior to the first private project completion (occupancy). A State loan program will be necessary to provide a funding mechanism to initiate mitigation projects (similar to Clean Water State Revolving Fund used for Wetland mitigation).

The County recommends the following changes in order for an alternative compliance program to be effective:

- The alternative compliance program should be administered directly by the Regional Board. Applicants wishing to utilize off-site mitigation must have approval by the Regional Board for mitigation applicability, option, location and perpetual maintenance fee to be eligible for alternative compliance within a jurisdiction.

- Delete section E.3.c.(3)(a)(iv), which prohibits receiving waters from being utilized to convey storm water runoff to the alternative compliance options

- Change Section E.3.c.(3)(a)(iv) to allow for a ten-year alternative compliance in-lieu fee.

Mitigation for Loss of Sediment Supply

Tentative Order section E.3.c.(2)(b) as written is unclear and implies that each development project will be required to conduct studies and compensation for the loss of sediment supply specifically on site. However, the ability to compensate for the loss of sediment supply has not yet been fully researched, nor have practices been developed to accomplish this. Therefore, the ability to require sediment compensation on a project-by-project basis is not yet validated or possible. The County recommends the language be removed from section E.3.c.(2)(b) and moved to Section E.3.d. as line item (6) so that it can be addressed regionally instead of at a project level: "Update sediment supply mitigation procedures, as research becomes available, to compensate for significant losses of sediment supply anticipated as a result of development." This proposed wording change would allow the Copermittees to study and adapt to how sediment supply should appropriately be managed.

Vector Breeding in Storm Water Management Devices

The existing permit includes vector-related language intended to raise awareness of the potential unintended public health risks resulting from mosquito production in certain storm water management devices. The Tentative Order does not include this language. The removal of the vector-related language raises a significant concern with the County's Department of Environmental Health, and the County requests that it be placed back into the proposed draft to protect public health. Please see the Department of Environmental Health's detailed comments on this issue in Attachment 5.

Other Concerns

In addition, the County fully supports the following San Diego County Copermittee recommendations related to requirements for new and re-development projects:

- Maintain the existing exemptions in the Regional Board-adopted San Diego Hydromodification Management Plan.
- Maintain the "pre-project" rather than "pre-development" standard for controlling runoff flow rates and durations.
- Instead of adjusting hydromodification management requirements now, reference the recently Board-adopted Resolution No. R9-2010-0066.

More detail and discussion on all of these recommendations is provided under separate cover in the San Diego County Copermittees' comment letter.

4. Attachment E, Total Maximum Daily Load for Total Nitrogen and Total Phosphorus in Rainbow Creek Watershed

The Rainbow Creek TMDL for Total Nitrogen and Phosphorous assigns a Load Allocation (LA) to the County. The Tentative Order inappropriately incorporates this Load Allocation as a Waste Load Allocation (WLA). We are aware of no legal basis for such a change, and therefore believe it was made in error. We request that the Regional Board strike the Rainbow Creek TMDL from Attachment E of the Tentative Order.

5. Santa Margarita Watershed WQIP and Transitional Monitoring Program

The County requests that the development of a WQIP and of a modified transitional monitoring program for the Santa Margarita River Watershed Management Area (WMA) be deferred until such time as the Riverside County Copermittees are covered under the reissued Order.

We are particularly concerned that the resource and time commitments required of dischargers, stakeholders, and Regional Board staff to develop a *provisional* WQIP for a limited portion of the Santa Margarita River WMA is not justified. San Diego County represents only 19% of the total land area and 12% of the population in this WMA. The extensive effort required to develop a WQIP for this limited area would be commensurate with that required to go through a full and inclusive WQIP process for the entire WMA – which would again be required once the Riverside County permittees obtain permit coverage. But this "first round" iteration would necessarily exclude many of the watershed stakeholders representing the Riverside County portion of the watershed, as well as other potential state and federal stakeholders. It simply does not make sense to invest in a "partial" WQIP process and to then repeat it on enrollment of the remaining watershed permittees – quite possibly only one or two years later. A full and inclusive process that involves all relevant watershed stakeholders should be the goal of WQIP development. Piecemeal plan development is antithetical to the WQIP vision.

We request that the County be allowed to use the current Watershed Urban Runoff Management Plan (WURMP), including the water quality priorities developed pursuant to Order No. R9-2007-0001, to guide implementation of Provisions D and E within its jurisdiction. We also request a reduction in the number of wet weather MS4 outfall discharge monitoring stations in the transitional monitoring program from five to two stations since: 1) the land uses within the unincorporated County represent only residential and agricultural use and not the full range of land uses listed in Provision D.2.a.(3).(a), and 2) this level of effort better reflects the County's portion of the WMA in terms of population and land area.

We understand that continued progress must be made during any transitional period, and can assure the Regional Board that the County is committed to maintaining its existing commitments in this WMA. We have already demonstrated, through the implementation of a 319(h) grant received in 2006, that we are committed to implementing actions within Rainbow Creek Watershed to reduce nutrient loadings. More recently, we have been awarded another 319(h) grant for Rainbow Creek to implement education and property evaluation programs targeted to agricultural and residential audiences, as well as extensive receiving water quality monitoring.

In addition to these implementation activities, the County, in partnership with Riverside County Flood Control and Conservation District, is committed to furthering our understanding of how nutrients are impacting the beneficial uses in the watershed. This effort is being funded through a Proposition 84 Integrated Regional Water Management (IRWM) grant to "test-drive" the State Water Board Nutrient Numeric Endpoint (NNE) process. This work will include the development of a Nutrients Process Plan to define the NNE process and to form as the foundation of an agreement between the various dischargers in the watershed and the Regional Board. The grant funds are also being used to collect background information, coordinate and facilitate stakeholder input and participation, complete data collection and modeling of the estuary, and to conduct water quality monitoring needed for the NNE process.

6. Non-Storm Water Discharges of Irrigation Runoff

Section B.2 of Order R9-2007-0001 requires that discharges from irrigation water, lawn watering, and landscape irrigation (collectively "over-irrigation discharges") be prohibited only where they have been identified as a significant source of pollutants to waters of the U.S. In contrast, Section E.2.a of the Tentative Order categorically defines these as illicit discharges based on a conclusion that each represents a source of pollutants to waters of the U.S., thus requiring their outright prohibition.

In our comment letter on the Administrative Draft Permit, we noted the significance of this change and posed two critical questions that remained unanswered. First, we requested a rationale for the determination that these irrigation runoff discharges are sources of pollutants to receiving waters. And second, we asked that if such a rationale were provided, these discharges alternatively be added to Section E.2.a.(4), which would allow their control through statute, ordinance, permit, contract, order, or similar means rather than outright prohibition. The Fact Sheet/Technical Report provided as Attachment F of the Tentative Order partially answers the County's first question and does not address the second. Our remaining concerns are addressed below.

Question 1: Are irrigation water, lawn watering, and landscape irrigation discharges [significant] sources of pollutants to receiving waters?

Regarding the designation of over-irrigation discharges as sources of pollutants to receiving waters, the Fact Sheet (pp. F-74 through F-77) states:

"Non-storm water discharges resulting from over-irrigation have been found to be a source of several types of pollutants (e.g., nutrients, bacteria, pesticides, sediment) in receiving waters. The San Diego Water Board and the Copermittees have identified categories of non-storm water discharges associated with over-irrigation as a source of pollutants and conveyance of pollutants to the MS4 and waters of the United States in the following documents...". In support, six references are provided and briefly described.

1. SmartTimer/Edgescape Evaluation Program (SEEP) Grant Application;
2. 2006-2007 Orange County Watershed Action Plan Annual Reports;
3. Fiscal Year 2008 Carlsbad Watershed Urban Runoff Management Program Annual Report;
4. 2007-2008 San Diego Bay Watershed Urban Runoff Management Program Annual Report;
5. Orange and Riverside County Copermittee Public Education Materials; and
6. Los Penasquitos Lagoon Sedimentation/Siltation TMDL Technical Report (June 2012)

Each is accompanied by one or more qualitative statements about the nature of urban runoff and the potential or actual contribution of various types of over-irrigation practices to it. The following overall conclusion is provided: "These documents confirm that non-storm water discharges associated with over-irrigation are a source of pollutants and should be addressed as illicit discharges to the MS4."

Several aspects of this analysis are problematic. In moving from the language of the previous permit to that of the Tentative Order, the applicable litmus for evaluation of potential discharge prohibitions has been modified from significant sources of pollutants to sources of pollutants. While we understand that this change is consistent with 40 CFR 122.26(d)(2)(iv)(B)(1) ("flows shall be addressed where such discharges are identified by the municipality as sources of pollutants to waters of the United States."), we would also emphasize that the implications of such a change go well beyond a paper exercise. Clearly, some potential exists for any over-irrigation discharge to reach receiving water. The pertinent question is really whether this potential is of a demonstrated level of significance that would justify the broad policy changes and resource commitments necessary to enforce their outright prohibition. From the little evidence cited in the Fact Sheet/Technical Report, we believe that such a case is not made.

None of the statements provided in support of staff's conclusion are supported by data, technical analysis, or any other form of substantiation. In particular, the use of outreach materials and a grant application (items 1 and 5) to justify the establishment of a categorical discharge prohibition covering portions of three counties is overreaching and inappropriate. Moreover, even if the remainder of the sources cited could be accepted as supporting staff's conclusions for the limited areas to which they apply (the Carlsbad, San Diego Bay, and Los Penasquitos Watersheds), they would not provide support for a more general conclusion that other watershed areas covered by the permit (San Juan, Santa Margarita, San Luis Rey, San Dieguito, San Diego, and Tijuana Watersheds) are similarly impacted.

It also bears emphasis that none of the discussion provided supports the conceptual leap that staff has taken from general statements concerning the presence of over-irrigation discharges to more specific conclusions that they are a source of pollutants to receiving waters <u>and</u> that they should be addressed as prohibited discharges. No evidence for either of these conclusions is presented.

Question 2: Why are over-irrigation discharges not included in Tentative Order Section E.2.a.(4) along with air conditioning condensation, individual residential vehicle washing, and dechlorinated swimming pool discharges?

In our comment letter on the Administrative Draft Permit, we noted that even if irrigation runoff discharges are determined to be sources of pollutants to receiving waters, a more appropriate compliance pathway for managing them is provided in Tentative Order Section E.2.a.(4), which would allow their control through statute, ordinance, permit, contract, order, or similar means rather than outright prohibition.

The Fact Sheet/Technical Report (p. F-76) states that "[p]rohibiting non-storm water discharges associated with over-irrigation, however, is not a new requirement for the Copermittees because it is also consistent with and required by the Water Conservation in Landscaping Act (AB 1881, Laird)." It is true that important conceptual similarities exist in the aims this Act and the Tentative Order. However, to equate the two sets of requirements is to miss critical distinctions between them, i.e., one establishes a variety of tools and approaches to conserve water and to discourage and prohibit runoff from leaving properties, and the other simply makes it illegal for over-irrigation runoff to enter MS4s. Since the former requirements are already in place through the adoption of local water conservation ordinances (County Ordinance No. 10032 was amended on 01/13/2010), it serves little function to create an additional layer of bureaucracy (and potential Copermittee liability) for the same discharges simply because they enter the MS4. It makes more sense to recognize these existing ordinances as substantially meeting the stated objective of Tentative Order Section E.2.a.(4) to instead allow these discharges to be controlled "through statute, ordinance, permit, contract, order, or similar means." In doing so, Copermittees are afforded greater opportunity to appropriately utilize their local water conservation ordinances, but also to augment these approaches with tools other than strict enforcement. Given the significant variety in the nature and severity of over-irrigation discharges likely to be encountered over a permit cycle, it makes sense to allow Copermittees the discretion they need to effectively deal with them. Tentative Order Section E.2.a.(4) already provides this discretion for air conditioning condensation, individual residential vehicle washing, and dechlorinated swimming pool discharges. The County sees no fundamental difference in the potential risk posed by over-irrigation discharges, and again would emphasize that the Fact Sheet/Technical Report has provided no evidence that it exists.

The County requests that over-irrigation discharges be added to Section E.2.a.(3) of the final adopted Order. Alternatively, if sufficient rationale is provided for their designation as illicit discharges, we request that they instead be added to Section E.2.a.(4) since their control through statute, ordinance, permit, contract, order, or similar means would constitute a more appropriate management response than outright prohibition.

7. Staffing and cost increases for new and expanded requirements cannot be absorbed

The County is tentatively supportive of many of the key conceptual shifts likely to occur under a re-issued permit. In particular, we agree that an increased presence in residential areas can help us to better characterize source contributions from these areas and to craft more effective approaches to managing them. We also believe that developing and fine tuning our WQIP strategies will over time result in commercial and industrial inspection programs that are more focused and efficient in addressing key watershed problems.

However, the County is compelled to support a cost-neutral permitting approach that takes advantage of increased efficiencies and prioritization to put limited resources where they will be best utilized. To comply with the current permit, the County currently spends well over $30 million each year. This is equivalent to the entire budget of our Department of Parks and Recreation. Unfortunately, our analysis of the Tentative Order indicates that the cost to comply would increase significantly. The County cannot support a permit that increases costs for which no reliable source of funding exists.

On top of the Bacteria TMDL-related costs discussed above (see item 1), other new permit costs include the following:

- Development and implementation of a residential inspection program

The Department of Public Works estimates that the County will require a minimum of two to three additional staff to carry out these inspections and conduct all necessary follow-up activities (education, enforcement, etc.) over eight WMAs and 24 Community Planning Areas.

- Increases to agricultural inspections

The Department of Agriculture, Weights, and Measures estimates that seven additional staff may be needed to conduct inspections of a wider variety of agricultural operations. This is due primarily to possible increases in inspections and complaint referrals of additional agricultural sites, where the County's inventory may increase approximately eightfold (from 483 to more than 4,000). These increases would be responsive to updated JRMP requirements and the development and implementation of WQIPs.

- Development and implementation of an alternative compliance program (see item 3 above):

There are significant administrative costs associated with developing off-site mitigation methodology, establishing off-site locations suitable for mitigation, and establishing outside agreements with agencies to perform perpetual maintenance. Plus, there is the cost of constructing the piping from the project sites to the mitigation area (due to Tentative Order section E.3.c.(3)(a)(iv)). In addition, the taxpayer (not the developer) will ultimately be responsible for the perpetual maintenance of the piping and the off-site mitigation lands.

- Development and implementation of a retrofit program for areas of existing development:

Per Section E.5.e.(2), the County would be required to develop "a program to retrofit areas of existing development within its jurisdiction to address identified sources of pollutants and/or stressors that contribute to the highest priority water quality conditions in the Watershed Management Area." While it is not possible at this time to anticipate the specific resource implications of this requirement, it is essential that they be acknowledged. Significant ongoing costs will be incurred in developing and managing the program itself, acquiring candidate properties, designing and constructing public projects, encouraging and/or compelling the construction of private facilities, and providing long-term maintenance of privately or publicly constructed facilities (e.g., permanent treatment control facilities installed in road rights-of-way). Such changes will require additional funding and resources that are not currently available.

Collectively, these increases are beyond the County's current ability to absorb. We believe that through additional dialogue we can identify commensurate reductions in other permit requirements or areas where greater prioritization and increased efficiencies can be achieved. We are anxious to continue dialogue so that an acceptable cost-neutral approach to implementing these new permit priorities can be found.

8. Determination of minimum inspection frequencies for industrial, commercial, and municipal facilities.

Tentative Order Section II.E.5.c.(1)(a)(iv) fails to differentiate compliance inspections from operation and maintenance inspections. In particular, inspections of linear municipal facilities and associated structures should not be included as part of a requirement to annually perform onsite inspections of an equivalent of at least 20 percent of a Copermittee's combined commercial, industrial, and municipal inventory.

Section II.E.5.a.(1) requires that Copermittee source inventories include commercial and industrial sources, and the following types of municipal facilities:

(i) MS4 and related structures

(ii) Roads, streets, and highways,
(iii) Parking facilities,
(iv) Municipal airfields,
(v) Parks and recreation facilities,
(vi) Flood management and flood control devices and structures,
- Operating or closed municipal landfills,

(vii) Publicly owned treatment works (including water and wastewater treatment plants) and sanitary sewer collection systems,
(viii) Corporate yards, including maintenance and storage yards for materials, waste, equipment, and vehicles,
(ix) Hazardous waste collection facilities,
(x) Other treatment, storage or disposal facilities for municipal waste, and
(xi) Other municipal facilities that the Copermittee determines may contribute a significant pollutant load to the MS4.

Section II.E.5.c.(1)(a)(iv) additionally requires that "[e]ach Copermittee must annually perform onsite inspections of an equivalent of at least 20 percent of the commercial facilities and areas, industrial facilities, and municipal facilities in its inventoried existing development". As such, it establishes a minimum inspection frequency that is based on each Copermittee's combined industrial, commercial, and municipal inventory totals.

Most of the facilities listed above are easily tabulated as discrete point sources (a building, a business location, etc.) and share a number of structural and operational commonalities (rooftop areas, parking lots, equipment operation, fueling, cleaning, etc.). As such, they are well-suited to the inspection requirements of Tentative Order Section II.E.5.c., which are primarily for compliance verification (assessment of BMP implementation, correction deficiencies or violations, etc.). Other facility types (streets, roads, highways, sanitary sewer collection systems, and MS4s) are fundamentally different because they consist of extensive networks of linear facilities and associated features (e.g., inlets and outlets). As such, it is impractical to inventory them as discrete point sources. Moreover, inspections of these facilities are conducted primarily for evaluating operation and maintenance needs, not for regulatory compliance. The following inventory totals are provided to illustrate how these differences in facility types apply to the County's current inventory.

<u>Facilities subject to "compliance" inspections (2,286 total "facilities")</u>

- Industrial sources (181 facilities)
- Stationary commercial sources (1,921 facilities)
- Solid waste facilities (22 facilities)
- Wastewater facilities (18 facilities)
- Road stations (21 facilities)
- Fleet maintenance facilities (27 facilities)
- Municipal airfields (4 facilities)
- Parks and recreational facilities (92 facilities)
- Office buildings and other municipal facilities (74 facilities)

Facilities subject to "maintenance" inspections (23,347 total "facilities")

- Streets, roads, and highways (1,929 linear miles)
- MS4 inlets and basins (18,974 facilities)
- MS4 linear channels (1,994 linear miles)
- Wastewater collection systems (450 linear miles)

As shown, calculating a combined total inventory across both lists by which either annual or 5-year inspection frequencies can be determined is problematic. Assuming for simplicity that each linear mile of road, MS4, or sewer collection system can be counted as a single facility, the "numbers" of these sources would outweigh all of the other discrete point sources in the first list by more than ten to one, artificially inflating the number of required annual facility inspections well beyond the apparent intent of the Tentative Order. While this would initially appear to drive inspection totals upward, it could have other unintended consequences. For example, a Copermittee could easily meet its overall targets by making comparatively minor increases to its inspections of streets, roads, highways, sewer collection systems, or MS4s. In essence, by focusing their efforts on linear municipal facilities, they could obviate the need for required inspections of other facility types. Such problems are easily remedied by separating the two sets of inspection requirements.

The County, therefore, requests that the following facility types be excluded from the requirements of Section II.E.5.c.(1)(a)(iv) to annually perform onsite inspections of an equivalent of at least 20 percent of the commercial facilities and areas, industrial facilities, and municipal facilities in each Copermittee's inventoried existing development:

- MS4 and related structures (inlets and outlets)
- Roads, streets, and highways, and
- Sanitary sewer collection systems.

This is consistent with Sections II.E.5.b.(1)(b) and (c), which make a clear distinction between general BMP implementation and those practices related to BMP operation and maintenance. We believe that the requirements of Section II.E.5.b.(1) are sufficient to ensure proper inspection frequencies for these other facilities.

9. Unfunded mandates

Permit Finding 29 (p. 9) states that the Tentative Order does not constitute an unfunded local government mandate subject to subvention under Article XIIIB, Section (6) of the California Constitution, and cites six reasons for this conclusion. Section VII-F of the Fact Sheet/Technical Report (p. F-29) provides further explanation of staff's reasoning. The County disagrees that the general discussion provided in each of these sections is sufficient to summarily dismiss the possibility that specific provisions of the final Order might in fact constitute unfunded mandates. The County also disagrees that the Fact Sheet's attempt at legal analysis is correct, or controlling of the unfunded mandate issue that is currently being litigated, and as may be litigated with regard to new provisions and requirements of the Tentative Order.

10. Firefighting discharges

Since the County Fire Authority will be directly regulated by this permit, the County is very concerned that public funds and critical personnel may have to be spent or resourced to comply with requirements that are unnecessary, and that this will ultimately reduce the emergency personnel and funding available for essential public services. The County Fire Authority's detailed comments on permit requirements for firefighting-related discharges are included as Attachment 6.

Also attached for your consideration are several comment letters received from Community Planning and Sponsor Groups in the unincorporated area. These letters express support for the County's positions and recommendations and are included here as Attachment 7.

Again, thank you for the opportunity to participate in the development of a new permit for the San Diego Region. We look forward to continued discussion of the issues raised above. If you have questions, please contact Jon VanRhyn, Water Quality Program Manager, at (858) 495-5133, or Todd Snyder, Land Use & Environmental Planning Manager, at (858) 694-3482.

Sincerely,

RICHARD E. CROMPTON, Director
Department of Public Works

REC:cw

ATTACHMENTS:

1) Letter from Ron Roberts, Chairman, County of San Diego Board of Supervisors, to Governor Jerry Brown, dated November 9, 2012, and letter from 20 elected officials to Regional Board Chairman Grant Destache, dated November 13, 2012.
2) County Counsel letter to Catherine Hagen, Esq.
3) Geosyntec Consultants, Technical Assessment of the San Diego Beaches & Creeks Bacteria TMDL
4) Rick Engineering Cost Comparison Study, December 2012
5) County of San Diego Department of Environmental Health Comment Letter
6) County of San Diego Fire Authority Comment Letter
7) Community Planning and Sponsor Groups Comment Letters

RON ROBERTS
CHAIRMAN
SUPERVISOR, FOURTH DISTRICT
SAN DIEGO COUNTY BOARD OF SUPERVISORS

November 9, 2012

The Honorable Jerry Brown
Governor, State of California
State Capitol Building, Suite 1173
Sacramento, CA 95814

Dear Governor Brown:

On behalf of the County of San Diego (County), I would like to inform you of recent action taken by the Board of Supervisors (Board) regarding the renewal of the San Diego Municipal Stormwater Permit (Permit). The Board has voted unanimously to approve a strategy to ensure that reasonable compliance standards are incorporated into the renewed Permit now under consideration at the San Diego Regional Water Quality Control Board (RWQCB). The County is concerned that the proposed permit requirements included in the draft tentative order of the Permit would impose unreasonable costs and at the same time guarantee non-compliance with permit requirements. This is particularly true for the numeric standards that would have to be achieved to meet the objectives of the Bacteria Total Maximum Daily Load (TMDL).

The County of San Diego has been the principal permittee for the San Diego Municipal Stormwater Permit and is joined by 20 other regulated parties referred to as copermittees, including the 18 incorporated cities, the San Diego Unified Port District and the San Diego County Regional Airport Authority. This Permit is renewed every five years, and with each renewal the permittees have been required to meet more stringent and costly requirements. "Sustainable Environments" is one of the County's three Strategic Initiatives, and the County has long been a leader in promoting clean water at local beaches, bays and streams.

The County currently spends over $35 million annually to comply with existing stormwater requirements, and collectively the copermittees spend over $100 million per year. Additional compliance costs are difficult to quantify, but are also paid by the private sector. These costs would be compounded by new permit requirements, including the Bacteria TMDL, which seeks to return beaches and creeks to conditions that existed prior to urbanization within 18 years. Regional compliance costs for the Bacteria TMDL alone are estimated to be between $2.2 billion and $4.2 billion in the six watersheds that involve the County over the remaining 18 years of the 20-year compliance schedule. The County's portion of estimated compliance costs is between $286 million and $567 million. On average, this program would cost the County an additional $16 to $31 million dollars each year. These cost estimates are consistent with estimates provided in the RWQCB's own TMDL documentation, as well as estimates developed as part of TMDL load reduction plans in other regions. The state or federal government does not provide any funding to local agencies to comply with these requirements.

Despite the unrealistic price, the required limits may be unattainable and current science cannot reliably guarantee that this effort will result in permit compliance.

COUNTY ADMINISTRATION CENTER • 1600 PACIFIC HIGHWAY, ROOM 335 • SAN DIEGO, CALIFORNIA 92101-2470
(619) 531-5544 • FAX: (619) 531-6262 • E-Mail: Ron-Roberts@co.san-diego.ca.us
www.ronroberts.com

The purpose of the Bacteria TMDL is to protect public health, as elevated bacteria levels at beaches have been shown to increase the risk of water-related illness in surfers and swimmers. However, the science used to develop the Bacteria TMDL underestimates the amount of bacteria that comes from natural sources such as birds, wildlife and natural decomposition. Since those sources of bacteria cannot be eliminated, compliance with the numeric limits in the proposed TMDL is unattainable. Additionally, bacteria are pervasive and can re-grow and multiply at a rapid rate, making them some of the most difficult pollutants to eliminate from the environment. Essentially, the Bacteria TMDL would require the impacts of over 100 years of urbanization to be reversed to pristine levels as soon as eight years from now in dry weather conditions and in less than 18 years for wet weather conditions. Above all, recent studies show that current technology is not capable of removing bacteria to levels that would meet standards, especially during rain events.

In addition to the Bacteria TMDL, the draft permit includes new unreasonable requirements for development projects that will increase costs significantly. The draft permit also includes performance standards that unnecessarily expose copermittees to third-party lawsuits.

While we necessarily focus on the specific requirements of the San Diego Municipal Stormwater Permit, we also remain concerned about developing policies at the national level where new stormwater permit requirements are expected next summer and United States Environmental Protection Agency (U.S. EPA) guidance on "waters of the U.S." could be released later this year. These represent significant additional regulatory requirements that could further impact the San Diego Municipal Stormwater Permit and increase its cost to residents and businesses in the San Diego region.

In the coming weeks the County will continue to express these concerns to the Regional Water Quality Control Board. The County urges your engagement on this issue at all levels, with the U.S. EPA, State Water Resources Control Board and RWQCB. Local government needs realistic objectives and schedules for the Bacteria TMDL, and more complete scientific analysis to ensure that resource commitments in water quality programs are justified based on the resulting benefits. Per the provisions of federal and state law, and the Maximum Extent Practicable standard established by the Clean Water Act, permit requirements should promote and ensure clean water while striking a reasonable balance in cost.

Concerns about the costs and compliance schedules for stormwater permits are shared by many jurisdictions in California and across the country. For this reason, the County is joining with other jurisdictions to bring attention to these concerns to regional water quality control boards, the U.S. EPA, and other appropriate state and federal offices. We appreciate your attention to the pending permit concerns in San Diego County, and we look forward to working with you in the months ahead to ensure that limited public funds are wisely dedicated to stormwater control. Please contact Geoff Patnoe, Director of the County of San Diego Office of Strategy and Intergovernmental Affairs, at (619) 531-5202 if you have any questions.

Sincerely,

RON ROBERTS
Chairman
San Diego County Board of Supervisors

RR:sia

County of San Diego
City of Carlsbad
City of Chula Vista
City of Coronado
City of Del Mar
City of El Cajon
City of Encinitas
City of Escondido
City of Imperial Beach
City of Lemon Grove
City of National City
City of Oceanside
City of Poway
City of San Diego
City of San Marcos
City of Santee
City of Solana Beach
City of Vista
S.D. Unified Port District

November 13, 2012

Mr. Grant Destache
Chairman
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

Re: Regional Municipal Storm Water Permit

Dear Chairman Destache:

As representatives of the jurisdictions in San Diego County that are regulated by the Regional Water Quality Control Board (Regional Board), we share deep concerns over proposed regulations in the new Regional Municipal Storm Water Permit. While we strongly believe in the mission of achieving clean water, the proposed regulations are without sound scientific merit and, if implemented, will have catastrophic negative impacts on the fiscal health of local governments and private industry.

Collectively, we are committed to the goal of improving water quality through the storm water management programs that have been developed in conjunction with the Regional Board. Current compliance efforts to reduce storm water pollution are significant and cost regional agencies more than $100 million annually. As stewards of public tax dollars and governments that are faced with having to do more with less, we are concerned that with each permit renewal cycle, the stringency and cost of the unfunded mandates continue to go beyond any practical standards of attainment and what is required by the Clean Water Act.

The Draft Regional Municipal Storm Water Permit released by the Regional Board continues to include the far-reaching Bacteria Total Maximum Daily Load (TMDL), and other additional impractical and unattainable requirements for development projects. It is estimated that the proposed Bacteria TMDL standards alone would cost between $2.2 billion and $4.2 billion for those jurisdictions that share responsibility in six of the watersheds included in the permit. The cost to private industry is unknown but it is clear that any additional costs will be passed on to already struggling and financially burdened families.

Taxpayers will be gravely impacted if this unilateral regulatory practice is allowed to move forward. Governing bodies will be forced to shift public funds away from existing programs, increase taxes or assessments, or face regulatory fines resulting from non-compliance. The Bacteria TMDL, along with the many other proposed regulations, should not be incorporated into the next Regional Municipal Storm Water Permit until we are certain that they are founded on verifiable scientific data, achievable standards, and until sufficient resources are available.

On behalf of our respective constituencies, we are requesting that the Regional Water Quality Control Board direct staff to work collaboratively with all the co-permitees and various stakeholders to draft language that makes practical sense from an environmental and economic standpoint.

Sincerely,

Ron Roberts

Chairman Ron Roberts
County of San Diego

Greg Cox

Vice Chairman Greg Cox
County of San Diego

Matt Hall

Mayor Matt Hall
City of Carlsbad

Cheryl Cox

Mayor Cheryl Cox
City of Chula Vista

Casey Tanaka

Mayor Casey Tanaka
City of Coronado

Carl Hilliard

Mayor Carl Hilliard
City of Del Mar

Mark Lewis

Mayor Mark Lewis
City of El Cajon

Mayor Jerome Stocks
City of Encinitas

Sam Abed

Mayor Sam Abed
City of Escondido

Mayor Jim Janney
City of Imperial Beach

Mary T. Sessom

Mayor Mary Teresa Sessom
City of Lemon Grove

Ron Morrison

Mayor Ron Morrison
City of National City

Jim Wood

Mayor Jim Wood
City of Oceanside

Don Higginson

Mayor Don Higginson
City of Poway

Mayor Jerry Sanders
City of San Diego

Mayor Jim Desmond
City of San Marcos

Mayor Randy Voepel
City of Santee

Mayor Joe Kellejian
City of Solana Beach

Mayor Judy Ritter
City of Vista

Admiral Lou Smith
Chairman
S.D. Unified Port District

April 10 and 11, 2013
Item No. 8
Supporting Document No. 5

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COUNTY COUNSEL

DEBORAH A. McCARTHY
ASSISTANT COUNTY COUNSEL

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WRITER'S DIRECT NUMBER:
(619) 531-4869
WRITER'S E-MAIL ADDRESS:
James.oday@sdcounty.ca.gov

January 10, 2013

Catherine Hagan, Esq.
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, California 92123-4340

via Fed Ex

Re: Tentative Order R9-2013-0001

Dear Catherine:

On behalf of our client the County of San Diego, I am writing concerning some provisions in Tentative Order R9-2013-0001 that are of particular concern to the County. I respectfully ask that you review our legal position on those provisions as outlined below, and please call me to discuss if you have any questions or need further information to assist your review.

The Bacteria TMDL Resolution

The Tentative Order would incorporate elements and requirements from the Bacteria TMDL Resolution (Resolution R9-2010-0001) into the new MS4 permit for San Diego Region copermittees, including the County of San Diego. We specifically urge the San Diego Regional Board to not incorporate the Bacteria TMDL provisions in this permit renewal cycle. It is our legal position that your Board has the authority to decline the demands of other interested parties that this action be taken.

Reasons Not to Incorporate the Bacteria TMDL Into the Permit

From a recent summary by Regional Board (RB) staff, County of San Diego copermittees spend approximately $119M per year on programs to improve water quality in the San Diego region. Those programs have improved water quality in general and at beaches in the region. With ever-increasing knowledge gained through trial and error, and with the Watershed Quality Improvement Plan concept expected to permit existing resources to be focused in more efficient and effective ways, San Diego copermittees expect to continue the march toward improved water quality using the current level of resources. The copermittees are continually working on ways to improve water quality and have done so for over two decades. As evident in our annual expenditure and work with experts, we are committed to improving water quality.

By RB staff estimates and as confirmed by San Diego copermittees, the implementation of the Bacteria TMDL in the next permit cycle would add a magnitude of additional costs to copermittee budgets that is unsustainable using existing methods for raising general fund monies and given California's legal constraints on taxation or fees. As your Board has heard, the range of additional cost attributable to the Bacteria TMDL alone is $144M to $272M per year, meaning billions of taxpayer dollars over the compliance period.

As presentations in the adoption process have shown, given the unique challenges associated with bacteria as a constituent in stormwater, the cost-benefit analysis dictates that implementing the Bacteria TMDL at this time, as written, would be bad public policy. Studies and experience show that any magnitude of controls for bacteria, up to and including disinfectant efforts, will not consistently achieve the Resolution's numeric standards, even with the expenditure of billions of dollars. So, the sensible, logical next step is to take a hard look at the standards and assumptions of the Bacteria TMDL and devise plans to improve water quality using existing resources and as realistically achievable with today's scientific methods.

<u>Legal Authority to Not Incorporate the Bacteria TMDL Into the Permit</u>

As you know in 1987, Congress declared its intent to chart a different course for improving water quality flowing from MS4 systems by enacting Clean Water Act § 402 (33 U.S.C. § 1342). In establishing the "maximum extent practicable" (MEP) standard of CWA § 402(p)(3)(B), Congress recognized and enacted a different standard than the technology based requirements of CWA § 301. The MEP standard is the legal standard for stormwater compliance.

In *Defenders of Wildlife v. Browner,* 191 F.3d 1159 (1999) the Ninth Circuit held that the MEP standard of CWA § 402(p)(3)(B) *replaces* the requirements of CWA § 301(b)(1)(C) for MS4 dischargers. The *Browner* decision goes on to discuss the discretion vested in permitting authorities to either require strict compliance, or less than strict compliance, with water quality standards.

Our office believes that the November 12, 2010 EPA memorandum concerning the incorporation and use of numeric WQBELs in permits is not dispositive of this issue. As acknowledged in its March 17, 2011 letter, EPA is still considering whether to retain, reissue, or withdraw the 2010 memorandum. And, in the same letter, EPA acknowledges that the 2010 memorandum, "does not impose legally binding requirements on EPA, States, or the regulated community, nor does it confer legal rights or impose legal obligations on any member of the public."

With regard to the unique challenges associated with bacteria control, the science shows that consistent achievement of the Bacteria TMDL numeric standards is not possible, even with any level of expenditure. Therefore, imposing the 2010 Bacteria TMDL provisions as permit conditions would exceed the "maximum extent practicable" standard. Accordingly, we believe your Board is vested with the discretion to elect not to incorporate the Bacteria TMDL provisions at this time.

Your Board would be justified to open a process to revisit and re-examine the Bacteria TMDL assumptions in the context of its basin planning process, instead of taking the irrevocable step of incorporating the TMDL into the permit and potentially wasting valuable taxpayer dollars that could better be spent on achievable water quality improvement goals.

Receiving Water Limitations (RWL) Language

As you know, the copermittees have expressed significant concerns about third-party liability risks resulting from the Ninth Circuit's interpretation of receiving water limitation language in the L.A. Region's stormwater permit. While we appreciate the State Water Resources Control Board's willingness to take comment and review those concerns, it may take several months for the State Board to act. The Tentative Order retains language similar to the problematic language reviewed in the *NRDC* case; this leaves the County and other copermittees immediately exposed to similar litigation from third parties for violations of water quality standards. We know that several various proposals to modify RWL language have been presented at state and local levels.

We suggest a simple solution consistent with Congress' intent in enacting CWA § 402 as discussed above: simply remove the RWL language in Provision A of the Tentative Order. Federal law does not require imposition of the receiving water limitations for MS4 systems. There is precedent for this action; a number of EPA issued stormwater permits throughout the country do not include this language. Your Board has the discretion under CWA § 402 and *Browner* to remove the language. If EPA does not consider the RWL language to be essential to its own MS4 permitting, it seems logical that your Board is not required to include it in the new permit.

State Water Board policy supports the iterative process approach to water quality improvement, and acknowledges that water quality standards for many pollutants from MS4s cannot be met immediately. Therefore it is unrealistic and at odds with the iterative process to enact a standard that puts the third-party lawsuit gun to the head of public entities diligently spending significant time and public money pursuing water quality improvement. The permit would still include its enforceable prescriptive requirements and the WQIP features that all parties believe will focus resources in each watershed in the most productive fashion. Over the past two decades, the region has developed the knowledge and skill set to improve water quality, but understands that only through an iterative process can true progress be made.

Removal of the RWL language would eliminate the inevitable jousting over modified language proposals and the uncertainty created by its retention in light of the *NRDC* ruling. Copermittees would simply be obligated to focus on permit condition compliance, including the tasks identified in approved WQIPs, subject to RB enforcement if appropriate. Removal of the language would not create a "free pass"; to the contrary, it would encourage effective water quality monitoring and reporting that might otherwise be discouraged by the specter of third party lawsuits like those filed in the *NRDC* and other cases.

<u>Land Development Standards/Hydromodification Issues</u>

County Counsel concurs with the legal concerns sent to your attention in the December 19, 2012 letter from the Office of the City Attorney of the City of San Diego. The letter points out potential constitutional issues with hydromodification requirements imposed in the Tentative Order. We urge you to recommend modifying the referenced provisions to avoid the potential consequences for copermittees outlined in the letter.

The County also urges the Regional Board to amend the Tentative Order to incorporate the approved hydromodification management plan (HMP) for San Diego County into the permit, and remove provisions of the Tentative Order that are inconsistent with the HMP. As you know, the HMP was developed at significant cost to copermittees, and has only recently been implemented. Therefore, scrapping key components and changing the baseline standard for redevelopment to the questionable "pre-development" standard without further study of the effectiveness of the HMP as implemented is legally inconsistent with the premise upon which the HMP was required to be developed in the first instance. Our client is submitting a more comprehensive technical comment on the HMP issue for your review.

Other legal concerns with various Tentative Order provisions will be woven into the comprehensive written comments to be submitted by the County and copermittees. Because of the potential impact of the above provisions of the Tentative Order for our client, we urge you to review and revise your recommendations to the Regional Board. Our mutual goal should be a permit that realistically and responsibly advances the march toward improved water quality in the region using available existing resources. As always, thank you for your consideration.

Very truly yours,

THOMAS E. MONTGOMERY, County Counsel

By James R. O'Day
James R. O'Day, Senior Deputy

JRO/tlm
12-00802

Geosyntec consultants

Technical Assessment of the San Diego Beaches & Creeks Bacteria TMDL

County of San Diego, Department of Public Works
January 2013

Executive Summary

The purpose of this paper is to evaluate the Beaches and Creeks Bacteria Total Maximum Daily Load (San Diego Bacteria TMDL), which was adopted by the San Diego Regional Water Quality Control Board (Regional Board) on February 10, 2010, and is proposed for inclusion in Tentative Order R9-2013-0001, the draft San Diego Municipal Separate Storm Sewer System (MS4) Permit (Permit). This technical evaluation identified three fundamental weaknesses: 1) the TMDL reference approach is inappropriately applied to the TMDL compliance sites; 2) the TMDL does not adequately reflect a protection of public health; and 3) the TMDL targets are unattainable given technological and environmental constraints. In addition, while a technical peer review of the TMDL was conducted prior to TMDL adoption, that review is found here to be too limited in scope to provide adequate defense of the TMDL basis and approach.

Introduction

The County of San Diego is a co-permittee in the San Diego MS4 Permit (Tentative Order No. R9-2013-0001), which is currently in draft form but expected to be adopted in 2013. The Regional Board proposes to include requirements consistent with the San Diego Bacteria TMDL (Resolution R9-2010-0001) in the MS4 Permit, thereby making compliance with the TMDL's requirements an enforceable permit requirement.

BACKGROUND

The California Ocean Plan and the San Diego Region Basin Plan (for inland waters) establish beneficial use designations (such as water contact recreation, or REC-1) and associated water quality objectives (WQOs) for marine beaches, estuaries, bays and freshwater bodies. The stated goal of the San Diego Bacteria TMDL is to protect human health and allow for water contact recreation at the 20 beach and creek segments in San Diego and southern Orange Counties. The TMDL defines achievement of the REC-1 beneficial use through attainment of WQOs, which are expressed as concentrations of bacterial indicators – total coliform, fecal coliform, and Enterococcus. The REC-1 WQOs are expressed as both single sample maximum (SSM) and geometric mean (GM) values.

Following adoption by the Regional Board, the TMDL became effective on April 4, 2011, upon approval by the State Water Board, Office of Administrative Law. The TMDL sets numeric compliance limits, or Wasteload Allocations (WLAs), for MS4 co-permittees based on a reference system approach. To account for natural sources of bacteria, this approach allows an identified percentage of samples to exceed the REC-1 WQOs based on observed exceedance frequencies at an undeveloped "reference" beach. The reference beach used in this TMDL is Leo Carrillo Beach in Los Angeles County. The TMDL's MS4 WLAs are expressed as allowable exceedance frequencies (AEFs) for any of the three SSM indicator bacteria WQOs, or 22% during wet weather (i.e., 22% of "wet weather" water samples are allowed to exceed any of the SSM WQOs) and 0% during dry weather, and 0% AEF of the GM during dry weather (i.e., no allowed exceedances). A "wet weather" day is defined in the TMDL as a day with rainfall of 0.2 inches or greater and the following 72 hours. All other days are treated as dry weather.

PURPOSE

The purpose of this white paper is to evaluate the TMDL based on a review of available data and relevant studies. This critical evaluation is structured into four fundamental questions: is the TMDL reference approach applied appropriately, does the TMDL reflect public health protection, are the TMDL MS4 WLAs attainable, and was the peer review sufficient?

1. Is the TMDL Reference Approach Applied Appropriately?

ALLOWABLE EXCEEDANCE FREQUENCIES ARE NOT APPROPRIATELY SET

To account for natural sources of bacteria, the San Diego Bacteria TMDL allows an identified percentage of samples to exceed REC-1 WQOs based on observed exceedance frequencies at an undeveloped "reference" beach. The "reference" beach used to set allowable exceedance frequencies (AEFs) for the San Diego Bacteria TMDL is Leo Carrillo Beach in Los Angeles County. MS4 WLAs are expressed as AEFs for three indicator bacteria (fecal coliform, total coliform, and Enterococcus) WQOs as follows:

- 22% AEF during wet weather[1] (i.e., 22% of "wet weather" water samples are allowed to exceed any of the SSM WQOs);

[1] A "wet weather" day is defined in the TMDL as a day with rainfall of 0.2 inches or greater and the following 72 hours. All other days are treated as dry weather.

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- 0% AEF of the SSM during dry weather;
- 0% AEF of the GM during dry weather.

The TMDL inappropriately applies the same AEFs to all compliance points, regardless of their beach type (e.g., open beach or lagoonal outlet), waterbody type (e.g., beach or stream), or watershed size. Enclosed lagoonal outlets have higher AEFs than open beaches due to limited flushing and stagnant water, nutrient and organic rich sediments and vegetation that harbor bacteria, and huge densities of birds and other wildlife, due to the high quality habitat. Freshwater streams are expected to have higher AEFs than marine beaches since beaches are sampled at "point zero", or in the mixing zone (where the discharge from the storm drain or stream initially mixes with the ocean water, resulting in dilution), and because streams carry higher suspended sediments, which harbor bacteria. For this reason, watershed size is expected to influence beach AEFs since large watersheds have greater discharge, and therefore less surfzone dilution. To demonstrate this influence, a 2006 Southern California Coastal Water Research Project (SCCWRP) monitoring study at Southern California reference beaches (Schiff et al, 2006) found that exceedance frequencies of bacteria WQOs in wet weather were greater in large (>100 km^2) watersheds than in medium (28-56 km^2) watersheds or small (3-12 km^2) watersheds. The Los Angeles Regional Board has acknowledged some of these factors in setting AEFs for various bacteria TMDLs. The Santa Clara Estuary, for example, has a wet weather SSM AEF of 30%, which is higher than that of other waterbodies due to its enclosed nature, which supports bacteria regrowth and natural sources. The Arroyo Sequit watershed, which drains to the Leo Carrillo reference beach, has a drainage area of approximately 31 km^2, placing it in the "medium watershed" category. For reference, the San Luis Rey River and San Diego River watersheds (two watersheds affected by the San Diego Bacteria TMDL) are 1,500 and 1,100 km^2, respectively, putting them in the "large watershed" category, and suggesting that TMDL compliance points at their outlets should have higher AEFs. AEFs could be more appropriately set to better reflect the watershed-specific characteristics of the regulated water bodies.

The San Diego Bacteria TMDL does not allow any exceedances during dry weather, which is inconsistent with both the reference watershed datasets and the Los Angeles bacteria TMDLs. The San Diego Bacteria TMDL requires a 0% SSM AEF during all dry weather conditions, while all Los Angeles TMDLs

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allow a higher dry weather SSM AEF, in some cases by separating summer-season dry weather from winter-season dry weather. In fact, based on review of recent monitoring data from the Leo Carrillo reference beach, Los Angeles beach bacteria TMDLs were modified in 2012 to increase the winter-season dry weather AEF from 3% to 10%. Furthermore, Geosyntec analysis of Leo Carrillo reference beach data from 2004 through 2011 shows an average SSM exceedance rate of 9% during summer-season dry weather, further challenging the basis for a 0% dry weather AEF in the San Diego TMDL. Table 1 compares dry weather single sample AEFs in the San Diego Bacteria TMDL with other Bacteria TMDLs adopted in the Los Angeles region.

Table 1. Bacteria TMDL Dry Weather Single Sample Allowable Exceedance Frequencies

Waterbody	Allowable Exceedance Frequency (%)	
	Winter Dry	Summer Dry
Los Angeles Region TMDLs		
Santa Monica Bay Beaches (reopened)	10%	0%
Malibu Creek (reopened)	1.6% (all dry weather)	
Los Angeles River	1.6% (all dry weather)	
Ballona Creek (reopened)	1.6% (all dry weather)	
Santa Clara River	1.6% (all dry weather)	
Santa Clara River Estuary	13.4%	4.7%
Malibu Lagoon (reopened)	10.4%	0%
Ballona Estuary (reopened)	10.4%	0%
San Diego Region TMDL		
San Diego 20 Beaches and Creeks (for comparison)	0% (all dry weather)	

The San Diego TMDL's use of AEFs as the compliance metric is also inconsistent with the Los Angeles reference approach (which uses allowable exceedance *days*) and, as a result, the wet weather WLAs are often unattainable at the reference beach itself. The Los Angeles TMDLs use the average wet weather reference beach exceedance frequency with the number of local wet days in the 90th percentile wet year to calculate the number of allowable exceedance days (AEDs)[2]. By doing this, the Los Angeles Regional Board has established a compliance metric that is only exceeded at the reference beach during 10% of years, and that accounts for the influence of year-to-year rainfall variability. In contrast, by using the average wet weather exceedance frequency as the compliance metric, the San Diego Bacteria TMDL

[2] The San Diego Bacteria TMDL also does this, but ultimately sets AEFs as the compliance metric, making its AED calculations unused and meaningless.

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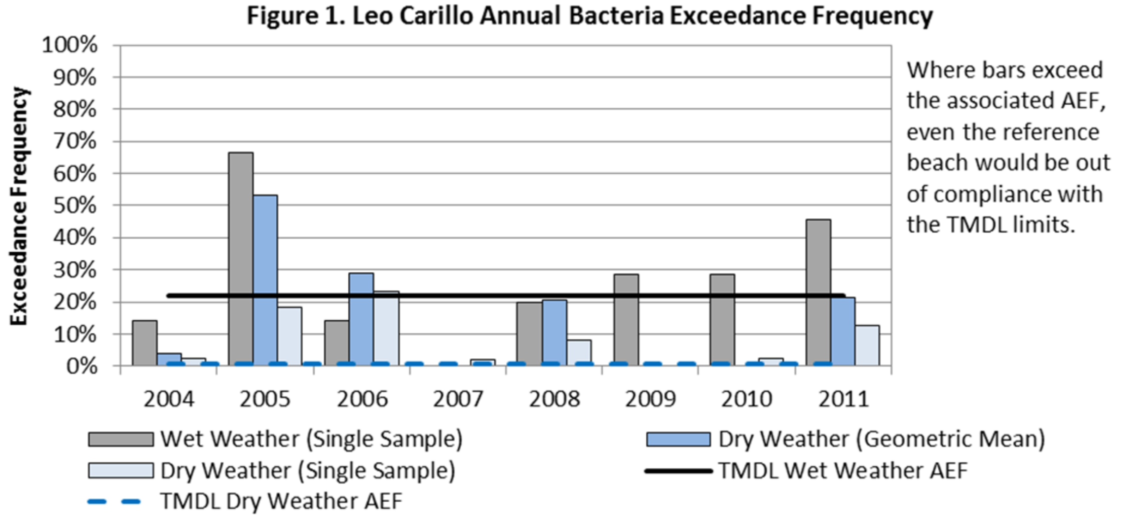
establishes a metric that is exceeded at the reference beach during approximately half of the years (since they are taking the average value).

Reference-based compliance metrics could be set such that the reference beaches and creeks consistently meet the TMDL WLAs. Geosyntec analysis of Leo Carrillo monitoring data from 2004 through 2011 demonstrates that the average wet weather SSM exceedance frequency (28%), the average dry weather 30-day GM exceedance frequency (16%), and the average dry weather SSM exceedance frequency (10%) are higher than the AEFs defined in the TMDL (22%, 0%, and 0% respectively). Figure 1 shows the annual exceedance frequencies (or percent of samples that exceed the SSM WQOs) for the Leo Carrillo reference beach compared to the TMDL AEFs. During these eight years of monitoring, this reference beach would have exceeded the TMDL's single sample AEFs in 4 of 8 years during wet weather and 7 of 8 years during dry weather. The reference beach also would have exceeded the GM AEF in 5 of 8 years. These results demonstrate that the TMDL AEFs are exceeded during most years at the reference beach itself. Furthermore, in its 2008 report (Tiefenthaler et al), SCCWRP evaluated bacteria concentrations in reference streams during dry weather. The study results demonstrated that bacteria levels at the reference stream sites fluctuate seasonally, annually, and from site to site, often with measured exceedance frequencies above the AEFs. Therefore, currently available reference beach and stream datasets could be used to set more appropriate TMDL compliance metrics.

Figure 1. Leo Carillo Annual Bacteria Exceedance Frequency



Notes:
1. 30-day Rolling GM - Geometric mean calculation performed every week, on the dry weather samples within the previous 30-days period, if 5 or more samples have been taken in the 30-day period.

THE TMDL REFERENCE SITE IS NOT REPRESENTATIVE OF THE SAN DIEGO REGION

The Los Angeles region's reference beach, Leo Carrillo, which was used to set the San Diego TMDL AEFs, is not located in the San Diego region. Temperature, rainfall, and vegetation type and density may vary significantly by geographic region. These factors are known to influence bacterial concentrations in environmental samples. Therefore, the AEFs developed based on Leo Carrillo may be very different than the AEFs developed for a San Diego reference beach, and the same may be true of San Diego reference streams. This hypothesis is supported by an extensive SCCWRP study, completed between 2004 and 2006, where multiple reference beaches were monitored (Schiff et al, 2006). This study, which has been referenced in several Southern California bacteria TMDLs, shows higher wet and dry weather exceedance frequencies at the two San Diego reference beaches (San Onofre and San Mateo) than at Leo Carrillo (Table 2).

Table 2. Average exceedance frequencies for key reference beaches

Season		SD TMDL	Leo Carrillo	San Onofre[1]	San Mateo[1]
Wet Weather (Single sample)		22%	28%	30%	30%
Dry Weather (GM)		0%	16%	-	-
Dry Weather (Single sample)	Winter	0%	9%	7%	20%
	Summer			0%	9%

[1]Exceedance frequencies at these beaches are believed to be based on SSMs for dry weather; however the report did not describe the analysis method used.

WET DAY DEFINITION IS UNSUPPORTED

The TMDL inconsistently uses a wet weather definition of 0.2 inches of rainfall for compliance purposes, but adopted the Leo Carrillo reference beach AEFs that were determined using a 0.1 inch definition. Table 3 summarizes the AEFs defined in Tentative Order R9-2013-0001, based on the San Diego Bacteria TMDL, as well as the average exceedance frequencies calculated between 2004 and 2011 at the Leo Carrillo reference beach. These results are presented based on two methods: 1) assuming wet weather is defined as 0.1 inches (per the Los Angeles Regional Board and Leo Carrillo reference beach) and 2) assuming wet weather is defined as 0.2 inches (per the San Diego Regional Board). As shown, the AEFs observed using the 0.2 inches definition are higher (10-31%) than those observed using the 0.1 inches definition (9-28%). This suggests that the TMDL AEFs are biased lower, or resulting in more stringent AEFs, than they would be if the 0.2 inches definition was accurately applied.

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Table 3. Leo Carrillo average exceedance frequencies based on different wet weather definitions, 2004-2011

Season	SD TMDL AEFs	Average Observed Exceedance Frequency at Leo Carrillo Reference Beach	
		0.1 inch	0.2 inch
Wet Weather (Single sample)	22%	28%	31%
Dry Weather (GM)	0%	16%	18%
Dry Weather (Single sample)	0%	9%	10%

In addition, the San Diego Bacteria TMDL's wet day definition (0.2 inches) inappropriately skews the number of dry days high (and noting that dry days have no allowed exceedances) and wet days low (whereas wet days are allowed a number of exceedances).

To further evaluate the 0.2 vs. 0.1 inch definition, an analysis was performed correlating rainfall data from the San Diego County ALERT Flinn Springs gauge (32.8464N 116.8636W, San Diego County) and streamflow data from the USGS Los Coches Creek gauge (11022200, Lakeside, CA) from October 2007 to September 2012 (5 water years). Los Coches Creek is a small tributary of the San Diego River with a drainage area of 12.2 square miles. This pair of gauges was selected because the Flinn Springs rain gauge reasonably represents the Los Coches Creek drainage. Of the 12 storms that occurred during this period that produced rainfall depths between 0.1 inches and 0.2 inches, all 12 resulted in rainfall-induced excess runoff to the creek, as defined by a temporary increase in flow rate of at least 50% above pre-event base flow. The increased flows for these storms averaged 840% above baseflow with a range between 74% and 2500%. Therefore, 0.1 inches is a more appropriate threshold value for defining TMDL wet days in the San Diego region.

TMDL SHOULD REFLECT APPROPRIATE REC USE CATEGORIES

By assuming a "designated beach" usage frequency (the highest REC use category) for all beaches and creeks, the TMDL applies the most stringent REC-1 Enterococcus WQOs from the Basin Plan, or 61 and 104 MPN/100mL for freshwater and saltwater, respectively. However, Chapter 7 of the Basin Plan states that the "designated beach" category may be over-protective of water quality for the impaired freshwater creeks because of their infrequent recreational use, and that these waters may be better represented by the "moderately to lightly used areas" category, which has an Enterococci freshwater REC-1 SSM WQO of 108 MPN/100mL. The San Diego Regional Board has indicated in the TMDL that they may be open to amending the Basin Plan for these lower usage water bodies, and the MS4 co-permittees would likely support this action, which would more accurately reflect freshwater REC uses in the region. Furthermore, a lower REC use intensity or alternatively a REC use suspension could be considered to limit the applicability of REC-1 bacteria WQOs during wet weather when creek access is rare and often unsafe due to high flows. Such Basin Plan Amendments have been approved in the Los Angeles and Santa Ana regions.

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In addition, the TMDL applies reference beach AEFs to San Diego creeks and rivers; however, these AEFs were developed based on a 104 MPN/100mL Enterococcus WQO (along with other indicator bacteria WQOs), whereas the TMDL then applies this AEF to a freshwater WQO of 61 MPN/100mL. As a result, the conservatively low AEFs are compounded with the conservatively low WQO, again resulting in unnecessarily low TMDL WLAs. Based on the Leo Carrillo reference beach data that is used to develop the TMDL AEFs, using a 61 MPN/100mL WQO for Enterococcus (along with other indicator bacteria WQOs) the site's WQO exceedance frequency is 13% and 33% for dry and wet weather, respectively. Therefore, the San Diego Bacteria TMDL could use these percentages as the basis for their freshwater AEFs if the 61 MPN/100mL threshold is kept. Another potential solution would be to use USEPA's 2012 recommended REC criteria for both freshwater and saltwater, which is 35 CFU/100mL Enterococcus as a geomean and 130 CFU/100mL as a 90th percentile Statistical Threshold Value. Notably, USEPA REC 2012 criteria guidance also now allows site-specific criteria to be developed where appropriate based on study approaches such as Quantitative Microbial Risk Assessment.

SAN DIEGO REFERENCE WATERSHED STUDY

In its response to comments on the San Diego Bacteria TMDL (TMDL Appendix V), the Regional Board recognized that a San Diego reference watershed is needed, stating: *"For these bacteria TMDLs, the San Diego Water Board decided to use the 22 percent wet weather exceedance frequency as an initial allowable exceedance frequency, with the expectation that a region specific or multiple watershed specific allowable exceedance frequencies would be developed as additional data were collected in reference systems identified for the San Diego Region"* (San Diego Regional Board, 2010).

The San Diego and Orange County MS4 Co-permittees are currently partnering with Caltrans, with technical assistance from SCCWRP, to fund a local reference study that will provide data much more appropriate to the water bodies regulated by the San Diego Bacteria TMDL. For example, water body-specific AEFs could be determined for reference beaches, creeks, and enclosed lagoonal outlets, rather than applying AEFs derived for one reference beach to all three water body types. AEFs could also be determined for reference watersheds of varying sizes, rather than applying AEFs derived for a medium watershed to all other size watersheds. AEFs could also be derived using the same wet weather definition as will be used for compliance assessment purposes, resulting in greater scientific validity of the compliance metrics. Lastly, it is anticipated that local hydrologic, geologic, and environmental (freshwater vs. marine water and flora/fauna) factors may result in AEFs more appropriate for local water bodies than those derived for the Leo Carrillo reference beach. Therefore, local AEFs would be expected to improve upon the limitations mentioned above.

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2. Does the TMDL Reflect Public Health Protection?

USEPA REC CRITERIA ACKNOWLEDGE THAT INDICATOR BACTERIA ARE NOT PREDICTIVE OF HUMAN HEALTH RISK AT STORMWATER-DOMINATED WATERS

Indicator bacteria are not themselves pathogens, or illness-causing microorganisms. Rather, indicator bacteria are used as a proxy for gastrointestinal (GI) illness risk because of their presumed correlation with human fecal waste, which is presumed to carry pathogens and is therefore presumed to generate illness as a result of body contact recreation. However, this inference chain breaks down for recreational waters -- like the San Diego Bacteria TMDL waterbodies -- that are impacted by urban runoff rather than municipal wastewater effluent, since urban runoff carries many non-human (and much less pathogenic) sources of indicator bacteria, such as from pets, birds, other wildlife, plants, and soils or sediment. Recent epidemiology studies (i.e., studies that "measure" swimmer illness rates via post-activity surveys) and Quantitative Microbial Risk Assessments (QMRA) (i.e., studies that calculate swimmer illness rates based on measured pathogen concentrations in recreational waters and using known dose-response relationships) support this understanding. USEPA's 2012 REC criteria recommendation also acknowledges this limitation for urban runoff-impacted waters, and as a result they now formally allow epidemiology and/or QMRA studies to be used to develop site-specific criteria where the default REC criteria are inappropriate. The San Diego Bacteria TMDL and MS4 Permit could acknowledge this fundamental weakness by refining the WLAs as possible based on currently available information from USEPA and allowing site-specific criteria to be developed through stakeholder-led special studies.

Bacteria WQOs have historically been derived from epidemiological studies conducted in recreational waters impacted by municipal wastewater effluent. Experts on bacteria water quality in California have suggested that an unclear relationship exists between illness and bacteria from non-point sources, supporting the finding that the application of relationships based on epidemiological studies conducted in the 1970s for effluent-impacted water bodies may be inappropriate for recreational waters (Boehm et al. 2009). Other recent studies have also demonstrated that the traditional bacterial indicators, fecal coliform and total coliform in particular, show a weak correlation with illness in stormwater-dominated waters. For example, as part of the National Epidemiological and Environmental Assessment of Recreational water (NEEAR) program, the USEPA most recently conducted epidemiological studies at an urban runoff-impacted beach in South Carolina. No statistically significant relationship between Enterococcus and GI illness was observed at Surfside Beach (USEPA, 2010), which was hypothesized to be due to either the lack of human inputs or

> The USEPA 2012 REC Criteria include only Enterococcus and *E. coli* (latter for freshwater only). These were found to be better indicators of public health than total and fecal coliforms. The USEPA also recommends the use of the GM and STV, not SSMs.

the low bacteria densities observed. A 2007 epidemiology study at Mission Bay (Colford et al) did not find any association between illness incidence and traditional fecal indicators (total coliform, fecal coliform, and Enterococcus). A four-year study conducted at 45 stormwater outfalls in Milwaukee found no correlation between E. coli or Enterococcus to the human Bacteroides genetic marker, even though all tested outfalls had Bacteroides detected in at least one sample (Sauer et al, 2011). The study further suggested that fecal indicators may be of little use for prioritizing efforts to protect human health in urban areas where numerous non-human sources of fecal pollution exist. A 2010 study (Fleischer et al) conducted at a recreational marine beach with no known point source inputs concluded that "there was no dose-response relationship between gastroenteritis and increasing exposure to Enterococci, even though many current water-monitoring standards use gastroenteritis as the major outcome illness." Other literature suggests that total coliform and fecal coliform concentrations do not correlate as well as Enterococcus with human illness rates in recreational waters (Cabelli 1983; Cabelli et al., 1982). Wade et al. (2003) conducted a scientific review of 27 studies evaluating the association between microbial indicators of recreational water quality and GI illness. The studies found that overall illness rates were better correlated with Enterococci in marine waters and with *E. coli* in freshwaters than with total coliform and fecal coliforms. Therefore, recreational waters that are not impacted by effluent require very careful application of bacteria WQOs (otherwise they create a compliance burden without providing any real human health benefit), and allowances for site-specific adjustments.

The recently finalized 2012 USEPA Recreational Water Quality Criteria Report states: *"Scientific advancements in microbiological, statistical, and epidemiological methods have demonstrated E. coli [for freshwater] and Enterococci [for marine sites] are better indicators of health than the previous indicators, total coliforms and fecal coliforms"* (USEPA 2012). This is consistent with USEPA's Ambient Water Quality Criteria for Bacteria (1986) which states: *"The freshwater studies confirmed the findings of the marine studies with respect to Enterococci and fecal coliforms in that densities of the former in bathing water showed strong correlation with swimming associated gastroenteritis rates and densities of the latter showed no correlation at all…. E. coli is the most fecal specific of the coliform indicators; and Enterococci, another fecal indicator, better emulates the virus than do the coliforms with respect to survival in marine waters"* (USEPA, 1986). Neither REC criteria (1986 or 2012) have been adopted by the California State Water Resources Control Board or the San Diego Regional Board. Given their weak link to public health, total coliform and fecal coliform WQOs could be removed from the San Diego Bacteria TMDL.

In the same 2012 document, USEPA further expresses that SSMs are overly conservative, statistically incorrect, and do not correlate with the same level of risk associated with the GM criteria. For this reason, they recommend replacing the 104 cfu/100mL SSM with the 130 cfu/100mL statistical threshold value (STV), or 90th percentile value (i.e., 10% of samples are allowed to exceed this). The STV corresponds to the same level of health protection as the GM, which was set based on observed illness rate correlations. Use of the STV would also increase consistency between states, which the USEPA has

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encouraged. In fact, even the San Diego Regional Board, in their Peer Review issue #9, acknowledge that, "the GM is more appropriate [for dry weather conditions] since this value likewise represents average conditions over 30 days." Inconsistent with Regional Board staff responses to peer reviewer comments, the SSM limit was included for all weather conditions in the adopted TMDL and draft permit.

URBAN RUNOFF BEACH EPIDEMIOLOGY STUDIES SHOW A WEAK CORRELATION BETWEEN BACTERIA CONCENTRATIONS AND HUMAN ILLNESS

Bacterial indicators, even *E. coli* and Enterococcus as recently recommended by USEPA, have been shown to have a weak (or nonexistent) correlation with human illness rates in stormwater-dominated waters, suggesting that WQOs based on these indicators may not accurately reflect public health as intended. Epidemiological results from the SCCWRP Pacific Coast Water Quality Study at Surfrider Beach in Malibu show increased illness rates for swimmers, although no relationship between illness and bacteria was observed (Arnold et al, draft, 2012). This is perhaps due to bather shedding of skin fungus and fecal pathogens (Elmir et al., 2007; Plano et al., 2011). Many epidemiological studies have similarly found no or very minor correlation between bacteria concentrations and illness rates associated with swimming in receiving waters impacted by non-point sources of bacteria. For example, a 2007 study conducted in Mission Bay in San Diego by Colford et al. found no associations between traditional bacteria concentrations (total coliforms, fecal coliforms, and Enterococcus) and illness. A number of other studies conducted in coastal water bodies in Southern California have also shown a lack of correlation between bacteria and human pathogens (Noble et al., 2006; Rajal et al., 2007; Boehm et al., 2003; Choi & Jiang 2005; Jiang & Chu, 2004a). Moore et al (2007) and Imamura et al (2011) found that Enterococcus in particular can originate in plants and kelp, thereby questioning the presumed human health linkage for urban runoff-impacted receiving waters. A recent epidemiology study in Dana Point, conducted at Doheny State Beach, which frequently exceeds bacteria WQOs, found that swimmer illness rates were not correlated to bacteria concentrations at any time except when a creek berm was open (Colford et al., 2012). Doheny State Beach is located at the outlet of the San Juan River, which is separated from the ocean by a sand berm for most of the dry season. The San Juan River is impacted by human sources, as evidenced by the consistent correlation of bacteria and human waste markers in the creek (McQuaig et al., 2012) and the fact that a municipal wastewater treatment plant discharges disinfected effluent into the creek less than a mile upstream of the outfall. On the ocean side of the berm, however, no consistent correlations were found between bacteria and human waste markers (McQuaig et al., 2012), suggesting that the dry weather bacteria exceedances at this beach may often be caused by sources other than those of human-origin when the berm is not overtopped. In all three recent Southern California beach epidemiology studies, the additional highly credible gastrointestinal illnesses (HCGIs) observed among swimmers (i.e., illnesses beyond those measured in the non-swimmer control group) were consistently below the USEPA's tolerable illness rate (up to 3.6%) that forms the basis for its REC criteria. This was even true for Doheny Beach with the creek berm open, which was the only beach and condition where an Enterococcus-illness association was observed (no illness associations for total or fecal coliform were observed at any of the beaches). Therefore, while indicator bacteria exceedances persist at these three Southern California beaches, measured swimmer illness rates are low and consistently meet USEPA's allowed levels. The San Diego Regional Board could therefore safely increase REC water quality objectives and still protect public health at creeks and beaches.

USEPA QMRA STUDIES SHOW RECREATIONAL OBJECTIVES ARE OVERLY CONSERVATIVE FOR SITES WITH MINIMAL HUMAN BACTERIA SOURCES

Recent USEPA Quantitative Microbial Risk Assessment (QMRA) studies (Soller et al 2010 and Schoen et al 2010) also indicate that REC objectives, specifically the Enterococcus GM, correspond to swimmer illness rates that are well below USEPA's tolerable levels at beaches with minimal human bacteria sources. Applying the 35 MPN/100mL limit at non-wastewater impacted beaches is a conservative (overly stringent) approach since recent peer-reviewed QMRA work by USEPA's contractor (Soller et al 2010) and USEPA (Schoen et al 2010) shows that the 35 MPN/100mL limit can be greatly increased at beaches where bacteria sources are primarily non-human, while still being protective of USEPA's gastrointestinal illness benchmark, as shown in Figure 2 from USEPA (Schoen et al 2010). Schoen states: *"The dominant source of fecal indicator at a recreational beach may not be the source of dominant risk."* This fact was recently acknowledged by USEPA REC criteria and QMRA experts at the November 28-29 State of the Science Workshop at SCCWRP, organized by SWRCB staff and the California Beach Water Quality Workgroup. So, while there are non-negligible risks from non-human fecal sources, for the same Enterococcus levels, these risks are much lower than those from human waste, which are the basis for default REC criteria. Therefore, if human sources are found to be very low or not detected, Enterococcus GM criteria can be safely increased[3].

[3] While used in the California Ocean Plan and San Diego Basin Plan, total and fecal coliform and SSM maximum objectives are no longer used in current USEPA REC criteria and are not associated with swimmer illnesses, therefore they are not mentioned here.

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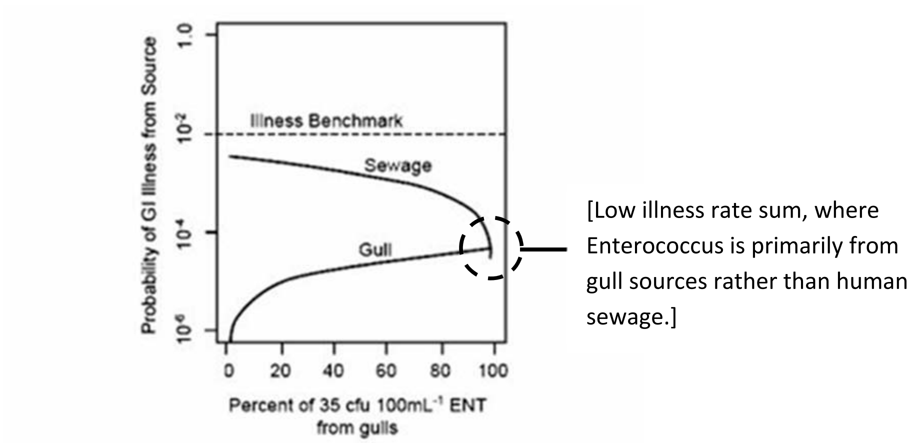

Figure 2. Comparison of median illness risk for adults when total ENT concentration (at 35 CFU /100mL) is attributed to a mixture of primary POTW effluent (sewage) and seagull feces (gulls) (Schoen et al 2010), of USEPA.

STUDIES SHOW THAT NATURAL SOURCES CONTRIBUTE SIGNIFICANTLY TO BACTERIA LEVELS, BUT PRESENT LOW HUMAN ILLNESS RISKS

Natural sources of bacteria, which present much lower human illness risks compared to human fecal sources, have shown to contribute to WQO exceedances at many Southern California sites. Table 4 summarizes several scientific studies that have identified and observed natural sources of bacteria, including plants, algae, soil, beach wrack, insects, and animal feces (especially birds). In fact, a very recent study conducted by SCCWRP and the San Diego MS4 co-permittees (Griffith and Ferguson, 2012) at Moonlight State Beach in Encinitas and Rock Pile Beach in La Jolla observed that at Moonlight Beach, *"the distribution of enterococci species and strains found in the creek and the storm drain system during the 22 week sampling period were phenotypically most similar to species and strains found among natural sources as compared to those present in sewage."* The *Bacteroides* marker was not found in any of the creek/stream or beach samples, suggesting that "human fecal contamination may not have been a significant source of Enterococci to either storm drain during the study period." In combination, these studies provide further evidence that natural sources are indeed significant contributors of indicator bacteria in Southern California recreational waters, while not likely contributing to an increased health risk.

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Table 4. Summary of findings on natural sources of bacteria

Finding	Reference(s)
Non-anthropogenic sources of bacteria confirmed, potentially contributing to exceedances.	Imamura et al 2011, Izbicki 2012b
Sand, sediment, and wrack can serve as reservoirs for bacteria.	Imamura et al 2011, Izbicki et al 2012b, Lee et al 2006, Ferguson et al 2005, Grant et al 2001, Griffith 2012, Litton et al 2010, Phillips et al 2011, Jiang et al 2004b, Sabino et al 2011, Weston Solutions 2010
Enterococci include non-fecal or “natural” strains that live and grow in water, soil, plants, and insects.	Griffith and Ferguson, 2012, Griffith 2012, Litton et al 2010, Weston Solutions 2010, Izbicki et al 2012b, Weisberg et al 2009
Lagoonal sediments have been shown to harbor nutrients, which when released may encourage regrowth of bacteria.	Sutula et al 2004, Weisberg et al 2009, Surbeck et al 2010

Bacterial regrowth can limit the ability of an MS4 to comply with the WQOs for a number of reasons. First, bacteria concentrations measured in impacted watersheds may be a result of actively growing, possibly environmental (rather than anthropogenic) communities within sediments or storm drain systems rather than a result of human fecal inputs. In addition, regrowth may lead to a decoupling of bacteria from pathogens, reducing the potential for bacteria concentrations to reflect risk of human illness (Litton et al 2010). The 2012 San Diego SCCWRP study also found that the naturally occurring bacteria species were apt to form biofilms on concrete surfaces, such as in storm drains, ultimately leading to sloughing and downstream release over time. These studies suggest that regrowth is a relatively uncontrollable source that, while potentially contributing to WQO exceedances, are unlikely to contribute increased risks to human health.

3. Was the Peer Review Sufficient?

In 2010 the San Diego Regional Board solicited two experts, Dr. Patricia Holden from University of California (UC) Santa Barbara, and Dr. Kara Nelson from UC Berkeley, to provide peer review of the wet and dry weather TMDL modeling approaches. Both are highly respected research scientists and academics. Dr. Holden is an expert on source tracking method development and testing, while Dr. Nelson is an expert on removal and inactivation of pathogens as well as vegetated treatment systems. While both researchers are highly respected in their fields, neither are expert practitioners on bacteria control technology selection or performance. Therefore, their approval of the TMDL should not reflect on the technical feasibility of meeting the TMDL limits.

The following are our specific comments on the expert peer review and San Diego Regional Board responses:

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a. *Other sources of bacteria*. In peer review topic #2 (use of wet weather model to simulate fate and transport of bacteria, and to calculate TMDL, to affected beaches and creeks), the reviewer raised the concern that "…the resuspension and erosion of sediments in water channels during storm events may be an important source of indicator bacteria that is not accounted for in the current model." Although the Board responds that, "the association of bacteria to sediments in the stream channels and processes of settling and resuspension are important considerations, and the LSPC model includes capabilities for the simulation of these processes if data becomes available to define modeling assumptions to facilitate model calibration", a peer-reviewed article co-authored by the expert reviewer was published on this exact topic in 2003 (Steets and Holden, 2003).

b. *Reference watershed.* In the peer review topic #3 (selection of Los Angeles watershed as a "reference" for background loading of bacteria in the San Diego Region during wet weather), it was noted by the reviewer that, "the Implementation Plan should require that one or more appropriate reference watersheds are identified and characterized for the San Diego region, and that these data are used to determine the TMDLs." This comment supports our opinion, expressed earlier in this paper, that a San Diego reference beach should be used to determine the final TMDL. The Board's response includes information that (1) measurements were based on the 2004-2005 winter season, (2) a single WQO was exceeded 27% of the time, on average across the four reference beaches evaluated, and (3) acknowledges that natural process do generate bacteria loads in both reference and urbanized systems. Although the reviewers were not provided an opportunity to respond to these items, we are concerned that (1) this response is based on only one wet season, while year to year variability has been illustrated at a reference beach per Figure 1, (2) if a 27% exceedance rate was observed across the four "local" reference beaches, why was 22% selected as the wet weather AEF?, and (3) natural source contribution processes occur year round, including during dry weather, therefore dry weather exceedances should be allowed.

c. *SSM objectives.* The use of SSM objectives (peer review topic #4) was questioned as follows, "…given that rainfall events subject the watersheds to more variability in flow and load, the use of a GM for wet weather seems more practical." The San Diego Regional Board responded, "The GM value does not evaluate peak loads at short time intervals because values are calculated over several weeks' time. Because the model used for wet weather analyzes high flow and loads, which are short-term events, the numeric target must likewise characterize risk from short-term events. Therefore the SSM WQOs were used." However, the comment was not regarding long term risk or short term risk, it was referring to the variability during individual storm events making it difficult for a single sample to accurately reflect the risk. The response did not adequately address the issue of variability in defending the use of SSM objectives. This

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reviewer comment is further supported by the 2012 USEPA REC criteria guidance, which does not recommend SSM for REC use protection.

d. *Assumptions concerning regrowth*. Peer review topic #10 (reasonableness of assumptions for dry weather modeling) prompted the reviewer to comment, "I agree that given the lack of data on the occurrence of bacterial regrowth in the Southern California region, however, it is not possible [to] include regrowth in the model for dry weather flows. However, regrowth has been demonstrated in tidally-influenced river sediments in Florida…Thus, regrowth should be recognized as a potential source of error, and should regrowth be documented in the region in the future, it may need to be incorporated into the modeling framework." The Griffith and Ferguson (2012) SCCWRP study has since demonstrated regrowth in the region. Also, although not directly identified by the reviewer, the model assumes that 100% of the existing load comes from MS4 discharges, while significant reference stream/beach data were available to demonstrate otherwise (e.g., SCCWRP Technical Report #542, "Fecal indicator bacteria (FIB) levels during dry weather from Southern California reference streams" [Tiefenthaler et al, 2008]). Therefore, we suggest the following: 1) Reopen the TMDL and remodel to include regrowth and other natural sources, 2) Use the model results to set MS4 compliance metrics (e.g., load based-metrics), and 3) Use the new model to evaluate whether AEFs are consistently achievable through MS4 load reductions, or whether instream regrowth, sediment resuspension, and other natural processes/inputs might prevent receiving water compliance with the WQOs even with substantial MS4 load reduction.

e. *Lagoons and estuaries.* The reviewer commented on peer review topic #11 (location of critical points for TMDL calculation) that, "where small estuaries or lagoons separate the creek mouth from the coastal ocean, they should be considered in this process." The San Diego Regional Board responded that, "the Board recognizes that small estuaries and lagoons provide habitat for wildlife, and therefore can be a significant source of bacteria. For this reason, systems with estuaries or lagoons were not analyzed in this project." While the San Diego Regional Board acknowledges that lagoons may have higher levels of bacteria than open beaches and streams, the Board does not set higher AEFs for such creeks and beaches. This is inconsistent and imposes unfairly strict AEFs on such waterbodies, and will likely result in more frequent an attainable non-compliance.

f. *Use of indicator bacteria for compliance and public health protection.* In response to the overarching question (b), "Is the scientific portion of the proposed rule based upon scientific knowledge, methods and practice", the reviewer questions the relationship between indicator bacteria and the threat to swimmers and fishers. It was specifically noted that, "At the time of this review, there is a reasonable amount of evidence in the peer-reviewed scientific literature that DNA-based markers of human waste can be used to more definitively understand the

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presence of human waste." We support this point that the indicators used in the TMDL do not protect public health, and that human waste marker data should be used as the basis for the TMDL.

g. *Insufficient data.* There were several instances where the reviewers could not fully comment on the question posed to them because the draft of the TMDL they were given contained insufficient data (peer review topics #2, #5, #6, #7, #8, and #12). This lack of data was mentioned by at least one of the reviewers in 5 of the 12 topics they were asked to comment on. While this information was often added to the TMDL in response, the reviewers did not have a chance to review the new information added to the TMDL, and therefore could not give their full opinion on the original question posed to them.

h. *Conservative assumptions.* There were also a number of instances where the reviewers pointed out sources of significant error and uncertainty in the models, data, or parameters used in developing the TMDL (peer review topics #2, #3, #7, #8, and #10). For example, the lack of regrowth in the model, the use of parameters from a few subwatersheds for use in the entire TMDL area, the assumptions about dry weather flows, and several other issues were identified as potential sources of significant uncertainty. To each of these, the San Diego Regional Board responded that while they recognize these issues as significant sources of uncertainty, the parameters and models they used were the best possible given the state of the science and the limited data available. They also pointed to efforts they are currently undertaking to collect more data to improve the models, and that, if these lead to significant changes to the TMDL, it could be addressed in a reopener. While we accept that there are many limitations imposed by limited data and the state of the science, the number and magnitude of these many sources of uncertainty underline the need for a more transparent and quantitative assessment of the level of conservatism that was applied within the TMDL analyses, since "conservative assumptions" are cited by the Regional Board as the "implicit margin of safety" used to address these sources of uncertainty. It is common in modeling studies to quantify uncertainty that derives from assumptions and limited data. Such scientific rigor is standard practice and should be followed by the Regional Board within this TMDL as well. One reviewer comment (peer review topic #12) stated, "It is really difficult to tell what are the 'conservative assumptions'." While the discussion of these assumptions was subsequently expanded after the peer review, the reviewers did not have access to them when giving their comments. Therefore, the TMDL's assumptions were recognized by the reviewers as being conservative as well as non-transparent, therefore their ability to review (including the lack of an opportunity to review the expanded discussion) was limited.

i. *San Diego Regional Board responses not reviewed.* While many positive changes were made to the TMDL as a result of the peer review, the experts were not offered the opportunity to

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approve the responses to their comments. Therefore, some of the responses by the Board may not have adequately addressed the reviewers' comments.

Lastly, a significant focus of this review was on the TMDL dry and wet weather modeling approaches, despite the fact that the TMDL model predictions (e.g., MS4 required load reductions to achieve the AEF during the critical year) were not used to set MS4 compliance metrics as stated in the draft Tentative Order. Rather, these compliance metrics were simply set to the reference beach average exceedance frequency for wet weather (22%) and the WQOs (SSM and GM) for dry weather. Therefore very little of the reviewers' attention was focused on aspects of the TMDL that are actually implemented for compliance determination purposes. For example, the reviewers were not asked to review the reference watershed data used to derive the AEF targets. Among other critical topics, reviewers were also not asked to comment on the appropriateness of using total coliform and fecal coliform rather than other indicators, nor were they consulted regarding the limits of technical achievability (nor are they experts on this subject). Therefore, we believe the peer review to have been limited in scope and lacking applicability to the important issues raised in this document.

4. Are TMDL MS4 WLAs Attainable?

BACTERIA WATER QUALITY STANDARDS ARE NOT CONSISTENTLY ATTAINABLE BY NON-STRUCTURAL SOURCE CONTROLS ALONE

Because of their low cost relative to structural treatment controls, the first emphasis of most Bacteria TMDL implementation strategies is to exhaustively explore and implement non-structural options to control bacteria at their source. Non-structural BMPs include outreach, inspection, and enforcement-based programs, such as those targeting homeowners to address over-irrigation and car washing as sources of dry weather runoff, pet owners to address pet waste, and food outlets to address sidewalk hose-down and proper trash and grease trap management. Non-structural BMPs also include illicit discharge detection and elimination programs, including efforts to identify sources of human waste into the MS4, such as recreational vehicle discharges and leaking sewer lines (where such flows may re-emerge into nearby stormdrains). Street sweeping and catch basin cleaning are also emphasized and intended to remove sources of sediment, trash and organic litter, all of which may contribute bacteria to the MS4.

Non-structural BMPs are essential components of the Comprehensive Load Reduction Plans (CLRPs) recently submitted to the Regional Board by the responsible parties named in the San Diego Bacteria TMDL. To the extent possible based on available data, the CLRPs quantified the effectiveness of non-structural BMPs. The CLRP analyses found these collective BMPs to achieve MS4 bacteria load reductions of 8 to 43% during dry weather and 5 to 29% during wet weather. Wide ranges were assumed due to the significant uncertainty associated with the effectiveness of such programs.

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However, even with the most optimistic assumptions, a thoroughly exhaustive and comprehensive implementation of non-structural BMPs can simply not achieve compliance with the TMDL WLAs. This is partly because outreach, inspection, and enforcement can never achieve perfect control outcomes (i.e., some target groups will miss outreach, some behaviors won't change, and some waste generation activities will miss inspection). This is also partly because some urban bacteria loads are unable to be addressed by such programs (e.g., biofilms in stormdrains consistently grow and then mobilize whenever flows are present, such as during one of the many allowed dry weather flow sources like groundwater inflow and infiltration, and fire hydrant testing). Evaluations of the effectiveness of other source controls, such as sweeping and cleaning programs, have consistently indicated that they are not able to capture 100% of sediments and organic debris.

BACTERIA WATER QUALITY STANDARDS ARE NOT EVEN ATTAINABLE THROUGH USE OF STRUCTURAL BMPS

Because of limitations in the effectiveness and consistent performance of non-structural BMPs, more costly and time-intensive structural BMPs are described in the CLRPs in order to demonstrate additional, more effective and controllable bacteria reduction. Dry weather structural BMPs potentially include localized infiltration, diversions to sewer, and disinfection. During wet weather, however, many of these BMPs are often not feasible because flow rates are substantially greater and more variable, and considerable transient storage would be required. In general, more natural, passive, sustainable, and multi-benefit wet weather structural BMPs are preferred and recommended (as opposed to energy-intensive, mechanical systems).

Geosyntec is co-principal investigator on the EPA/ASCE International Stormwater BMP Database. The database is used to help evaluate and predict performance of structural BMPs in removing bacteria. Statistically evaluated monitoring data from the database, however, indicate that most non-disinfection[4] structural BMPs are not capable of achieving REC WQOs with the consistency, frequency, and predictability required by the TMDL and the CLRPs (Figure 3).

[4] Disinfection is not considered suitable or cost-effective for treating wet weather MS4 discharges.

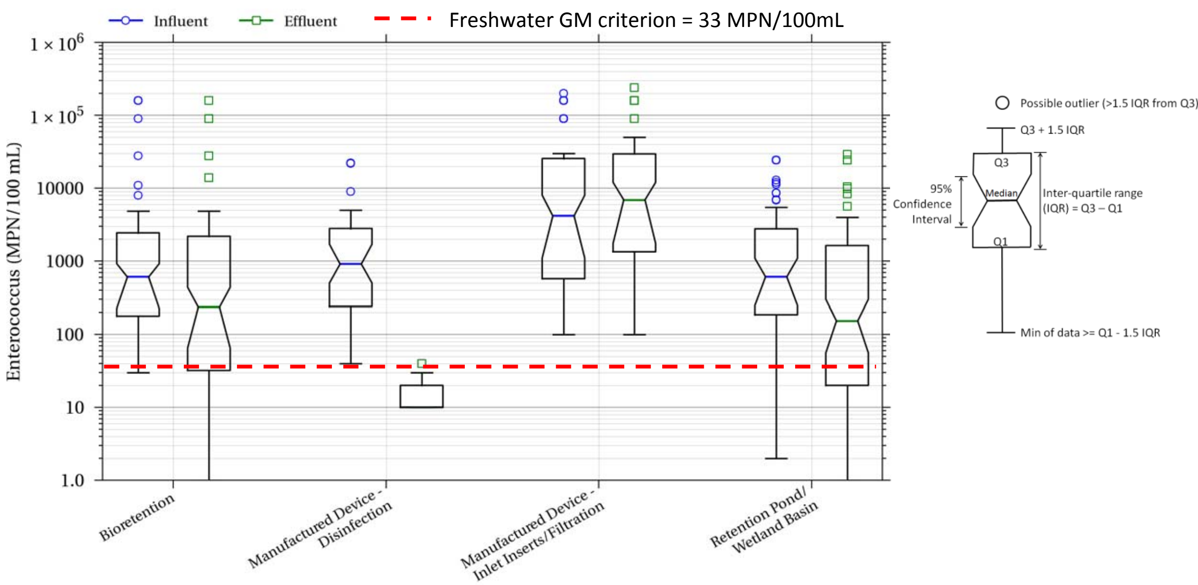

Figure 3. Structural BMP performance (Clary et al, 2012)

The CLRPs also describe other structural BMPs for wet weather controls such as subsurface flow wetlands (which have less performance data available but initial datasets suggest a relatively high level of effectiveness) and "zero discharge" types that rely on infiltration (e.g., infiltration trenches and basins) or capture and use (e.g., rainwater harvesting cisterns). These BMPs are effective for bacteria but are subject to local and site-specific constraints, which must be evaluated before implementation. For instance, infiltration BMPs are not appropriate for areas with relatively impervious soils, shallow groundwater, steep hillsides, landslide or liquefaction risk zones, subsurface contamination, or close proximity to certain structures. Similarly, capture and use BMPs are not cost effective for areas with little available water demand (such as minimal landscaping irrigation needs) or where water demand is temporally inconsistent with available supply (frequently the case in the arid southwest where rainfall occurs during one season while peak irrigation demands occur during a different period). Therefore many urban areas exist without feasible or cost-effective wet weather structural BMP options available.

EVEN COMBINING STRUCTURAL AND NON-STRUCTURAL BMPS, CONSISTENT AND RELIABLE ATTAINMENT OF BACTERIA STANDARDS IS NOT POSSIBLE

In order to reduce existing wet weather MS4 bacteria concentrations with the objective of meeting TMDL WLAs (with some regularity), no potential and reasonable non-structural and structural BMPs are excluded. This is the same strategy that is planned by many Los Angeles-area MS4 co-permittees in their TMDL Implementation Plans.

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That said, there remain numerous small watershed and beach examples where exhaustive non-structural and structural BMP efforts have been intensively applied, and significant costs expended, without the desired (or initially predicted) outcome of compliance. Extrapolating such costs on a per acre basis to the entire Sand Diego Bacteria TMDL area would result in tremendous cost estimates without evidence that TMDL compliance would be achieved, or that public health would benefit as a result.

- In Santa Barbara, extensive stormdrain investigations were conducted using conventional techniques (e.g., CCTV, visual flow observation, automated flow rate measurement, wastewater chemical indicators, bacteria sampling, dye testing, etc.) as well as more novel ones (e.g., canines scent trained for human waste, and human waste genetic markers) to seek inputs of human waste. As a result, RV discharges and leaking sewer lines were identified and immediately addressed (Sercu et al, 2011). Despite these efforts, however, channel and creek indicator bacteria levels are unchanged.

- At the Santa Monica Pier, BMPs included bird netting, trash covers, homeless enforcement, prevention of pier washing, repair of leaking sewers, major dry weather storm drain diversion (Santa Monica Urban Runoff Recycling Facility [SMURRF]) and potable offset use, and human source marker sampling to confirm that human fecal sources were indeed removed (Gold, 2012). However, despite these significant efforts which cost approximately $14M to treat runoff from 5,000 acres, beach bacteria concentrations improved but TMDL exceedances persist.

- At Inner Cabrillo Beach in the Port of Los Angeles, BMPs and studies included hydrodynamic modeling, circulation enhancement field investigations, bird deterrent testing, bird exclusion structures, dry weather storm drain diversions, sewer inspection and groundwater sampling, sewer repair, eelgrass sampling (eelgrass was found to be a natural source of indicator bacteria), human source marker sampling, and beach sand replacement (since beach sands were found to be a reservoir for indicator bacteria) and storm drain outfall exclusion. Again, despite over $30 million dollars spent at this one beach, TMDL WLA exceedances persist (Port of Los Angeles, 2006).

- In the Aliso Creek watershed in Orange County, dry weather storm drain discharges were treated with disinfection; despite complete bacteria removal at the treatment system outlet, bacteria concentrations in the concrete channel shortly downstream (with no other discharges entering the channel) rebounded as a result of uncontrollable regrowth) (Andersen, 2005).

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- At Ramirez Canyon in Malibu, where dry weather flows are disinfected at the beach by a system costing approximately $1 million dollars, surf zone water quality continues to exceed TMDL WLAs.

Perhaps most importantly, all the focused source control and treatment case studies described here focused on dry weather only; wet weather compliance costs would completely eclipse these dry weather compliance costs due to the orders of magnitude greater treatment flow rates.

OTHER ENVIRONMENTAL GOALS OFTEN CONFLICT WITH TMDL COMPLIANCE

There are also significant trade-offs between bacteria control measures and environmental concerns. For example, in-stream diversions often inhibit fish passage and impact downstream baseflow and habitat needs. In coastal environments, while shoreline wrack has been shown to contribute natural sources of bacteria, wrack itself is a valuable part of the beach ecosystem, and its removal is potentially problematic and often prohibited by resource agencies. Where bird feces is a significant bacteria source (like at many lagoons and beaches), resource agency requirements often restrict the use of bird deterrents because of needs to protect special status species such as the brown pelican. UV treatment of urban creeks also results in the sterilization of natural and beneficial aquatic microbes. Looking at the big picture, while massive treatment projects such as disinfection systems could be more effective at treating bacteria, such processes require significant long-term power consumption and do not necessarily align with the “sustainability” goals of regulators, municipalities, and the public (and in some cases, like the $12M Santa Monica Urban Runoff Facility, when the treatment system’s water demand is not met by urban runoff, potable water must be supplied, resulting is a highly wasteful outcome). Lastly, some regional BMP footprints rely on recreational spaces for retention during wet weather and this land becomes unavailable for the intended public uses for a longer period than would have been the case otherwise. In summary, environmental constraints may be hindrances to projects that could reduce bacteria levels.

Conclusions

We appreciate the San Diego Regional Board’s review of the above concerns and welcome any feedback. Our main concerns with the San Diego Bacteria TMDL are the lack of scientific justification and the infeasibility of achieving compliance. We strongly value the recreational uses of our water bodies; therefore, we are seeking revisions to the TMDL that would better reflect public health protection and the realities of technological and environmental constraints. To support these ends, the stakeholders have recently or are currently invested in the following significant efforts to improve the TMDL:

- The MS4 co-permittees have recently worked with SCCWRP to study the effects of Enterococci regrowth and natural bacteria sources at Moonlight State Beach in Encinitas and Rock Pile Beach in La Jolla (Griffith and Ferguson, 2012).
- The MS4 co-permittees are working with SCCWRP on an ongoing reference study evaluating both local reference watersheds and the impact of the wet day definition.
- The County and other San Diego MS4 co-permittees participated in the November 28-29 State of the Science Workshop to explore the current state of bacteria and science through the collaboration of experts, stakeholders, and regulators.
- The County is embarking upon significant bacteria source investigation work in the San Luis Rey, San Diego River, and San Dieguito River Watersheds.
- Other San Diego municipalities are considering QMRA test cases, including a proposal for funding through the Clean Beaches Initiative (CBI).

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COMPARISON OF COST OF ON-SITE RETENTION VS. TREATMENT AND RELEASE OF 85TH PERCENTILE STORM WATER RUNOFF

Job Number 16289-Z

November 29, 2012
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AND

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Job Number 16289-Z

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COMPARISON OF COST OF ON-SITE RETENTION VS. TREATMENT AND RELEASE OF 85TH PERCENTILE STORM WATER RUNOFF
January 8, 2013

This paper presents the results of an investigation of the potential cost of on-site retention of 85th percentile storm water runoff in San Diego County pursuant to the anticipated future municipal storm water permit (Tentative Order No. R9-2013-0001) versus the current cost of treatment and release of storm water runoff under the current municipal storm water permit (Order No. R9-2007-0001). This study was funded by the County of San Diego.

Background

California Regional Water Quality Control Board San Diego Region (SDRWQCB) Order No. R9-2007-0001, the municipal storm water permit in effect today for San Diego County and Co-Permittees, places requirements for new development and redevelopment to implement low impact development (LID) practices and/or treatment of storm water runoff. Priority development projects (PDPs) must implement LID practices such as infiltration or bioretention to treat storm water runoff to the maximum extent practicable (MEP). When LID practices are shown to be infeasible, storm water runoff may be treated using conventional treatment methods such as extended detention or filtration. The treated storm water runoff can be released from the project site. See Provisions D.1.d.(4) and D.1.d.(6) of Order No. R9-2007-0001 for LID and treatment control BMP requirements for PDPs.

A new municipal storm water permit, SDRWQCB Tentative Order No. R9-2013-0001, is anticipated to be adopted in spring 2013. The new municipal storm water permit would require each PDP to implement LID BMPs that are designed to retain (i.e., intercept, store, infiltrate, evaporate, evapotranspire, or harvest and use) a design capture volume of storm water runoff. See Provision E.3.c.(1)(a) and Appendix F, page F-87 of Tentative Order No. R9-2013-0001. When site conditions preclude the use of infiltration practices to remove the design capture volume, as is often the case in San Diego County due to geologic constraints, another potential way to dispose of the captured storm water runoff is to use it on-site ("harvest and use"). The purpose of this paper is to compare the cost of treating and releasing storm water runoff pursuant to current requirements of Order No. R9-2007-0001 (storm water management practice "today") to the potential cost of harvest and use of storm water runoff under the requirements of Tentative Order No. R9-2013-0001 (storm water management practice "future").

Selection of Projects and Practices for Analysis

For the purpose of this study, sample projects and storm water management practices had to be selected. There are many factors to be considered when evaluating the impact of the changing regulations. Any of the following factors could influence the results of the cost analysis: project size, project type (new development or redevelopment), proposed land use, site condition (e.g., soil type, geology, topography, proximity to existing infrastructure), amount of rainfall, or other factors. Therefore, multiple projects were evaluated. A range of typical projects was found from the "APWA BMP Sizing Calculator Training" workshop presented on March 8, 2011. In early 2011, Rick Engineering Company developed five example projects for the purpose of training engineers to use the San Diego BMP Sizing Calculator in the "APWA BMP Sizing Calculator Training" workshop. All of the five example projects were based on actual PDPs. For the APWA workshop, "snapshots" of portions of the PDPs were taken for simplified analysis, amounts of impervious and pervious area were tabulated, and details of project site characteristics that affect runoff such as soil type, rainfall basin, and slope were created to represent a range of conditions throughout San Diego County. Using these previously developed example projects provided an un-biased range of realistic projects. Exhibits of the five example projects are attached (Attachment 1). Note the facility sizes and orifice sizes shown on the attached exhibits are from the BMP Sizing Calculator results for hydromodification management from the APWA workshop and are not a part of this study.

Tables 1 and 2 present the project data for the five example projects. In general it will be assumed that all of the project area will be captured in the storm water management practice, including landscaping area. However, example project 5 includes such a significant amount of landscaping area (approximately 30.55 acres or 51%) that this project will be evaluated both with and without capturing the landscaping area. Example project "5" will capture all of the project area including landscaping, and example project "5a" is the same project but capturing only the impervious area.

Table 1
Example Project Data

Project	Description	Total Area (Acres)	Rain Gauge	Slope	Hydrologic Soil Group
1	New Linear Roadway	0.77	Oceanside	Flat	C
2	Residential	1.15	Oceanside	Moderate	D
3	Small Commercial	0.53	Lake Wohlford	Flat	B
4	Redevelopment (Apartment Complex)	0.29	Lindbergh Field	Flat	D
5	Large Commercial	59.59	Lake Wohlford	Flat	D
5a	Large Commercial (Capturing the Impervious Area Only)	59.59	Lake Wohlford	Flat	D

Table 2
Example Project Proposed Impervious Area, Landscape Area, and Post-Project Effective Impervious Area

Project	Description	Total Area (ft^2)	Proposed Impervious Area (ft^2)	Proposed Landscape Area (ft^2)	Post-Project Effective Impervious Area* (ft^2)
1	New Linear Roadway	33,452	28,366	5,086	28,875
2	Residential	49,886	29,525	20,361	31,561
3	Small Commercial	23,020	19,787	3,233	20,110
4	Redevelopment (Apartment Complex)	12,613	11,163	1,450	11,308
5	Large Commercial	2,595,606	1,264,901	1,330,705	1,397,972
5a	Large Commercial (Capturing the Impervious Area Only)	2,595,606	1,264,901	1,330,705 (not captured)	1,264,901

*Post-project Effective Impervious Area = (Proposed Impervious Area x 1.0) + (Proposed Landscape Area x 0.1), pursuant to the County of San Diego SUSMP dated January 8, 2011.

Post-project effective impervious area was calculated based on the method and runoff factors presented in the County of San Diego SUSMP dated January 8, 2011. The runoff factor for impervious area is 1.0. The runoff factor for landscape area is 0.1.

Stormwater Management Practice "Today"

There is a wide range of options available to satisfy the PDP LID and treatment control requirements of Order No. R9-2007-0001. In order to quantify the cost of requirements today, an appropriate LID or treatment control BMP must be selected. Bioretention was selected for this analysis because it would satisfy requirements for LID as well as provide a high level of treatment for most pollutants. Provided that land is available for a bioretention system (i.e., provided the bioretention system can fit into land already slated for project landscaping), it is also expected to be a relatively cost-effective practice, especially when long-term maintenance is considered.

Treatment-only bioretention facilities were sized for each example project using a sizing factor of 0.04 multiplied by the effective impervious area, pursuant to the County of San Diego SUSMP dated January 8, 2011. Table 3 presents the sizing of treatment-only bioretention facilities.

Table 3
Sizing of Bioretention Facilities

Project	Description	Post-Project Effective Impervious Area (ft^2)	Surface Area of Treatment-Only Bioretention Facility* (ft^2)
1	New Linear Roadway	28,875	1,155
2	Residential	31,561	1,262
3	Small Commercial	20,110	804
4	Redevelopment (Apartment Complex)	11,308	452
5	Large Commercial	1,397,972	55,919
5a	Large Commercial (Capturing the Impervious Area Only)	1,264,901	50,596
*Area of Treatment-Only Bioretention Facility = 0.04 x Post-Project Effective Impervious Area			

Stormwater Management Practice "Future"

It is anticipated that harvest and use of storm water will be the typical method for PDPs to satisfy the on-site retention requirement of Provision E.3.c.(1)(a) of Tentative Order No. R9-2013-0001. There are many ways to use harvested storm water. Some typical uses include irrigation, toilet flushing, and HVAC cooling. For the purpose of this study, it is assumed that the harvested storm water will be used for spray irrigation. All of the five example projects include landscaping on-site and will have a demand for irrigation water. However, this study does not establish a maximum holding time for the harvested storm water, size storage units to ensure collection of back to back storm events, or optimize the size of the storage unit based on irrigation demand. This study simply calculates the minimum design capture volume of storm water runoff pursuant to Provision E.3.c.(1)(a)(i) of Tentative Order No. R9-2013-0001. For the purpose of this study, the storm water harvesting system is assumed to include a pre-treatment unit to capture gross pollutants (for example inlet inserts or a hydrodynamic separator), an underground concrete vault for storage, a mechanical system for distribution that includes a pump, a treatment system consisting of fine filtration and ultraviolet disinfection, and a connection to a source of make-up water using a reduced pressure zone (RPZ) valve. Make-up water is the municipal water supply that will augment the harvested storm water supply to fulfill the total water demand (in this case, the total irrigation demand).

The minimum volume of the storm water runoff harvesting facility was calculated based on Provision E.3.c.(1)(a)(i) of Tentative Order No. R9-2013-0001, the volume of storm water produced from a 24-hour 85th percentile storm event. The 85th percentile rainfall was determined from the June 2003 *San Diego County Hydrology Manual,* Appendix E, 85th Percentile Precipitation Isopluvial Map. Table 4 presents the sizing of storm water harvesting facilities (minimum on-site retention volume).

Table 4
Sizing of Storm Water Harvesting Facilities

Project	Description	85th Percentile Rainfall (inches)	Post-Project Effective Impervious Area (ft^2)	Minimum On-Site Retention Volume* (ft^3)	Minimum On-Site Retention Volume (gallons)
1	New Linear Roadway	0.70	28,875	1,684	12,600
2	Residential	0.70	31,561	1,841	13,772
3	Small Commercial	0.85	20,110	1,424	10,656
4	Redevelopment (Apartment Complex)	0.60	11,308	565	4,229
5	Large Commercial	0.85	1,397,972	99,023	740,743
5a	Large Commercial (Capturing the Impervious Area Only)	0.85	1,264,901	89,597	670,233

*Minimum On-Site Retention Volume (ft^3) = (85th Percentile Rainfall / 12 inches per foot) x Post-Project Effective Impervious Area
**1 cubic foot is approximately 7.48 gallons

Costs

Rick Engineering Company estimated the cost of a typical treatment-only bioretention system in San Diego (based on a detail consistent with the County of San Diego SUSMP) at approximately $9.00 per square foot for media, liners, subdrains, lansdcaping, and installation. Based on the California Storm Water Quality Association New Development and Redevelopment Handbook Fact Sheet TC-32 Bioretention, construction costs for bioretention for commercial, industrial, or institutional sites can range from $10.00 to $40.00 per square foot, based on the need for control structures, curbing, storm drains, and underdrains. All of the example projects in this study would be considered to be "commercial-sized" projects. The low range cost for a commercial scale bioretention system was selected from TC-32. The following was used to estimate the cost for the treatment-only bioretention systems: $10.00 per square foot of bioretention area.

The cost of a rainwater harvesting system includes the cost of the pre-treatment unit (for example inlet inserts or a hydrodynamic separator), the storage vault, and the mechanical system for distribution. Pre-treatment costs were estimated to be $1,000.00 per inlet insert or roof drain insert (example projects 1 and 3 would each require 1 inlet insert and example project 4 would require 4 roof drain inserts), $15,000.00 for a small hydrodynamic separator for example project 2, or $40,000.00 for a large hydrodynamic separator for example project 5. The cost of the storage vault was estimated to be $8.50 per cubic foot for a modular concrete underground storage system. The mechanical system includes a pump, a treatment system consisting of fine filtration and ultraviolet disinfection, and a connection to a source of make-up water. The total mechanical system cost was estimated to be $45,000.00 for the small projects (example projects 1 through 4, which will be storing and processing an average of 10,000 gallons of runoff), and $110,000 for the large project (example project 5, which will be processing approximately 700,000 gallons of runoff). The sum of the pre-treatment, storage, and mechanical system costs for each example project is presented in Table 5.

Table 5
Sum of Estimated Costs for Rainwater Harvesting Systems

Project	Description	Total Area (Acres)	Estimated Cost for Pre-Treatment	Estimated Cost for Runoff Storage	Estimated Cost for Mechanical System	Total Estimated Cost
1	New Linear Roadway	0.77	$1,000	$14,317	$45,000	$60,317
2	Residential	1.15	$15,000	$15,649	$45,000	$75,649
3	Small Commercial	0.53	$1,000	$12,108	$45,000	$58,108
4	Redevelopment (Apartment Complex)	0.29	$4,000	$4,806	$45,000	$53,806
5	Large Commercial	59.59	$40,000	$841,695	$110,000	$991,695
5a	Large Commercial (Capturing the Impervious Area Only)	(29.04 acres new impervious area)	$40,000	$761,576	$110,000	$911,576

Cost Comparison

Table 6 presents the estimated costs for on-site retention (harvest and use) of storm water runoff vs. treatment (treatment-only bioretention) and release of storm water runoff.

Table 6
Comparison of Costs for Harvest and Use of Storm Water Runoff vs. Treatment and Release of Storm Water Runoff

Project	Description	Total Area (Acres)	Estimated Cost for Treatment-Only Bioretention	Estimated Cost for Harvest and Use System	Ratio of Harvest and Use Cost to Treatment-Only Bioretention Cost
1	New Linear Roadway	0.77	$11,550	$60,317	5
2	Residential	1.15	$12,624	$75,649	6
3	Small Commercial	0.53	$8,044	$58,108	7
4	Redevelopment (Apartment Complex)	0.29	$4,523	$53,806	12
5	Large Commercial	59.59	$559,189	$991,695	2
5a	Large Commercial (Capturing the Impervious Area Only)	(29.04 acres new impervious area)	$505,960	$911,576	2

The results in Table 5 show that for example projects 1 through 4 ranging in size from 0.29 to 1.15 acres, the cost to harvest and use storm water runoff is approximately 5 to 12 times the cost of treatment-only bioretention and release of storm water runoff under the requirements of Order No. R9-2007-0001. For the larger project, example project 5, the cost of harvest and use is approximately twice the cost of treatment and release of runoff, regardless of whether the project design will capture runoff from all of the project area or from only the impervious area.

The following other factors may be significant to the cost or benefit of harvest and use of storm water runoff: the value of land not used for bioretention, the cost of electricity to operate the system, the value of the harvested water, system maintenance costs, possible enhancement to property value from "green" infrastructure, or other factors. These factors can only be quantified for systems that are in place and operating, and are not a part of this study.

Impact With Hydromodification Management

All of the five example projects were initially developed for the purpose of training engineers to use the San Diego BMP Sizing Calculator, which is a tool for sizing hydromodification management facilities pursuant to the "Final Hydromodification Management Plan" for County of San Diego dated March 2011. This study used the same previously developed example projects to evaluate treatment-only storm water management facilities, and the cost analysis in this study does not factor in the facility sizes potentially needed to meet hydromodification management criteria. In all cases, the size of the hydromodification management facility would be much larger than the size of the potential harvest and use facility. It can be expected that for PDPs subject to hydromodification management, the hydromodification management requirements will determine the design of storm water management facilities, and the impact of the future on-site retention requirements may be less significant.

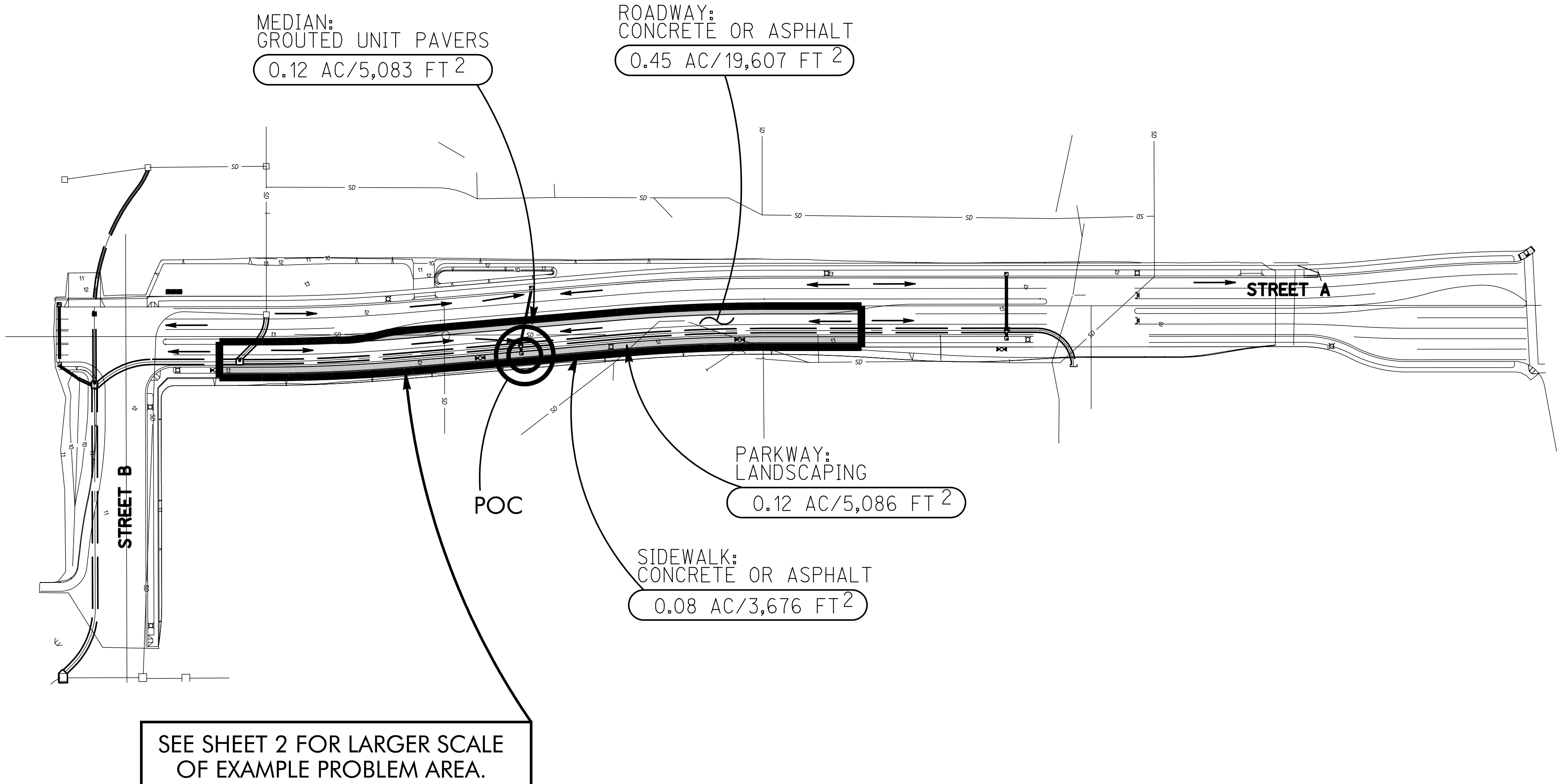
Conclusion

Based on the costs estimated for this study, the cost of storm water management features for new development and redevelopment priority development projects to satisfy the requirements of the future municipal storm water permit, Tentative Order No. R9-2013-0001, may be two to twelve the cost of storm water management practices to satisfy the requirements of the current municipal storm water permit, Order No. R9-2007-0001. It is important to note that all new development and redevelopment projects are unique, and may or may not implement the specific storm water management features evaluated in this study, as there are many practices available to meet the current or future municipal permit requirements.

Attachment 1
Exhibits of Five Example Projects

New Linear Roadway
Residential
Small Commercial
Redevelopment (Apartment Complex)
Large Commercial

APWA BMP SIZING CALCULATOR TRAINING
EXAMPLE #1 ~ NEW LINEAR ROADWAY
EXHIBIT 1 (SHEET 1 OF 2)



150 75 0 150 300 450

GRAPHIC SCALE 1"= 150'

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MARCH 8, 2011

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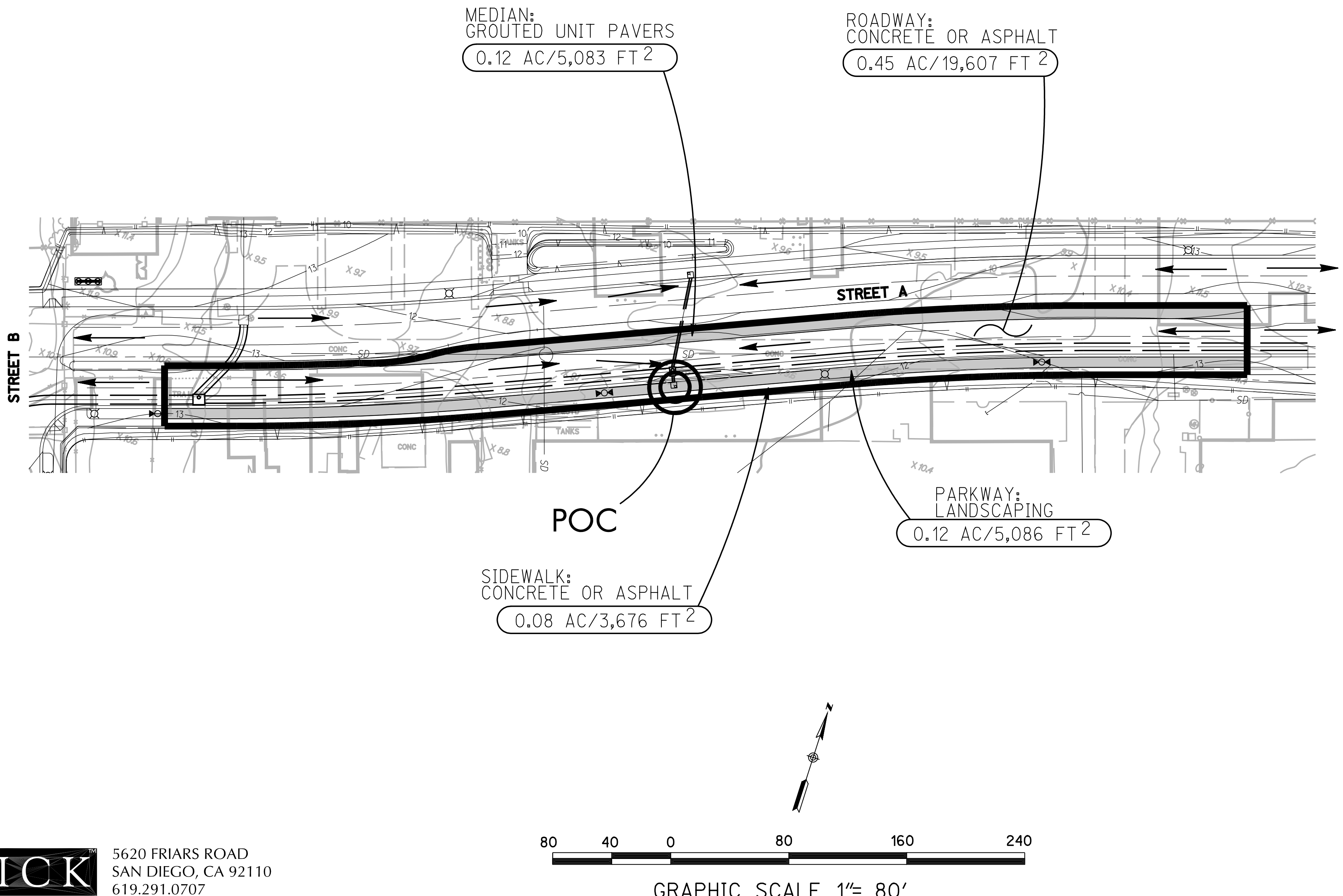
April 10 and 11, 2013
Item No. 8
Supporting Document No. 5

APWA BMP SIZING CALCULATOR TRAINING
EXAMPLE #1 ~ NEW LINEAR ROADWAY
EXHIBIT 1 (SHEET 2 OF 2)



EXAMPLE # 1 ~ NEW LINEAR ROADWAY

EXAMPLE INPUT DATA

- ☐ DESIGN GOAL: TREATMENT + FLOW CONTROL
- ☐ RAINFALL BASIN: OCEANSIDE
- ☐ POINT OF COMPLIANCE (POC): SUMP INLET ON STREET A
- ☐ DRAINAGE SOIL (HYDROLOGIC SOIL TYPE): TYPE C
- ☐ POST SURFACE: VARIES (SEE EXHIBIT)
- ☐ PRE-PROJECT COVER: PERVIOUS
- ☐ PRE-PROJECT SLOPE: 2%

EXAMPLE PROBLEM

SCENARIO 1:

DESIGN BIORETENTION BMP FOR PROPOSED PROJECT SURFACE AS SHOWN ON EXHIBIT.

ANSWER: AREA 3,748.8 FT^2

V_1 3,123.1 FT^3

V_2 2,249.3 FT^3

ORIFICE 0.5 IN

SCENARIO 2:

CHANGE BIORETENTION BMP TO FLOW-THROUGH PLANTER BMP.

ANSWER: AREA 5,479.1 FT^2

V_1 4,565.0 FT^3

V_2 3,287.4 FT^3

ORIFICE 0.5 IN

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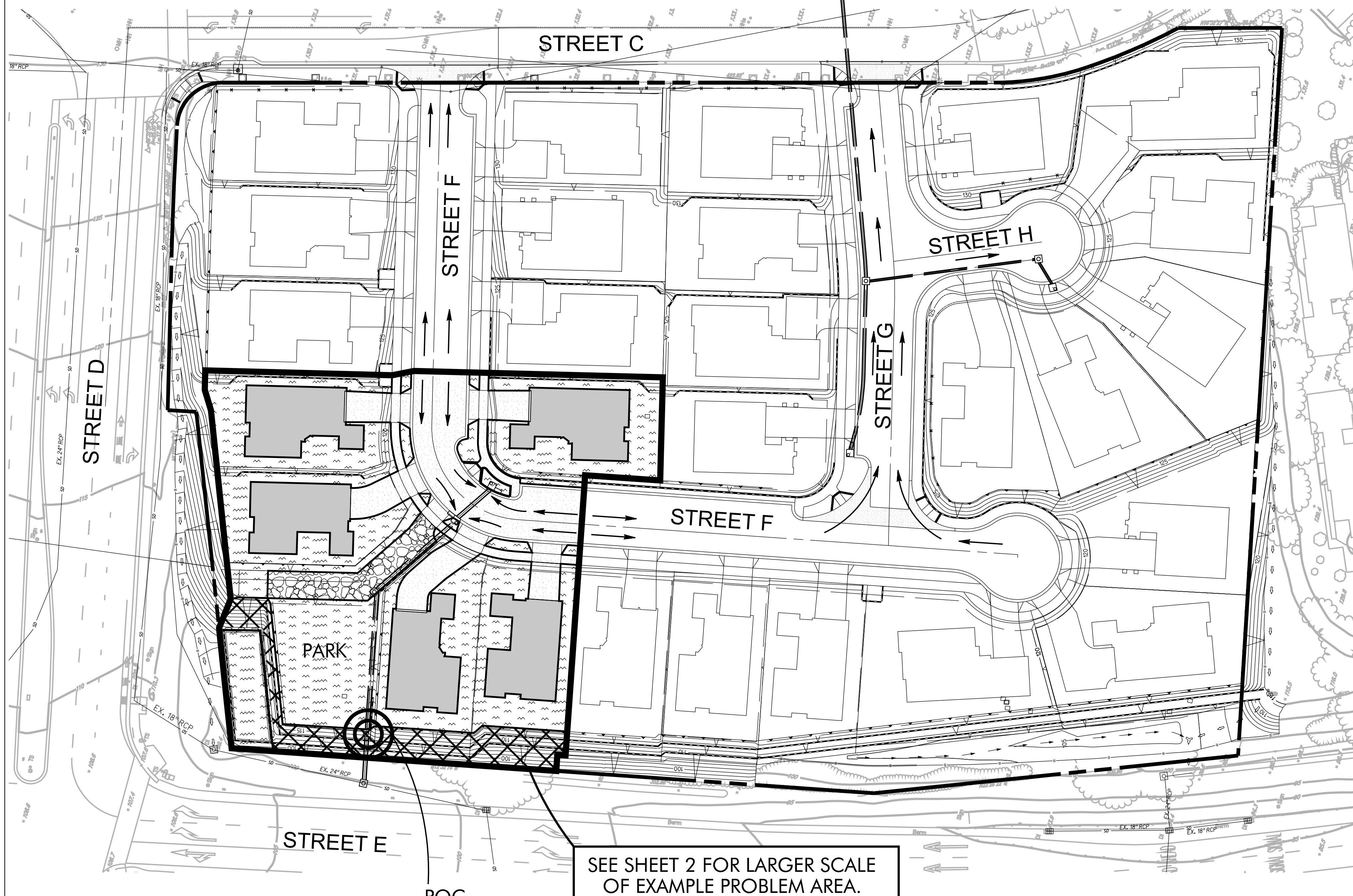
MARCH 8, 2011

APWA BMP SIZING CALCULATOR TRAINING
EXAMPLE #2 ~ RESIDENTIAL
EXHIBIT 1 (SHEET 1 OF 2)



LEGEND

SYMBOL	SURFACE	TOTAL AREA
	DRIVEWAYS, SIDEWALKS AND ROADWAY: CONCRETE OR ASPHALT	0.19 AC/8,194 FT^2
	ROOFS: ROOFS	0.45 AC/19,785 FT^2
	MAINTENANCE ACCESS: CRUSHED AGGREGATE	0.03 AC/1,546 FT^2
	LAWNS, PARK: LANDSCAPING	0.47 AC/20,361 FT^2
	SLOPES: LANDSCAPING (SELF-TREATING)	0.08 AC/3,699 FT^2

60 30 0 60 120 180

GRAPHIC SCALE 1"= 60'

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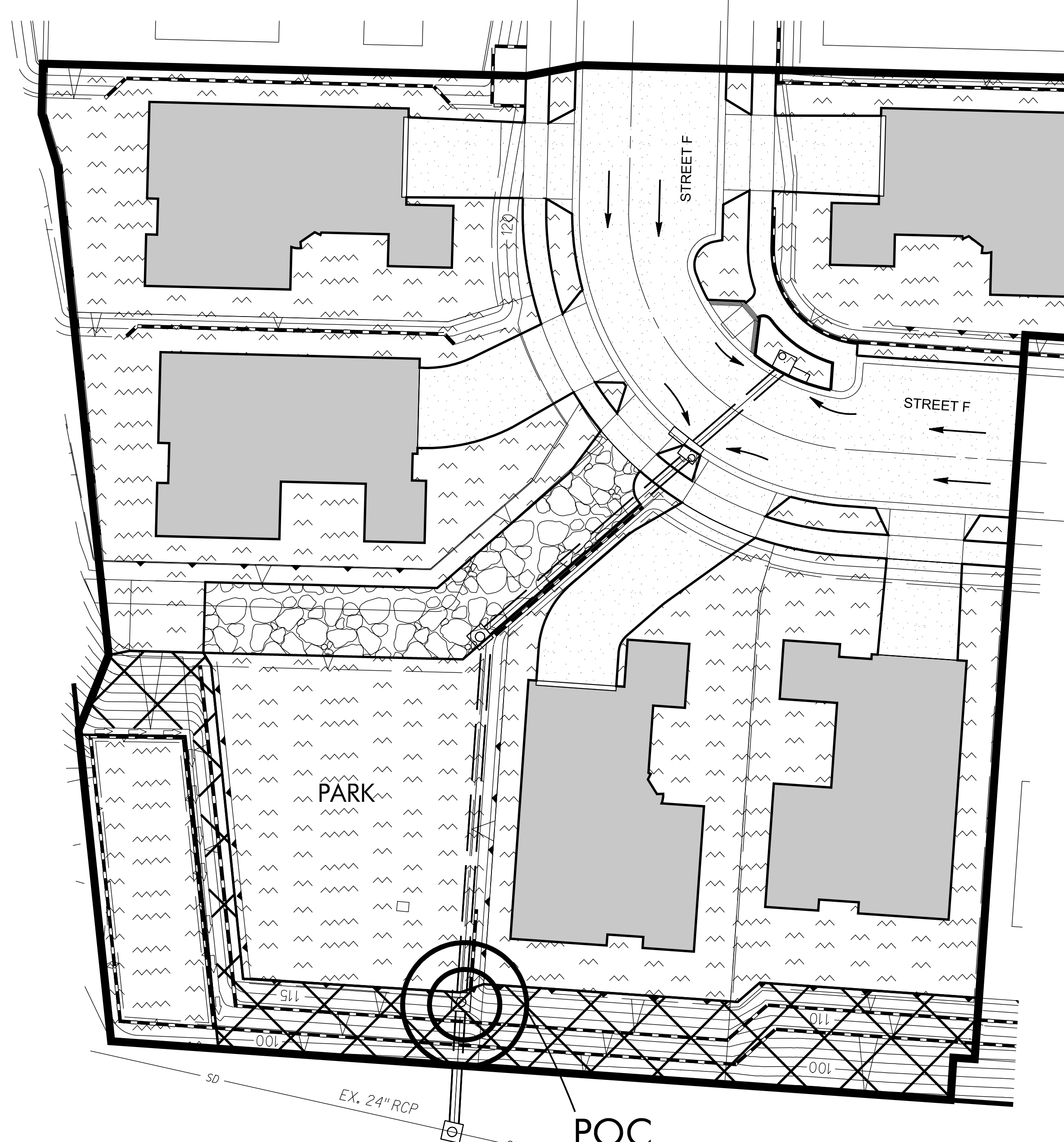
APWA BMP SIZING CALCULATOR TRAINING
EXAMPLE #2 ~ RESIDENTIAL
EXHIBIT 1 (SHEET 2 OF 2)



GRAPHIC SCALE 1"= 30'

LEGEND

SYMBOL	SURFACE	TOTAL AREA
	DRIVEWAYS, SIDEWALKS AND ROADWAY: CONCRETE OR ASPHALT	0.19 AC/8,194 FT^2
	ROOFS: ROOFS	0.45 AC/19,785 FT^2
	MAINTENANCE ACCESS: CRUSHED AGGREGATE	0.03 AC/1,546 FT^2
	LAWNS, PARK: LANDSCAPING	0.47 AC/20,361 FT^2
	SLOPES: LANDSCAPING (SELF-TREATING)	0.08 AC/3,699 FT^2

EXAMPLE #2 ~ RESIDENTIAL

EXAMPLE INPUT DATA

- ☐ DESIGN GOAL: TREATMENT + FLOW CONTROL
- ☐ RAINFALL BASIN: OCEANSIDE
- ☐ POINT OF COMPLIANCE (POC): OUTLET TO STREET E
- ☐ DRAINAGE SOIL (HYDROLOGIC SOIL TYPE): TYPE D
- ☐ POST SURFACE: VARIES (SEE EXHIBIT)
- ☐ PRE-PROJECT COVER: PERVIOUS
- ☐ PRE-PROJECT SLOPE: 7%

EXAMPLE PROBLEM

SCENARIO 1:

DESIGN CISTERN PLUS BIORETENTION BMP FOR PROJECT SURFACES AS SHOWN ON EXHIBIT.

ANSWER: CISTERN VOLUME 6,011.4 FT^3

BIORETENTION AREA 601.1 FT^2

ORIFICE 0.6 IN

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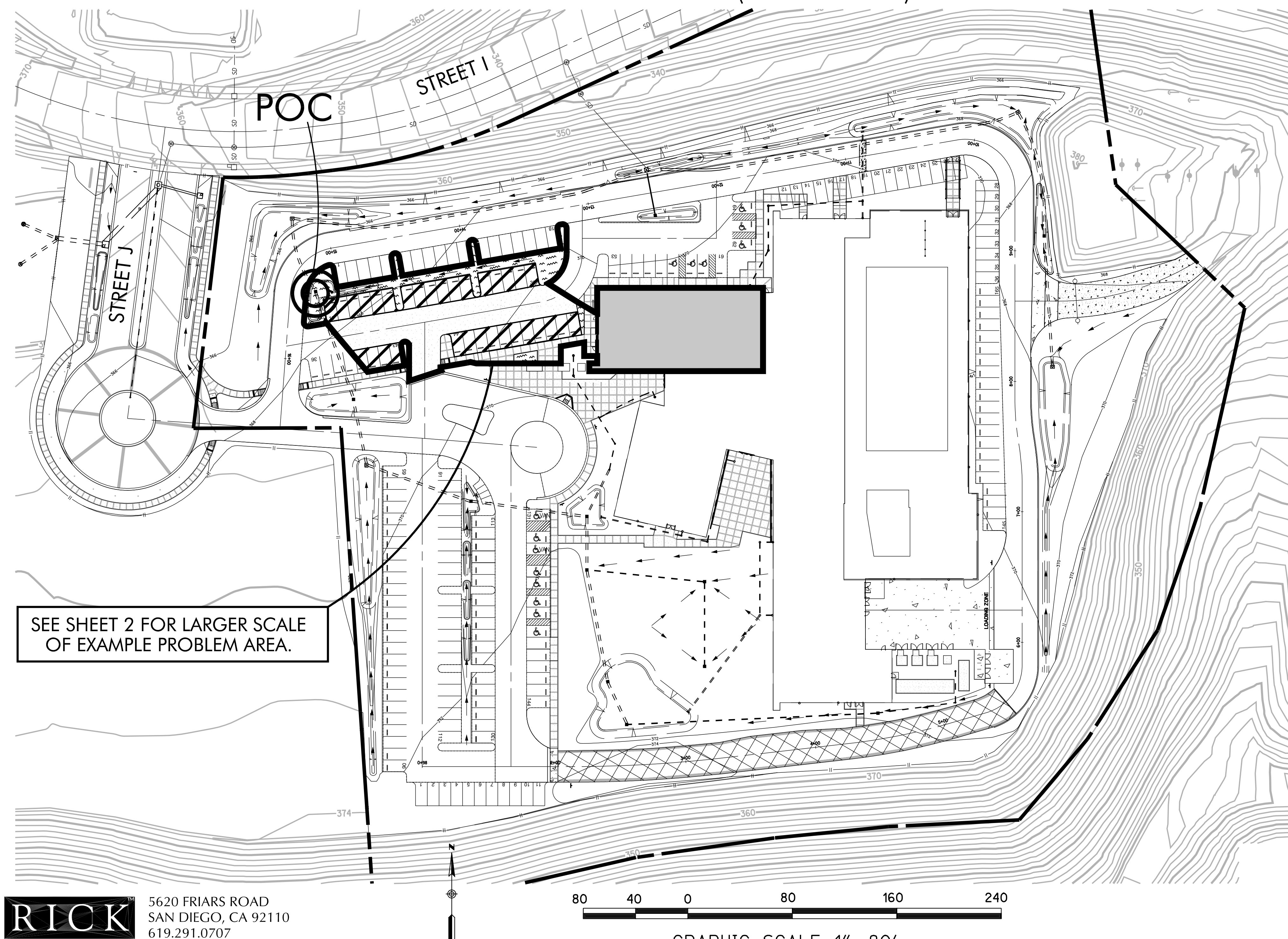
Supporting Document No. 5

APWA BMP SIZING CALCULATOR TRAINING
EXAMPLE #3 ~ SMALL COMMERCIAL
EXHIBIT 1 (SHEET 1 OF 2)



LEGEND

SYMBOL	SURFACE	TOTAL AREA
	DRIVE LANE: CONCRETE OR ASPHALT	0.11 AC/5,030 FT^2
	ROOFS: ROOFS	0.19 AC/8,126 FT^2
	PARKING STALLS: CONCRETE OR ASPHALT	0.12 AC/5,112 FT^2
	SIDEWALK: CONCRETE OR ASPHALT	0.03 AC/1,519 FT^2
	LANDSCAPING: LANDSCAPING	0.07 AC/3,233 FT^2

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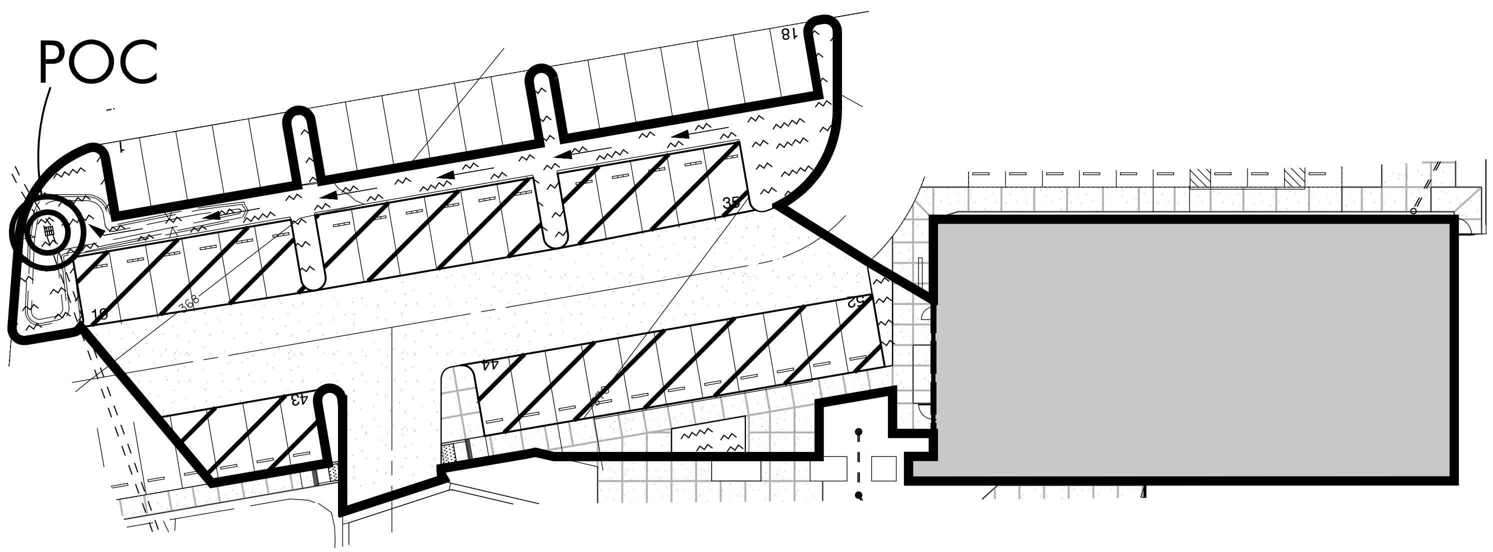
APWA BMP SIZING CALCULATOR TRAINING
EXAMPLE #3 ~ SMALL COMMERCIAL
EXHIBIT 1 (SHEET 2 OF 2)

POC



LEGEND

SYMBOL	SURFACE	TOTAL AREA
	DRIVE LANE: CONCRETE OR ASPHALT	0.11 AC/5,030 FT^2
	ROOFS: ROOFS	0.19 AC/8,126 FT^2
	PARKING STALLS: CONCRETE OR ASPHALT	0.12 AC/5,112 FT^2
	SIDEWALK: CONCRETE OR ASPHALT	0.03 AC/1,519 FT^2
	LANDSCAPING: LANDSCAPING	0.07 AC/3,233 FT^2

N

40 20 0 40 80 120

GRAPHIC SCALE 1"= 40'

EXAMPLE # 3 ~ SMALL COMMERCIAL

EXAMPLE INPUT DATA

- DESIGN GOAL: TREATMENT + FLOW CONTROL
- RAINFALL BASIN: LAKE WOHLFORD
- POINT OF COMPLIANCE (POC): NORTHWEST CORNER OF PARKING ISLAND
- DRAINAGE SOIL (HYDROLOGIC SOIL TYPE): TYPE B
- POST SURFACE: VARIES (SEE EXHIBIT)
- PRE-PROJECT COVER: PERVIOUS
- PRE-PROJECT SLOPE: 1%

EXAMPLE PROBLEM

SCENARIO 1:

DESIGN DRY WELL BMP FOR PROPOSED PROJECT SURFACES AS SHOWN ON EXHIBIT.

ANSWER: AREA 1,542.8 FT^2

VOLUME 4,011.3 FT^3

SCENARIO 2:

CHANGE SURFACE OF PARKING STALLS FROM CONCRETE OR ASPHALT TO SOLID UNIT PAVERS ON GRANULAR AND RE-SIZE DRY WELL BMP.

ANSWER: AREA 1,218.7 FT^2

VOLUME 3,168.7 FT^3

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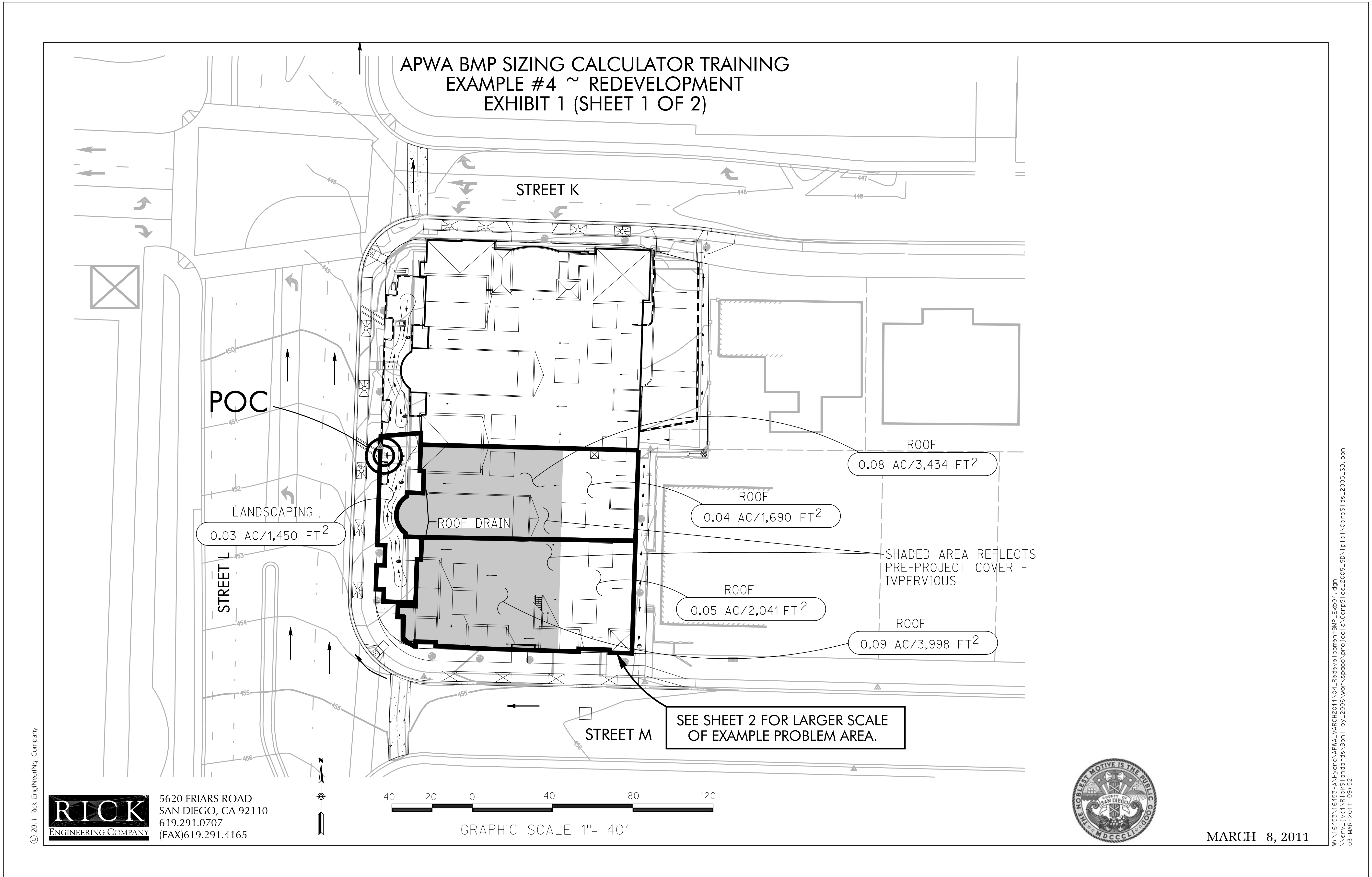
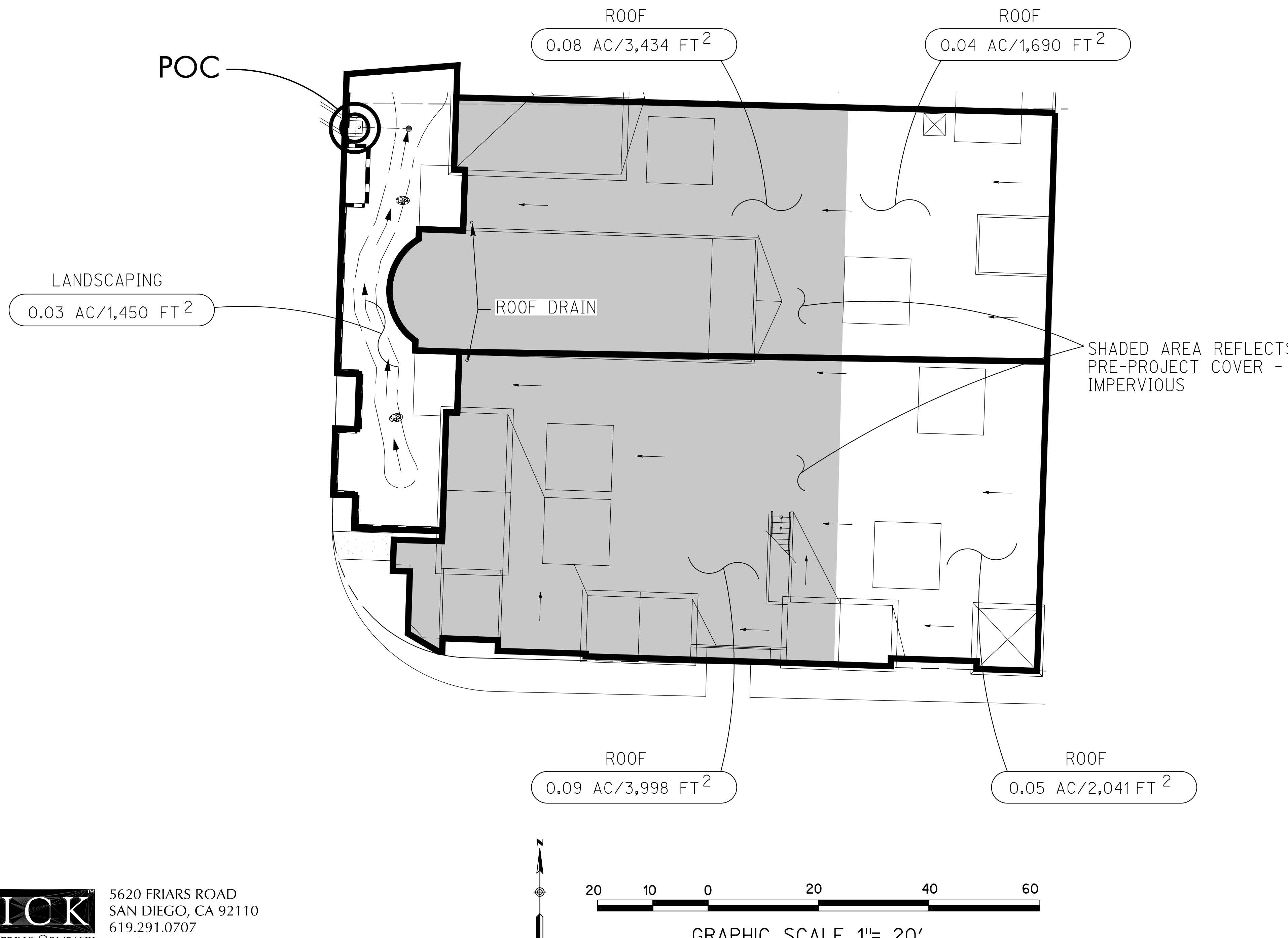
Item No. 8
Supporting Document No. 5



APWA BMP SIZING CALCULATOR TRAINING
EXAMPLE #4 ~ REDEVELOPMENT
EXHIBIT 1 (SHEET 2 OF 2)



EXAMPLE # 4 ~ REDEVELOPMENT

EXAMPLE INPUT DATA

- ☐ DESIGN GOAL: TREATMENT + FLOW CONTROL
- ☐ RAINFALL BASIN: LINDBERGH FIELD
- ☐ POINT OF COMPLIANCE (POC): OUTLET TO STREET L
- ☐ DRAINAGE SOIL (HYDROLOGIC SOIL TYPE): TYPE D
- ☐ POST SURFACE: VARIES (SEE EXHIBIT)
- ☐ PRE-PROJECT COVER: PERVIOUS EXCEPT SHADED AREA - IMPERVIOUS (SEE EXHIBIT)
- ☐ PRE-PROJECT SLOPE: 1%

EXAMPLE PROBLEM

SCENARIO 1:

DESIGN BIORETENTION PLUS VAULT BMP FOR PROPOSED PROJECT SURFACES AS SHOWN ON EXHIBIT.

ANSWER: AREA 162.0 FT^2

V_1 1,053.3 FT^3

ORIFICE 0.4 IN

SCENARIO 2:

ASSUME THIS IS NEW DEVELOPMENT AND ALL PRE-PROJECT COVER IS PERVIOUS.

DESIGN BIORETENTION PLUS VAULT BMP FOR PROPOSED PROJECT SURFACES AS SHOWN ON EXHIBIT.

ANSWER: AREA 458.2 FT^2

V_1 2,978.7 FT^3

ORIFICE 0.1 IN

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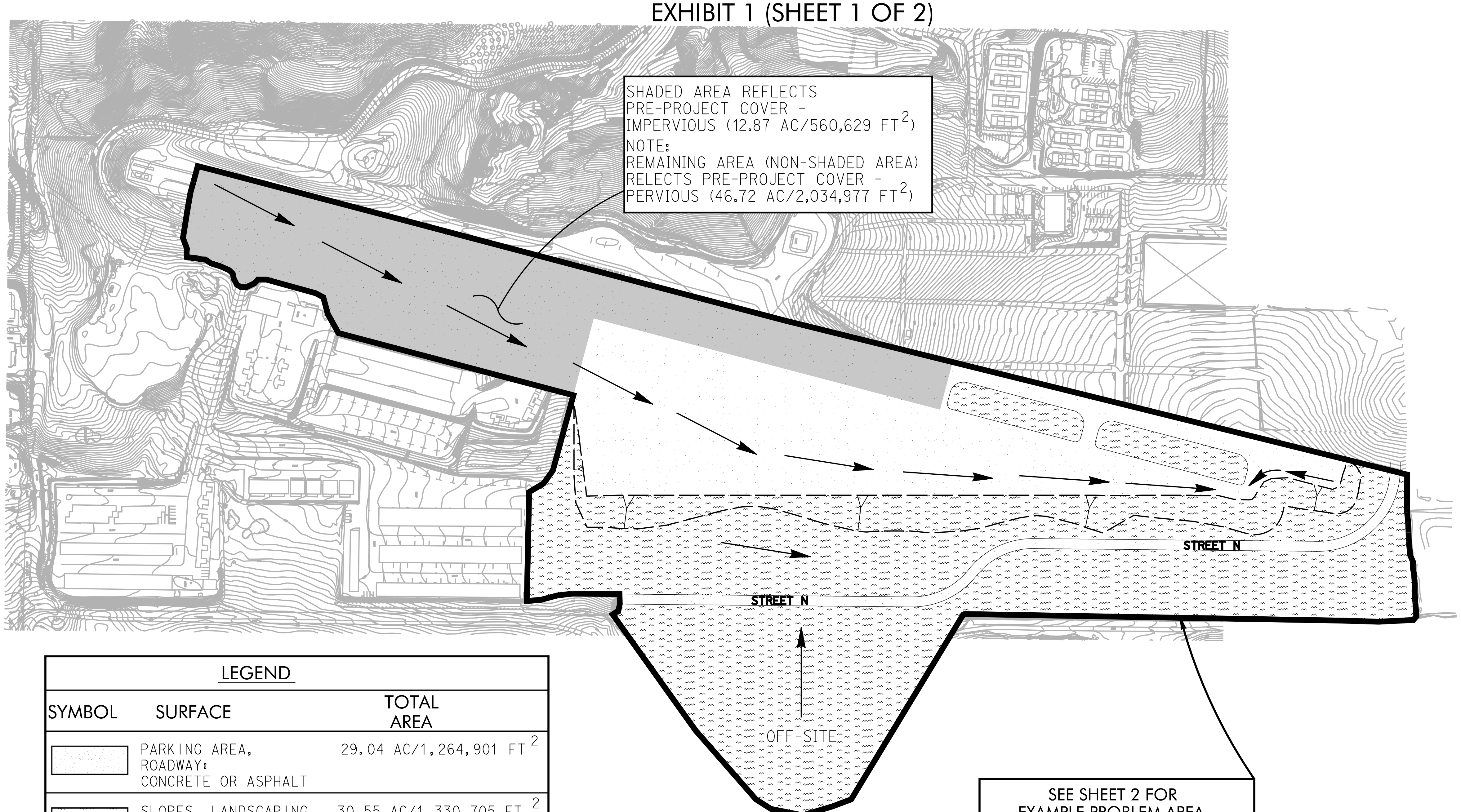
MARCH 8, 2011

APWA BMP SIZING CALCULATOR TRAINING
EXAMPLE #5 ~ LARGE COMMERCIAL
EXHIBIT 1 (SHEET 1 OF 2)



LEGEND

SYMBOL	SURFACE	TOTAL AREA
	PARKING AREA, ROADWAY: CONCRETE OR ASPHALT	29.04 AC/1,264,901 FT^2
	SLOPES, LANDSCAPING, PARK: LANDSCAPING	30.55 AC/1,330,705 FT^2

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GRAPHIC SCALE 1"= 300'

MARCH 8, 2011

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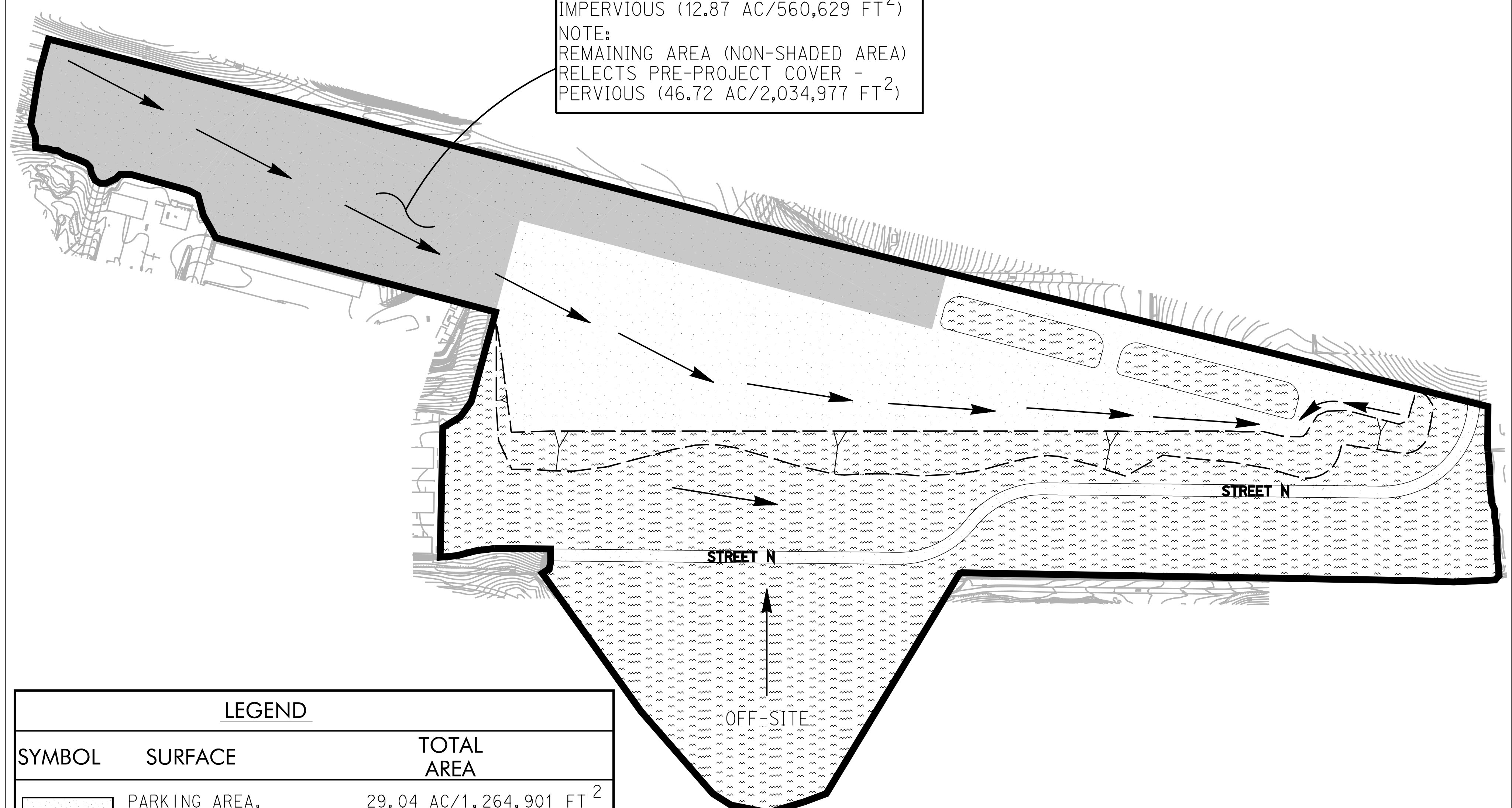
APWA BMP SIZING CALCULATOR TRAINING
EXAMPLE #5 ~ LARGE COMMERCIAL
EXHIBIT 1 (SHEET 2 OF 2)

SHADED AREA REFLECTS PRE-PROJECT COVER - IMPERVIOUS (12.87 AC/560,629 FT^2)
NOTE:
REMAINING AREA (NON-SHADED AREA) RELECTS PRE-PROJECT COVER - PERVIOUS (46.72 AC/2,034,977 FT^2)



LEGEND

SYMBOL	SURFACE	TOTAL AREA
	PARKING AREA, ROADWAY: CONCRETE OR ASPHALT	29.04 AC/1,264,901 FT^2
	SLOPES, LANDSCAPING, PARK: LANDSCAPING	30.55 AC/1,330,705 FT^2

300 150 0 300 600 900
GRAPHIC SCALE 1"= 300'

EXAMPLE # 5 ~ LARGE COMMERCIAL

EXAMPLE INPUT DATA

- ☐ DESIGN GOAL: TREATMENT + FLOW CONTROL
- ☐ RAINFALL BASIN: LAKE WOHLFORD
- ☐ POINT OF COMPLIANCE (POC): SOUTHWEST CORNER OF SITE
- ☐ DRAINAGE SOIL (HYDROLOGIC SOIL TYPE): TYPE D
- ☐ POST-PROJECT COVER: VARIES (SEE EXHIBIT)
- ☐ PRE-PROJECT COVER: PERVIOUS EXCEPT SHADED AREA - IMPERVIOUS (SEE EXHIBIT)
- ☐ PRE-PROJECT SLOPE: 3%

EXAMPLE PROBLEM

SCENARIO 1:

DESIGN POND BMP FOR PROPOSED PROJECT SURFACES AS SHOWN ON EXHIBIT.

POND DIMESNIONS (INPUT DATA):

SIDE SLOPE 1 (H:1) 3.00
SIDE SLOPE 2 (H:1) 3.00
DEPTH 5.0 FT
LOWER ORIFICE INVERT 0.00 FT
UPPER ORIFICE INVERT 3.0 FT
WEIR INVERT 5.0 FT
WEIR LENGTH 0.0 FT

ANSWER:
LOWER MAX. ORIFICE SIZE 5.0 IN
UPPER MAX. ORIFICE SIZE 28.0 IN
TOP AREA 75,596 FT^2
BOTTOM AREA 60,000 FT^2
VOLUME 338,992.3 FT^3
DRAWDOWN TIME 74.0 HRS
PERCENT DRAINED (96 HRS) 100 %

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MARCH 8, 2011

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County of San Diego

JACK MILLER
Director

DEPARTMENT OF ENVIRONMENTAL HEALTH
P.O. BOX 129261, SAN DIEGO, CA 92112-9261
Phone: (858) 505-6700 FAX (858) 505-6890
Phone: 1 (800) 253-9933
www.sdcdeh.org

ELIZABETH POZZEBON
Assistant Director

January 9, 2013

Mr. Wayne Chiu
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4353

NPDES PERMIT AND WASTE DISCHARGE REQUIREMENTS FOR DISCHARGES FROM THE MUNICIPAL SEPARATE STORM SEWER SYSTEMS (MS4) DRAINING THE WATERSHEDS WITHIN THE SAN DIEGO REGION (REGIONAL MS4 PERMIT) (ORDER NO. R9-2013-0001)

Dear Mr. Chiu:

The County of San Diego, Department of Environmental Health (DEH) has reviewed the proposed draft Order No. R9-2013-001 (Regional MS4 Permit), and offers the following comments:

The existing San Diego MS4 Storm Water permit includes vector-related language which is intended to raise awareness of the potential unintended public health risk resulting from mosquito production in certain storm water management devices, the proposed draft permit does not. The removal of the vector-related language raises a significant concern, and we request that it be placed back into the proposed draft to protect public health. Please note that the San Diego Regional MS4 permit was the first in the United States to include vector-related language, and ultimately resulted in improved language adopted into storm water permits throughout the State.

The vector-related language included in the existing MS4 permit represents a compromise that allows water quality goals to be met while minimizing the risk to public health. It recognizes that mosquitoes cannot completely be eliminated given the current water quality requirements. It further serves a critical public health purpose of maintaining an awareness of the potential unintended public health threat created by mosquitoes, and emphasizes the importance of proper maintenance of storm water management and treatment structures to minimize the potential for mosquito production and ultimately the spread of mosquito-borne diseases including West Nile Virus (WNV).

WNV continues to be a threat to human health, and has proven to be unpredictable. 2012 was the second worst year for WNV in the United States and California since it was introduced 13 years ago. Approximately 5,400 human illnesses were confirmed nationwide, with 243 deaths as of December 12, 2012. In California there were 464 confirmed cases in 2012 with 18 deaths as of December 24, 2012.

It is critical that the State and the RWQCB continue to include vector-related language in storm water NPDES permits to protect public health. It would be counterproductive and counterintuitive to strive to improve the quality of water for the benefit of public and environmental health only to create environments highly conducive to mosquitoes that have the potential to severely impact human and animal health from mosquito-borne diseases.

The County of San Diego's DEH respectfully requests that the Board restore the vector-related language in the proposed draft MS4 Permit. The following is the existing permit language from Section D - Urban Runoff Management Systems, Subsection 2 - Development Planning:

> f. *If not properly designed or maintained, certain BMPs implemented or required by municipalities for urban runoff management may create a habitat for vectors (e.g. mosquitoes and rodents). However, proper BMP design and maintenance can prevent the creation of vector habitat. Nuisances and public health impacts resulting from vector breeding can be prevented with close collaboration and cooperative effort between municipalities and local vector control agencies and the State Department of Health Services during the development and implementation of urban runoff management programs.*

In addition, the County of San Diego's DEH requests that to facilitate inspection of new BMPs, the San Diego Regional Permit require that a list of new storm water management and treatment units be submitted by the Permittees to their respective vector control agencies. The County requests that the Permit include the following language recently added to the draft Fact Sheet for the Los Angeles MS4 permit:

> *Monitoring studies conducted by the California Department of Public Health (CDPH) have documented that mosquitoes opportunistically breed in structural storm water Best Management Practices (BMPs), particularly those that hold standing water for over 96 hours. Certain Low Impact Development (LID) site design measures that hold standing water such as rainwater capture systems may similarly produce mosquitoes. BMPs and LID design features should incorporate design, construction, and maintenance principles to promote drainage within 96 hours to minimize standing water available to mosquitoes. This Order requires regulated MS4 Permittees to coordinate with other agencies necessary to successfully implement the provisions of this Order. These agencies may include CDPH and local mosquito and vector control agencies on vector-related issues surrounding implementation of post-construction BMPs.*

Thank you for the opportunity to submit comments on the proposed draft language for the MS4 Permit. If you have questions regarding the above comments, please contact Rebecca Lafreniere, Chief, at (858) 694-3595 or by E-mail at Rebecca.Lafreniere@sdcounty.ca.gov.

Sincerely,

JACK MILLER, Director

cc: Richard Crompton, Director, County of San Diego, Department of Public Works
Rebecca Lafreniere, Chief, County of San Diego, Department of Environmental Health, Community Health Division

County of San Diego

HERMAN REDDICK
PROGRAM MANAGER
(858) 974-5813
FAX (858) 974-5928

PUBLIC SAFETY GROUP
SAN DIEGO COUNTY FIRE AUTHORITY
5510 Overland Ave, Suite 250, San Diego, CA 92123

KEN MILLER & RALPH STEINHOFF
FIRE SERVICES COORDINATOR
(858) 974-5920
FAX (858) 974-5928

January 4, 2013

Mr. Wayne Chiu, P.E.
California Regional Water Quality Control Board, San Diego Region
9174 Sky Park Court, Suite 100
San Diego California 92123-4340

Dear Mr. Chiu,

SUBJECT: Amendment of Draft Permit Language for Fire Fighting Activities – Tentative Order No.R9-2013-0001, Regional MS4 Permit, Place ID: 786088Wchiu

As a local authority affected by the most recent MS4 Draft Permit we feel compelled to provide written comments to ensure that water quality regulations are practical, cost-effective, and scientifically justified. Since the County Fire Authority will be directly regulated by the Regional MS4 Permit, we are concerned that public funds and critical personnel may have to be spent or resourced to comply with requirements that are unnecessary, and that this will ultimately reduce the emergency personnel and funding available for essential public services.

It is vital that the resources required to keep our communities safe from the threat of fire be solely purposed for that task. For this reason the 15 rural fire agencies within San Diego County have joined the County Fire Authority's call to action to protect water quality while controlling the mounting and unsubstantiated costs of increased regulation on local governments, business, and industry. As written, the Tentative Order will result in a significant and unprecedented level of regulation and cost without clear scientific basis or environmental benefit. The Fire Authority along with the 15 rural agencies believe that the language incorporated in a re-issued permit should not deviate from the current permit unless the RWQCB can provide clear evidence that emergency fire fighting activities and fire sprinkler line flushing significantly impact stormwater runoff, and that the increased costs associated with proposed changes are justified and feasible. Accordingly, we ask that the Regional Board honor the language in the existing permit and make no changes at this time.

In order to provide the best service possible the Fire Authority and its 15 participating agencies must be focused on emergency activities and not with implementing BMPs or removing debris caused by the emergency after the fact. This should be the sole responsibility of the entities owning or operating the sites or facilities for which the fire agencies are responding. The Fire Authority also believes that existing requirements are sufficient to ensure that the flushing of fire sprinkler systems has minimal impact to storm water quality and should not be prohibited. These activities exist for the safety of the public and the environment and should be continued in their current fashion pursuant to existing permit requirements.

We are hopeful that the final permit language will result in programs that make sense from a public safety, environmental and economic standpoint. Please contact Greg Schreiner, Fire Marshal, if you have questions or would like to discuss our concerns. His number is 858-495-5425, email is greg.schreiner@sdcounty.ca.gov

Sincerely,

Herman Reddick,
Program Manager

CC:
Acting Chairman Gary Strawn, San Diego Regional Water Quality Control Board (SD RWQCB)
Board Member Eric Anderson, SD RWQCB
Board Member Henry Abarbanel, SD RWQCB
Board Member Tomas Morales, SD RWQCB
Board Member Sharon Kalemkiarian, SD RWQCB
Executive Officer David Gibson, SD RWQCB

April 10 and 11, 2013
Item No. 8
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JAMUL DULZURA
COMMUNITY PLANNING GROUP
P.O. Box 613
Jamul, California 91935

December 14, 2012

Mr. Rich Crompton, Director
County of San Diego Department of Public Works
5510 Overland Ave, Ste 410
San Diego, CA 92123

SUBJECT: Comment – Tentative Order No.R9-2013-0001, Regional MS4 Permit, Place ID: 786088Wchiu

Dear Mr. Crompton,

The Jamul Dulzura Community Planning Group feels compelled to provide written comments on the draft San Diego Regional MS4 Permit to ensure that water quality regulations are practical, cost-effective, and scientifically based. While we are not directly regulated by the Regional MS4 Permit, we are concerned that public funds may have to be spent to comply with requirements that are not proven or effective, and that this will ultimately reduce the funding available for community projects and essential public services.

It is vital that the resources required to implement regulations are balanced with other public and environmental programs. For this reason we have joined the County's call to action to protect water quality while controlling the mounting and unsubstantiated costs of increased regulation on local governments, business and industry. As written, the Tentative Order will result in a significant and unprecedented level of regulation and cost without clear scientific basis or environmental benefit. The three main areas of concern in the draft permit are: 1) a far-reaching Bacteria Total Maximum Daily Load (TMDL), 2) additional requirements for development projects, and 3) performance standards that unnecessarily expose municipalities to third-party lawsuits. These requirements needlessly increase costs for regulated parties and may further constrain development in the region.

The cost to comply with the Bacteria TMDL is estimated between \$2.6 billion and \$4.9 billion for the named watersheds in the region over the 20 year TMDL compliance timeline, of which only 18 years remain. The numeric targets in this TMDL may never be attainable even if the County and other municipalities were to spend billions in public resources. This puts us in an untenable situation with the public, who will ultimately fund this effort. Technology simply does not exist to return urbanized watersheds back to pristine, "reference" conditions. The TMDL compliance targets must be attainable. The Bacteria TMDL requirement should not be incorporated into the MS4 Permit until there are more practical goals to work toward. We cannot ask the public to fund a program that will not succeed.

The cost of doing business in California has already pushed many businesses and developers out of the state. The draft permit will impose significant hardships on development. Permit requirements would require almost all development projects in the County to comply with hydromodification requirements, regardless of whether the projects themselves contribute to the problem. It also requires that new and re-development projects return site hydrology to pre-development conditions as opposed to pre-project conditions. Returning urban infill projects to conditions that existed under "natural", pre-urban conditions would be a substantial constraint to re-development. Over the last several years, local governments in San Diego have worked together with Regional Board staff and a host of technical experts to develop a Hydromodification Management Plan with reasonable and scientifically based standards. The

Regional Board recently approved that Plan. This draft permit ignores all of the good work invested in that Plan, which was developed at a significant cost to the public. In its place, it would impose new, one-size-fits-all requirements that impose a standard that is unrealistic and without scientific justification. The result of all these changes is that the structures built to mitigate development impacts will need to be bigger and will cost significantly more than the current approved program. Implementing these requirements would be an economic burden to our region and, are targeted at an unobtainable endpoint.

Accordingly, we would like for the Regional Board to honor existing plans, including the Hydromodification Management Plan. SANDAG has worked for many years through a comprehensive public process to develop the Regional Transportation Plan and Regional Comprehensive Plan that provides the framework for local General Plans. These plans recognize regional smart growth opportunity areas, including infill development. These are sound principals. Urban infill reduces aerial deposition which then reduces pollutant loading in urban runoff. Re-development is considered an environmentally preferable method of development. The MS4 permit should encourage re-development, retrofit landscapes, and green streets, through greater flexibility and reduced requirements rather than penalizing it with additional cost and constraints. To this end, any new regulations must be integrated into approved plans and must not be a burdensome, additional layer.

Finally, the draft permit includes performance standards that should be amended so that regulated municipalities are not unnecessarily exposed to third-party litigation. This Permit's receiving water limitations language is contrary to the intent of the federal Clean Water Act, which is to assure municipal agencies will be regulated to a reasonable standard. The State and Regional Water Boards have the discretion and a responsibility to ensure that water quality regulations are applied in a context that results in economic and environmental sustainability. It is imperative to reduce the threat of litigation when a municipality is engaged in a good faith effort to comply. The current receiving water provisions do not serve the environment, the public or the permittees. Public funds should be used to implement comprehensive programs that are proactive and adaptive to promote clean water goals.

Local government must have the flexibility to make policy decisions for the good of our residents. The 21 Copermittees in our region (the County, 18 cities, Port District, and Airport Authority) already spend close to $120 million a year to comply with current permit requirements. Heal the Bay's own report cards show that water quality at local beaches is improving. We would like to see the Regional Board adopt a permit that will be cost neutral and that local municipalities will have the flexibility to apply funding to priority areas.

We are hopeful that the final permit language will result in programs that make sense from both an environmental and economic standpoint. Please contact me if you have questions or would like to discuss our concerns.

Sincerely,

Michael Casinelli

Michael Casinelli, Chair
Jamul Dulzura Community Planning Group

CC:
Vice Chairman Gary Strawn, San Diego Regional Water Quality Control Board (SD RWQCB)
Board Member Eric Anderson, SD RWQCB
Board Member Henry Abarbanel, SD RWQCB
Board Member Tomas Morales, SD RWQCB
Executive Officer David Gibson, SD RWQCB
Mr. Wayne Chiu, SD RWQCB

Pala Pauma Valley Community Sponsor Group
P O Box 1273, Pauma Valley, CA 92061
760.481.4201

By: USPS

Monday, December 10, 2012

Mr. Rich Crompton, Director
County of San Diego Department of Public Works
5510 Overland Ave, Ste 410
San Diego, CA 92123

Dear Mr. Crompton,

Re: Comment – Tentative Order No.R9-2013-0001, Regional MS4 Permit,
Place ID: 786088Wchiu

At its December 4, 2012 meeting the Pala Pauma Community Sponsor Group ("PPCSG") voted unanimously to support the action of San Diego County to protect water quality while controlling the mounting and unsubstantiated costs of increased regulation on local governments, business and industry. In particular, PPCSG supports the view that regulation based upon unproven science used in pursuit of parametric objectives that are apparently unattainable is poor governance and detrimamential to the interests of our community.

PPCSG believes that it is incumbent upon regulatory agencies to ensure that their enacted regulations are practical, cost-effective, and scientifically based. We are concerned that, otherwise, public funds may have to be spent to comply with requirements that are not proven nor effective, and that this will ultimately reduce the funding available for community projects and essential public services and increase the costs absorbed by trade and industry thereby inhibiting badly needed economic growth.

It appears that, as written, the Tentative Order will result in a significant and unprecedented level of regulation and cost without clear scientific basis or environmental benefit. The three main areas of concern in the draft permit are: i.) a far-reaching Bacteria Total Maximum Daily Load ("BTMDL"), ii.) additional requirements for development projects, and iii.) performance standards that unnecessarily expose municipalities to third-party lawsuits

PPCSG understands that the cost to comply with the Bacteria TMDL is estimated to be between $2.6 billion and $4.9 billion for the named watersheds in the region over the 20 year TMDL compliance timeline, of which only 18 years remain. The numeric targets in this TMDL may never be attainable even if government agencies were to spend billions in public resources, thereby increasing the costs of business and trade. PPCSG understand that available technology does not exist to return urbanized watersheds back to pristine, "reference" conditions.

Additionally, the Tentative Order requires that new and re-development projects return site hydrology to pre-development conditions as opposed to pre-project conditions. Returning urban infill projects to conditions that existed under "natural", pre-urban conditions would be a substantial constraint to re-development to the disadvantage of general Plans that seek to use infill development as a way of reducing urban sprawl. Further, the Tentative Order ignores all of the good work invested in the Hydromodification Management Plan developed at a significant cost to the public over the past years between the County and Regional Board staff and apparently seeks to impose a new, one-size-fits-all requirements standard that is unrealistic and without scientific justification. The result of all these changes is that the structures built to mitigate development impacts will need to be bigger and will cost significantly more than under the currently approved program.

PPCSG understands that receiving water limitations language is contrary to the intent of the Federal Clean Water Act, which is to assure municipal agencies will be regulated to a reasonable standard resulting in State and Regional Water Boards having the responsibility to ensure that water quality regulations are applied in a context that results in economic and environmental sustainability. PPCSG further understands that the 21 Co-permittees in our region (the County, 18 cities, Port District, and Airport Authority) already spend close to $120 million a year to comply with current regulations. PPCSG would like to see the Regional Board adopt Permit standards that will be cost neutral in a way that local municipalities will have the flexibility to apply funding to priority areas.

PPCSG is hopeful that the final permit language will result in programs that are rational from both environmental and economic standpoints -regulation within reason- and not impose upon our community the crippling disadvantages of regulation without reason.

Yours sincerely,

Charles Mathews

Charles Mathews, Chair,
Pala Pauma Valley Community Sponsor Group.

Copy: PPCSG members
Gary Strawn, Vice Chairman
Eric Anderson, SD RWQCB
Henry Abarbanel, SD RWQCB
Tomas Morales, SD RWQCB
David Gibson, SD RWQCB
Wayne Chiu, SD RWQCB
California Regional Water Quality Control Board, San Diego Region
9174 Sky Park Court, Suite 100
San Diego California 92123-4340
Stephanie Gaines, DPW Watershed Protection Program (by email)

April 10 and 11, 2013
Item No. 8
Supporting Document No. 5

Julian Community Planning Group

P.O. Box 249, Julian, CA 92036

January 4, 2013

Ms. Stephanie Gaines, Land Use/Environmental Planner
DPW/Watershed Protection Program (M.S. 0326)
5510 Overland Avenue, Suite 410
San Diego CA 921123

Dear Stephanie;

First I want to thank you for meeting with our Planning Group to discuss the reissuance process regarding the region NPDES Permit (MS4 Storm Water) with particular focus on the Total Maximum Daily Load plan (TMDL) and the effects that may have on our community.

After reviewing the documents provided to us, discussing the issue with you, and considerable discussion by our Group, the following statement has been prepared to express the position of the Julian Community Planning Group:

1) As written, the tentative order MS4 will result in a significant, unprecedented and likely unattainable level of regulation and unsustainable cost. The tentative order includes:

A. Far reaching water quality improvements.

B. Performance standards that cannot conceivably be attained.

C. Transferring the state's responsibility of cost to the local agencies, including testing, liability, and enforcement.

D. Ignoring of existing plans developed by other agencies.

E. Requiring the co-permittee to comply with unknown conditions.

The far reaching water quality improvements likely never can be attained, especially in urban developed areas. Will the Regional Water Quality Control Board remove legal conforming residences to obtain pre-development conditions; or require all existing developments to retrofit in order to attain the requested standards?
There are also jurisdictions over which the co-permittee has no authority and therefore can not require compliance. Those include Caltrans, State lands and parks, Federal lands and parks, and Indian Reservations.

2) The San Diego Regional Water Quality Control Board is attempting to pass all cost and responsibility to the co-permittee. Why would any agency accept these liabilities and costs? The County of San Diego has estimated the cost to comply with the Bacteria TMDL alone to be between 2.6 and 4.9 million dollars.

3) The County of San Diego, Cities and SanDag have worked extensively to develop Transportation plans, regional comprehensive plans and general plans that address the concerns shown in the tentative order MS4. The San Diego Regional Water Quality Control Board has ignored this effort in the new proposed regulation.

4) The proposed MS4 permit requires the co-permittees to accept new regulation without knowledge of what they are or their impacts.

5) The requirement of returning all watersheds back to pristine reference level is just not practical nor feasible.

6) The County of San Diego should not require the portion of the County in the Colorado River Basin to comply with San Diego County Water Quality Control Board requirements. The issues and conditions in the Colorado River Basin are not similar to those in the western coastal portion of the County.

Thank you for including our comments in your presentation to the San Diego Region Water Quality Control Board.

Sincerely

Jack D. Shelver

Jack D. Shelver, Chair
Julian Community Planning Group

RAMONA COMMUNITY PLANNING GROUP
15873 HWY 67, RAMONA, CALIFORNIA 92065
Phone: (760)445-8545

December 14, 2012

Mr. Rich Crompton, Director
County of San Diego Department of Public Works
5510 Overland Ave, Ste 410
San Diego, CA 92123

Dear Mr. Crompton,

SUBJECT: Comment – Tentative Order No.R9-2013-0001, Regional MS4 Permit, Place ID: 786088Wchiu

As the Ramona Community Planning Group, a land use advisory group to the County of San Diego for land use issues in Ramona, we feel compelled to provide written comments on the draft San Diego Regional MS4 Permit to ensure that water quality regulations are practical, cost-effective, and scientifically based. While we are not directly regulated by the Regional MS4 Permit, we are concerned that public funds may have to be spent to comply with requirements that are not proven or effective, and that this will ultimately reduce the funding available for community projects and essential public services.

It is vital that the resources required to implement regulations are balanced with other public and environmental programs. For this reason we have joined the County's call to action to protect water quality while controlling the mounting and unsubstantiated costs of increased regulation on local governments, business and industry. As written, the Tentative Order will result in a significant and unprecedented level of regulation and cost without clear scientific basis or environmental benefit. The three main areas of concern in the draft permit are: 1) a far-reaching Bacteria Total Maximum Daily Load (TMDL), 2) additional requirements for development projects, and 3) performance standards that unnecessarily expose municipalities to third-party lawsuits. These requirements needlessly increase costs for regulated parties and may further constrain development in the region.

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Tentative Order No.R9-2013-0001 **December 14, 2012**

Finally, the draft permit includes performance standards that should be amended so that regulated municipalities are not unnecessarily exposed to third-party litigation. This Permit's receiving water limitations language is contrary to the intent of the federal Clean Water Act, which is to assure municipal agencies will be regulated to a reasonable standard. The State and Regional Water Boards have the discretion and a responsibility to ensure that water quality regulations are applied in a context that results in economic and environmental sustainability. It is imperative to reduce the threat of litigation when a municipality is engaged in a good faith effort to comply. The current receiving water provisions do not serve the environment, the public or the permittees. Public funds should be used to implement comprehensive programs that are proactive and adaptive to promote clean water goals.

Local government must have the flexibility to make policy decisions for the good of our residents. The 21 Copermittees in our region (the County, 18 cities, Port District, and Airport Authority) already spend close to $120 million a year to comply with current permit requirements. Heal the Bay's own report cards show that water quality at local beaches is improving. We would like to see the Regional Board adopt a permit that will be cost neutral and that local municipalities will have the flexibility to apply funding to priority areas.

We are hopeful that the final permit language will result in programs that make sense from both an environmental and economic standpoint. Please contact Jim Piva if you have questions or would like to discuss our concerns.

Sincerely,

Jim Piva

JIM PIVA, Chair
Ramona Community Planning Group

CC:
Vice Chairman Gary Strawn, San Diego Regional Water Quality Control Board (SD RWQCB)
Board Member Eric Anderson, SD RWQCB
Board Member Henry Abarbanel, SD RWQCB
Board Member Tomas Morales, SD RWQCB
Executive Officer David Gibson, SD RWQCB
Mr. Wayne Chiu, SD RWQCB

EOMPOA

East Otay Mesa Property Owners Association

January 10, 2013

Mr. Wayne Chiu, P.E.
California Regional Water Quality Control Board, San Diego Region
9174 Sky Park Court, Suite 100
San Diego California 92123-4340

SUBJECT: Comment – Tentative Order No.R9-2013-0001, Regional MS4 Permit, Place ID: 786088Wchiu

Dear Mr. Chui:

Everyone, from every edge of the political and economic spectrum, supports improved water quality and environmentally healthy watersheds. The East Otay Mesa Property Owners Association ("EOMPOA") represents the major landowners within the County portion of Otay Mesa, who collectively control more than 2,000 acres at the last large scale industrial development site in the County, also support the California Regional Water Quality Control Board's ("Board") goal of clean water for all users in the region.

However, after listening to public testimony at recent board workshops, and being briefed by co-permittees on the proposed Tentative Order No. R9-2013-0001, Regional MS4 Permit ("Tentative Order"), we are writing to express our significant reservations on the Tentative Order. In brief, our concerns fall into these broad categories:

1. Existing Tentative Order No. R9-2007-0001-- Over the last several years, local governments in San Diego have worked together with your staff and a host of technical experts to develop a Hydromodification Management Plan with reasonable and scientifically based standards. Your Board recently approved that Plan in July 2010. This draft permit ignores all of the good work invested in that Plan, which was developed at a significant cost to the public. The existing Plan has only been in effect for 2 years, with 3 years remaining prior to its expiration. Given the short timeframe that the existing Plan has been in practice, we do not yet have adequate data to determine if the measures within the existing Plan are sufficient. Pursuing a new tentative order at this time has not been scientifically validated and is premature.

2. Legal Issues--The attempt by Board staff to mandate a proposed in lieu fee for watershed and hydrologic unit improvements to projects that have no impacts and therefore, no nexus to the watershed or unit improvements is a direct violation of CEQA, according to multiple city attorneys who spoke to the issue at the December 12, 2012 public hearing. On such a key issue as a CEQA violation, why didn't Board counsel catch this error in advance in the draft permit?

1050 Rosecrans Street, Ste. B
San Diego, CA 92106

619.222.8155 • 619.222.8154

EOMPOA

East Otay Mesa Property Owners Association

3. Clarity on Pre-Development vs. Pre-Project Conditions--We are at a loss to find a definition of the term pre-development conditions in the Tentative Order. For such a significant determination and impact, the lack of clarity on this matter is concerning. In the most current public workshop on December 12, 2012, when a Board member pressed staff on this issue, the staff member was unable to clearly define what the term meant, how far back was a reasonable gauge of pre-development conditions and finally, when pressed about the source of a soils database found on the internet that would be used as a key determinant of compliance, staff was unable to describe the accuracy or source documents for the website's database.

4. Hydromodification--We disagree with the proposed deletion of the current exemption in the hydromodification permit approved by the Board in July of 2010 for projects that discharge stormwater into lined or engineered channels. Speaker after speaker in the public comment period of the December 12th workshop representing co-permittees and other stakeholders, gave numerous examples of the conflict they had with Board staff on this issue. Further, the potential waste of public and private dollars and man-hours spent on already approved permits under the current hydromod scheme would be shocking. And this leads to our next point.

5. Fiscal Impact--Why is there no credible economic analysis on the potential cost to the co-permittees and the public for the implementation of the Tentative Order? For a regulator, or staff, to propose such broad and sweeping changes to public policy, without any consequence to the cost of their grand ideal, is irresponsible.

6. Coordination with neighboring regional boards and publication of previous similar experiences--According to public testimony at the December 12th workshop, the neighboring regional water boards in North Orange County and the Inland Empire have already dealt with several of the issues contemplated in the San Diego Board's Tentative Order. Specific examples include pre-development vs. pre-project conditions. Why hasn't the experience of the neighboring boards on these critical issues been shared with the public so our decision could benefit from their experience?

SANDAG estimates that the industrial development of the East Otay Mesa sub-region can produce up to 42,000 well-paying jobs for unemployed San Diegans by 2020. When the total cost of environmental compliance from local, state and federal agencies is placed upon the backs of landowners in East Otay and other parts of our region with other habitat and environmental mandates, the financial return on economic development will simply not pencil out. Proposed projects will not develop, jobs will not be created, economies will not grow and the dream of an emerging economy will die hard. The cost of doing business in California has already pushed many businesses and developers out of the state and disincentive developers further would be a catastrophic loss to California.

1050 Rosecrans Street, Ste. B
San Diego, CA 92106

619.222.8155 • 619.222.8154

EOMPOA

East Otay Mesa Property Owners Association

If implemented as written, this Tentative Order, and the actions of the Board, will further degrade San Diego's economy. We will have an economy based on sand and suntan oil, with a lower income workforce to match, instead of a healthy and diverse economic base with well-paying jobs for all San Diegans.

We urge the Board to delay implementation of the Proposed Order and revisit the untimely, unfunded mandate, poorly drafted terminology, the lack of key definitions, the apparent CEQA violations and unjust burden on industry and the economy. The Tentative Order is not ready for implementation and should not be considered until data from the existing 2010 Plan is fully understood. It would be a public travesty and irresponsible act by the Board to enact the Tentative Order in its current form at this premature stage.

Sincerely,

Judd Halenza, Vice President
EOMPOA

cc: Assemblymember Ben Hueso
Supervisor Greg Cox
Richard Crompton, County of San Diego
Stephanie Gaines, County of San Diego

January 11, 2013

Via e-mail to wchiu@waterboards.ca.gov
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

RE: Comments from Environmental Groups on Tentative Order Number: R9-2013-0001

Dear Mr. Chiu:

San Diego Coastkeeper, Orange County Coastkeeper, Inland Empire Waterkeeper, Environmental Health Coalition, Surfrider Foundation—San Diego County Chapter, Surfrider Foundation—South Orange County Chapter, Laguna Bluebelt Coalition, South Laguna Civic Association, and Preserve Wild Santee (the "Environmental Groups") respectfully submit the following comments on the draft San Diego Regional Municipal Separate Storm Sewer System permit, Tentative Order No. R9-2013-0001 ("Draft Permit").

BACKGROUND

Urban runoff is the San Diego region's most urgent pollution problem. Arguably, it is the most difficult to solve. In a region known for its beaches and strong tourism economy, polluted runoff keeps people out of the water and off the beaches for at least 72 hours after a rain event. Even in dry weather, our urban drool from residents and businesses overwatering lawns becomes a major pollution source.

The San Diego region Copermittees cannot solve this problem alone. It will take municipalities partnering with businesses, environmental groups, planning groups, fishing clubs, and even the local Parent-Teacher Association for us to tackle these pollution issues and restore our waters to a healthy state where they support all designated beneficial uses. Because we can only solve our urban runoff problem with help and buy-in from municipalities, businesses and residents working together, this Permit must foster a watershed-based planning process that involves the whole community in achieving a healthier watershed.

COMMENTS

I. THE PERMIT MUST IMPROVE THE WATER QUALITY IMPROVEMENT PLAN DEVELOPMENT PROCESS.

The Draft Permit takes a unique approach to permitting by focusing on Water Quality Improvement Plans. Other than setting some baseline requirements related to development and monitoring, the Draft Permit basically requires the Copermittees to write their own watershed-based permits by directing them to create Water Quality Improvement Plans.

This approach has the potential to lead to significant improvements in water quality while allowing Copermittees to focus on spending stormwater funds efficiently and effectively. However, without certain safeguards, this approach could stall water quality improvements, or in a worst case scenario, lead to backsliding in water quality. To ensure the Water Quality Improvement Plans become effective *de facto* permits, the Regional Board must make the following changes to the Draft Permit.

A. The Permit must require robust stakeholder participation throughout the entire Water Quality Improvement Planning process.

Robust stakeholder involvement is key to successful Water Quality Improvement Planning. First, meaningful stakeholder involvement throughout the planning process can ensure stakeholder buy-in to the process and help develop a well-vetted plan. Environmental groups and other stakeholders have key information, data, knowledge, and resources that can assist Copermittees in developing a robust Water Quality Improvement Plan.

Second, while Copermittees may have good intentions about achieving water quality improvements, they are also faced with significant other pressures and dwindling budgets. The Regional Board is essentially placing the Copermittees in an untenable conflict that promotes marginal, and less expensive, water quality improvements rather than designing and implementing a comprehensive plan that rises to the challenges presented by this complex issue. While the current stormwater professionals working for the Copermittees would likely love to see their programs be granted robust budgets, they will undoubtedly receive pressure from city council members, mayors, city managers, and supervisors to reduce costs of the stormwater programs to the minimum amount necessary to meet permit requirements. To best support these stormwater professionals, stakeholders and Regional Board staff members must be involved throughout the planning process to provide a backstop and an opposing pressure to those political and economic pressures the stormwater staff will face.

1. Early, consistent input from knowledgeable stakeholders is key to developing well-informed and successful Water Quality Improvement Plans.

Meaningful stakeholder involvement throughout the planning process can ensure stakeholder buy-in to the process and help develop a well-vetted plan. Environmental stakeholders like lagoon foundations or river park foundations have specific knowledge of watershed challenges and will likely be key partners in seeing true watershed improvements. Engaging these groups as partners throughout the process, instead of merely at checkpoints, will ensure their input is considered and incorporated during the planning process, leading to a better end product. Stakeholder groups often have access to different and additional resources than Copermittees to address watershed-based problems, so active partnership between Copermittees and these groups could lead to more funding for watershed activities. Additionally, active participation by key stakeholders will also help streamline the final approval process.

2. **The Draft Permit language allows watershed groups to develop Water Quality Improvement Plans with minimal public participation.**

The Draft Permit only requires minimal stakeholder participation. The Draft Permit requires Copermittees to develop a public participation plan, and "encourages" public participation, but only provides minimal public participation requirements. Specifically, the Draft Permit requires that Copermittees: *(1)* solicit public input as to priority water quality conditions;[1] *(2)* submit priority water quality conditions to the Regional Board to solicit comments for 60 days;[2] *(3)* submit water quality improvement strategies and schedules to the Regional Board to solicit comments for 60 days;[3] and *(4)* submit the entire Water Quality Improvement Plan to the Regional Board for a 30 day public comment period.[4]

The problem with this approach is that, by the time the separate sections of the Water Quality Improvement Plan are subject to public review, much of the "work" of selecting issues, goals and strategies is complete. This means that incorporating feedback or suggestions becomes a more difficult prospect. As this permitting process demonstrated, the final approval process becomes streamlined when stakeholders are involved early and often throughout the permit development process.

Further, the Draft Permit's language "encouraging"[5] public participation is meaningless; Copermittees are free to disregard the suggestion and only allow minimal stakeholder input.

3. **The Draft Permit fails to detail the extent of Regional Board staff participation in developing the Water Quality Improvement Plans.**

Just as involving key stakeholders early and often as Water Quality Improvement Plans are developed will avoid the potential for having to start from scratch on the plans, Regional Board staff participation throughout the Water Quality Improvement Plan process is imperative. The Permit should reflect when and how the Regional Board staff intends to be involved in Water Quality Improvement Plan development. At a minimum, the Regional Board staff should receive monthly updates from watershed groups and should provide formal review of water quality priorities, pollutant sources identified, numeric targets and schedules, strategies and schedules, and monitoring

[1] *See* Tentative Order No. R9-2013-0001 § II.F.1.a.(1)(a) at 109.
[2] *See* Tentative Order No. R9-2013-0001 § II.F.1.a.(1)(c) at 109.
[3] *See* Tentative Order No. R9-2013-0001 § II.F.1.a.(2)(c) at 110.
[4] *See* Tentative Order No. R9-2013-0001 § II.F.1.b.(1) at 110.
[5] *See* Tentative Order No. R9-2013-0001 § II.F.1.a.(1)(b), (2)(a) at 109.

and assessment plans as they are developed. Ideally, the Regional Board should be part of the Water Quality Improvement Plan development team through the Stakeholder Advisory Group.

4. **The Permit should require that Copermittees develop Water Quality Improvement Plans in conjunction with regional board staff and a Stakeholder Advisory Group.**

To address the current shortfalls in the Water Quality Improvement Planning process related to stakeholder and regional board staff input, the Permit should be changed to require a Water Quality Improvement Plan development team, which includes a Stakeholder Advisory Group. The development team should consist of one or more representatives from each Copermittee in the watershed, a regional board staff member, and the Stakeholder Advisory Group, consisting of at least one representative of an environmental group familiar with the watershed, and at least one non-Copermittee representative with engineering, hydrology, geology or other specialized knowledge to assist in selecting effective strategies for the watershed. The regional board could select the non-Copermittee members of the development team based on an application process.

Adding an independent environmental representative and scientist to the development team provides legitimacy to the Water Quality Improvement Plan development process. At the same time, it provides important stakeholder input while keeping the process streamlined to avoid delays that would be caused by requiring multiple lengthy public comment periods (which is another way to add legitimacy and oversight).

5. **The Permit must require Copermittees within each Watershed Management Area to create a schedule for developing Water Quality Improvement Plans that reflects points for stakeholder input.**

The Draft Permit requires Copermittees to establish a public participation plan for its Water Quality Improvement Plan development process.[6] However, the Permit could better encourage robust public participation if it required Copermittees to create a schedule for Water Quality Improvement Plan development and public input.

This process of establishing a schedule ahead of time becomes critical for volunteer-based groups or planning groups that meet infrequently. Some planning groups or watershed-based groups only meet once a month. Without prior notice of public input points, key stakeholders may miss the opportunity to submit public comments based on their meeting frequency.

B. Formal review periods for the Water Quality Improvement Plans should occur after identifying priorities, then after strategies, then after goals and assessment methods.

The Water Quality Improvement Plan development process would work better if the development teams identified strategies to improve water quality, and received formal feedback on those strategies, before the goals are finalized. Furthermore, because most Copermittees span more than

[6] *See* Tentative Order No. R9-2013-0001 § II.F.1.a. at 109.

one watershed, Copermittees will likely need an internal review period to examine all jurisdictional activities to determine how many activities are feasible to perform within each watershed. Therefore, the Permit should take these delays into consideration as the Water Quality Improvement Plan development process is adjusted.

C. The Water Quality Improvement Plans should be developed consecutively, starting with the "worst" watershed, instead of concurrently.

To facilitate effective and efficient Water Quality Improvement Planning, and to ensure robust stakeholder participation and Regional Board staff review of the plans, the Permit should stagger the preparation of Water Quality Improvement Plans. For groups such as San Diego Coastkeeper, which will be reviewing all ten Water Quality Improvement Plans for San Diego County, the prospect of reviewing all ten plans during a 30-day comment period is untenable. San Diego Coastkeeper cannot effectively comment on ten Water Quality Improvement Plans in such a short period of time, particularly if Coastkeeper is not actively involved in the plan development process. Without an adequate time to review and opportunity to comment on the plans, the process invites groups either to oppose the plans in order to gain more time, or else the plans go unreviewed and the watershed is deprived of the benefit of public comments from groups like Coastkeeper.

Not only would consecutive Water Quality Improvement Plan development ensure better public participation, but it would ensure that later plans were completed faster as each subsequent plan can learn from, and be streamlined because of, the plan developed before. At the very least, the Regional Board should ensure that the comment periods for each phase of each Water Quality Improvement Plan are not concurrent in order to ensure robust public participation.

D. The Water Quality Improvement Plans Must Detail Specific Activities Each Copermittee will Undertake to Achieve the Water Quality Improvement Plan Goals.

The Draft Permit requires the Copermittees within a watershed to identify activities that "may"[7] be undertaken by one or more Copermittees during the permit cycle to meet watershed goals. While watershed-based goals and activities may be ideal for the watershed itself, this approach ignores the reality of how activities are actually accomplished and paid for—at the jurisdictional level.

In an ideal world, each Copermittee within a watershed would expend its fair share of effort and resources to reach the watershed goals. But with limited funding and many Copermittees facing costs to comply with Bacteria TMDL requirements, it becomes a real possibility that the burdens of achieving water quality improvement within a watershed will fall to only one or two Copermittees. Or even worse, there is the possibility that all Copermittees within a watershed may focus on their "other" watersheds, leaving a particular watershed "orphaned."

To prevent this situation, and to ensure that each Copermittee's' contribution to achieving water quality improvements in a watershed is clearly laid out, the Water Quality Improvement Plan must include a detailed list of activities and the jurisdictions that will perform them. This list must then

[7] *See* Tentative Order No. R9-2013-0001 § II.B.3.a.1 at 24.

be approved by the Regional Board, after a public hearing, to become enforceable requirements of the Permit.

An alternative option would be for the Permit to require approval, after public review and comment, of each Copermittee's jurisdictional plan. Either approach gives both the jurisdictions and stakeholders the enforceable commitments each Copermittee will undertake to achieve "compliance" with the Permit. While this approach is not the "safe harbor" that come Copermittees seek, it does provide needed clarity on what Copermittees must do to be in compliance with the Permit.

E. The Permit Should Require Interim and Final Numeric Targets and Schedules Based on Applicable Water Quality Standards.

The Draft Permit states that Copermittees must develop and incorporate interim and final numeric targets into their Water Quality Improvement Plans.[8] The permit should direct Copermittees that final targets must be compliance with applicable water quality standards. Interim targets should reflect incremental, yet demonstrable, progress towards improving water quality. Interim targets will allow the Copermittees, the Regional Board, and the public to fully assess Copermittees' progress towards compliance with final targets.

F. Each Copermittee Should Be Held Accountable For Achieving Watershed Numeric Targets.

During the focused meeting process, some Copermittees indicated that they intended to focus jurisdictional program efforts on one watershed and effectively ignore water quality priorities in other watersheds that are also within its jurisdiction. While this approach may be consistent with jurisdictions focusing resources where they can have the most impact, it also presents the potential that watershed priorities will be "orphaned" or that one jurisdiction will carry the primary or sole burden of implementing water quality improvement strategies within the watershed.

In order to help identify this problem, the Water Quality Improvement Plan schedules for implementing water quality improvement strategies must indicate which jurisdiction(s) is responsible for each strategy and cross-reference the section and page in the jurisdictional plan where each Copermittee commits to implementing the strategy.[9]

To avoid this potential problem and ensure that each jurisdiction remains actively involved in ensuring that each watershed within its jurisdiction achieves its interim and numeric targets, the Permit should reflect that each jurisdiction will be held accountable for achieving the watershed numeric targets.[10] Further, the Permit should specify that the Regional Board will reject any Water Quality Improvement Plan including orphaned priorities.[11]

[8] *See* Tentative Order No. R9-2013-0001 § II.B.2.b at 20.
[9] *See* Tentative Order No. R9-2013-0001 § II.B.3.b(1) at 25.
[10] *See* Tentative Order No. R9-2013-0001 § II.B.2.e at 23.
[11] *See* Tentative Order No. R9-2013-0001 § II.F.1 at 109.

These proposed changes are consistent with the Draft Permit's special study requirements. The Draft Permit requires Copermittees to implement at least three special studies within each Watershed Management Area, and the special studies require some form of participation by all Copermittees within the Watershed Management Area.[12] This requirement demonstrates the Regional Board's commitment to avoiding "orphaned" water quality priorities or having the primary responsibility for watershed strategy implementation fall to only Copermittee.

G. The Water Quality Improvement Plans Must Solicit and Include Alternative Compliance Options that Copermittees May Allow Priority Development Projects to Utilize According to provision E.3.c.(3).

The Draft Permit contains development provisions that Copermittees must incorporate into their jurisdictional plans. While some complain that these baseline requirements are "one size fits all," the Draft Permit properly provides "off-ramps" and alternative compliance methods where compliance is infeasible, or in some cases when greater water quality benefits can be achieved. Alternative compliance methods include off-site mitigation and in-lieu fee mitigation schemes, within the Copermittee's discretion.

1. **The Water Quality Improvement Plans must solicit and include alternative compliance options that Copermittees may allow priority development projects to utilize according to provision E.3.c.(3).**

The Draft Permit fails to detail how and when off-site mitigation projects are identified or how in-lieu fee programs might work. Because retrofit or stream rehabilitation or enhancement projects can carry a hefty price tag, there is a great risk that these projects may not be completed unless developers and Copermittees from throughout the watershed contribute funding. In order to make these projects a reality, they should be identified during the Water Quality Improvement Plan development process and be available as a "menu" of approved mitigation options for developers and Copermittees to choose from.

2. **The Draft Permit must revise the alternative in-lieu compliance process to ensure that projects are completed.**

The Draft Permit allows Copermittees to develop an alternative compliance in-lieu fee option either individually or with other Copermittees. While the Draft Permit specifies that the "alternative compliance projects must be constructed… no later than 4 years after the certificate of occupancy is granted for the first Priority Development Project that contributed funds toward construction of the offsite alternative compliance project…,"[13] the Draft Permit fails to detail exactly who is responsible for ensuring that the alternative compliance project is completed. The Draft Permit should specify that the Copermittee that approves that alternative compliance project is ultimately responsible for completing the project within four years and failure to complete to project in four years is a permit violation. This will incentivize the Copermittees to require proper bonding and assurances from developers to guarantee that the alternative compliance project is completed.

[12] *See* Tentative Order No. R9-2013-0001 § II.D.3.a. at 54.
[13] *See* Tentative Order No. R9-2013-0001 § II.E.3.c(3)(ii)[b] at 85.

H. The Permit Must Add a Step Where the Public and Regional Board Review All Watershed Activities and Water Quality Improvement Plans to Avoid "Orphaned" Watersheds.

Because the Water Quality Improvement Plans allow jurisdictions to prioritize how and where they choose to spend their stormwater funding, there is a real danger of a watershed being "orphaned" by jurisdictions that all chose to spend their efforts in adjacent watersheds. To avoid orphaned watersheds, the Permit must add a step where all watershed plans and jurisdictional activities can be reviewed together—before Water Quality Improvement Plans and jurisdictional plans are finalized. This will allow regional board staff and the stakeholders to do a county-wide review of all watersheds to ensure that no watershed is abandoned.

One way to easily display this information visually is to require Copermittees to create a matrix by watershed of all jurisdictional activities. This way, the regional board and stakeholders can evaluate and prevent orphaned watersheds.

I. The Water Quality Improvement Plans Must Be Approved at a Public Hearing.

California law requires the Regional Board hold a public hearing before adopting any water quality control plan.[14] Water Quality Improvement Plans qualify as "water quality control plans" and therefore are subject to public hearing requirements.[15] The criteria to be considered a "water quality control plan" subject to a public hearing are that the plan: *(1)* is created for a specific area or region; *(2)* protects the beneficial uses of waters; *(3)* sets limits to protect beneficial uses; *(4)* includes an implementation program designed to meet water quality objectives.[16] The Water Quality Improvement Plans meet all the criteria of a water quality control plan.[17] Therefore, the permit must require, not merely allow, public hearings for Water Quality Improvement Plans.[18]

J. The Annual Reporting Must Reflect Activities That Each Copermittee Undertakes to Achieve Water Quality Improvements in Each Watershed.

In addition to establishing in the Water Quality Improvement Plans exactly what activities each jurisdiction plans to undertake in order to see improvements in the watershed, the annual reporting process must reflect whether or not those activities were completed and whether or not they were successful. This analysis is critical to the adaptive management process. If water quality within a watershed fails to improve to target levels, Copermittees, the Regional Board, and stakeholders must know whether that was because the strategies were poorly selected or not implemented.

The Annual Report form contained in Appendix D fails to require enough information from the Copermittees to determine whether or not they successfully completed all committed activities in

[14] *See* Cal. Water Code § 13244.
[15] *See* Cal. Water Code § 13050(j).
[16] *See id.*
[17] *See* Tentative Order No. R9-2013-0001 §§ II. B.1., B.2(a) & (d), B.3 at 17-25.
[18] *See* Tentative Order No. R9-2013-0001 § II. F.1. at 109.

each watershed. Indeed, thorough reporting is beneficial for Copermittees to justify their budgets and programs to their city council, mayor, manager, or supervisors. The environmental community and the Copermittees stand hand-in hand asking for a more robust reporting requirement.

K. The Adaptive Management Process Should Include a Formal Public Participation Process.

The Draft Permit recognizes that public participation is an important element in the adaptive management process.[19] However, the Draft Permit fails to detail how and when the Copermittees are to solicit recommendations for modifications to the Water Quality Improvement Plans or Jurisdictional Runoff Management Plans as part of a public participation process.

For Water Quality Improvement Plans, the permit should include a process during which the Copermittees in each Watershed Management Area prepare a progress report, akin to a Report of Waste Discharge, that details the water quality improvement strategies completed or in progress, along with water quality data (from the Copermittees and third parties) and an assessment of progress towards interim and final numeric targets. Before revising the Water Quality Improvement Plan, the Copermittees must solicit comments from the Regional Board and public. The revised Water Quality Improvement Plan should be subject to public comment and a public hearing.

The Draft Permit requires Copermittees to create a means for the "public to participate in updating the highest priority water quality conditions, numeric goals, and water quality improvement strategies in the Water Quality Improvement Plan."[20] Part of the adaptive management process for Jurisdictional Runoff Management Programs requires Copermittees to take into account recommendations they receive.[21] To involve the public in the adaptive management process for jurisdictional runoff management programs, the Permit should explicitly require each Copermittee to solicit public comment on its initial findings and proposed changes before changes to the jurisdictional runoff management program is finalized.

II. THE DRAFT PERMIT PROPERLY REQUIRES WATER QUALITY BASED COMPLIANCE WITH BACTERIA TOTAL MAXIMUM DAILY LOADS BUT SHOULD REQUIRE PERIODIC MONITORING AND SET INTERIM GOALS.

A. The Permit Should Include Mass Limits In Order to Comply with the Bacteria Total Maximum Daily Loads.

The Total Maximum Daily Loads for Indicator Bacteria, Baby Beach in Dana Point Harbor and Shelter Island Shoreline Park in San Diego Bay (adopted June 11, 2008) and the Total Maximum Daily Loads for Indicator Bacteria, Project I—Twenty Beaches and Creeks in the San Diego Region (adopted February 10, 2010) include both effluent limitations and wasteload allocations. However,

[19] *See* Tentative Order No. R9-2013-0001 § II.B.5.b.(7) at 27.
[20] *See* Tentative Order No. R9-2013-0001 § II.E.7.b.(1) at 106.
[21] *See* Tentative Order No. R9-2013-0001 § II.B.5.b.(6)-(7) at 27.

the Draft Permit excludes the wasteload allocations. These wasteload allocations are a requirement of a valid Total Maximum Daily Load (TMDL),[22] and therefore should be included in the Permit.

However, the Regional Board should not allow Copermittees to demonstrate compliance with the TMDL solely based on mass loading numbers.[23] As the TMDL reflects, the mass loading numbers are conservative and based on a worst-case-scenario year of rain.[24] This means that loading will likely vary year to year as rainfall varies.[25]

The Copermittees are asking the Regional Board to incorporate "BMP-based compliance" as an alternative to having to meet the numeric water quality based effluent limits currently in the Permit. But the TMDL document recognizes that "Meeting the concentration based TMDLs in the receiving waters will be used to determine compliance with the TMDLs."[26] Further, since "dry weather TMDLs are assigned entirely to the Municipal MS4s as W[aste] L[oad] A[llocation]s," meeting the numeric water quality based objective is an appropriate measure of Copermittee compliance with the Bacteria TMDL.[27]

B. The Permit should require interim goals and monitoring for the Bacteria TMDL.

In order to assess whether or not the Copermittees are progressing toward Bacteria TMDL goals, the Permit must incorporate interim goals and monitoring for the Bacteria TMDL. Regardless of the interim goals stated in the TMDL itself, the Permit must require periodic monitoring and evaluation of progress toward achieving TMDL goals. It is particularly important that the Permit include interim goals for wet-weather bacteria exceedances, since the wet-weather compliance date is well past the Permit term. At the very least, this assessment must take place by the end of the Permit term.

C. The Permit should not allow Copermittees to comply with TMDLs by performing a "reasonable assurance" analysis that a suite of BMPs will reduce bacteria loads.

Some Copermittees are requesting that the Regional Board allow them to demonstrate compliance with the Bacteria TMDL requirements by developing a suite of BMPs that should, according to the Copermittees' modeling, reduce bacteria loads to comply with the Bacteria TMDL. However, under the law, all permit terms must be consistent with the assumptions and requirements of Waste Load Allocations established in TMDLs.[28] The Twenty Beaches TMDL does not contemplate a

[22] *See* 40 C.F.R. 130.2(i).
[23] "The mass-load based TMDLs were calculated under critical conditions consisting of flows generated during a critical wet year and estimation of existing and allowable loads at a critical location." Twenty Beaches TMDL, Resolution No. R9-2010-0001, Attachment A. February 10, 2010.
[24] "The flow from the critical wet year is a "worst case" annual wet weather flow and loading scenario. Actual annual wet weather flow and loading will vary from year to year." Twenty Beaches TMDL, Resolution No. R9-2010-0001, Attachment A. February 10, 2010.
[25] "The mass-load based TMDLs calculated at the critical location are dependent on the flow, which can vary from year to year, but the numeric targets will not vary." Twenty Beaches TMDL, Resolution No. R9-2010-0001, Attachment A. February 10, 2010.
[26] Twenty Beaches TMDL, Resolution No. R9-2010-0001, Attachment A at A19, February 10, 2010.
[27] Twenty Beaches TMDL, Resolution No. R9-2010-0001, Attachment A at A53, February 10, 2010.
[28] *See* 40 C.F.R. § 122.44(d)(1)(vii)(B).

"reasonable assurance" analysis, but rather specifies that "Meeting the concentration based TMDLs in the receiving waters will be used to determine compliance with the TMDLs."[29] To comply with the law, the Permit must require that each Copermittee must demonstrate compliance with all interim and final goals set forth in the TMDL. Any compliance option that excuses any Copermittee from compliance with interim or final goals violates that law.

Further, the Regional Board should not look to the Los Angeles Regional Board for ideas on changes to this permit. The Los Angeles region stormwater permit's safe harbor provisions violate federal anti-backsliding requirements; violate state and federal antidegradation requirements and violate requirements for incorporation of TMDLs into permits. The Los Angeles Waterkeeper is legally challenging the Los Angeles region stormwater permit because of the safe harbor provisions in the permit. The Environmental Groups urge the San Diego Regional Board to avoid the pitfalls of the Los Angeles stormwater permit and to maintain the current approach to receiving water limitations and TMDLs incorporated in the Draft Permit.

III. MONITORING AND ASSESSMENT REQUIREMENTS MUST ENSURE THAT COPERMITTEES IDENTIFY PROGRESS TOWARDS WATERSHED GOALS AND TRACK THE HEALTH OF THE WATERSHEDS.

The Draft Permit sets out a comprehensive system of monitoring and assessment procedures that will ensure Copermittees are able to detect and eliminate illicit discharges and connections. The Regional Board must recognize the importance of extensive monitoring in making continued progress towards clean waters in the San Diego Region. If the Permit does not include enough monitoring, the watersheds in Region 9 will be in danger of increased pollutant discharges that Copermittees will not be able to detect.

A. The Permit Should Specify that Copermittees Must Accept Quality-Controlled Data Received from Third Parties.

The Draft Permit and the Regional Board staff have indicated that Copermittees should use third party water quality monitoring data to assist in assessing our watersheds and the Copermittees' progress towards achieving water quality standards.[30] However, some Copermittees are reluctant to use data collected by third parties. One Copermittee articulated its distaste for third party-collected data by saying that third party data is not as rigorous as data collected by the Copermittees and therefore trying to compare third party data to Copermittee data is "like comparing apples and oranges."

The Permit should specify that Copermittees must use third party data that meets particular criteria. These criteria should require third parties to maintain and make available for review the following information: *(1)* a quality assurance project plan; *(2)* a list of methods used; and *(3)* standard operating procedures. In the alternative, the Permit should specify that data is "appropriate" if it has been collected using the latest Standard Methods of Water and Waste Water Analysis.

[29] Twenty Beaches TMDL, Resolution No. R9-2010-0001, Attachment A at A19, February 10, 2010.
[30] *See* Tentative Order No. R9-2013-0001 § II.B.2 at 20.

Additionally, the Draft Permit's "Assessment Requirements" should specify that Copermittees must evaluate not just "the data collected pursuant to Provisions D.1, D.2, and D.3" to identify causes of exceedances, but must also solicit and evaluate third party data that meets that permit criteria to identify causes of water quality problems.

B. The Permit Should Allow Third Party Participations in Special Studies.

The Draft Permit requires Copermittees to implement at least three special studies within each Watershed Management Area and at least two regional special studies for the San Diego Region.[31] These studies are important to ensure that the Copermittees work together to identify sources of high priority pollutants and assess the efficiency of various best management practices within a watershed to achieve watershed goals. The Draft Permit's approach properly requires each Copermittee within a watershed to participate in each of the watershed's special studies. However, the Permit should also specifically allow Copermittees to partner with environmental groups or other third parties to complete regional special studies.

For example, Copermittees within the Peñasquitos watershed group might partner with San Diego Coastkeeper to complete a pilot project combining GPS-based water quality data and volunteer patrols to track pollution up a watershed to identify a pollution problem's source. Or perhaps Copermittees within the Carlsbad watershed might work with the Building Industry Alliance and the Escondido Creek Watershed Conservancy to create a pilot Escondido Creek restoration project and assess the feasibility of using such restoration as a regional mitigation project for development within the Carlsbad watershed.

By encouraging the Copermittees to partner with third parties to complete special studies, the Permit could foster watershed-based collaboration and leverage efficiencies and additional resources that third parties bring to the table.

CONCLUSION

In conclusion, the Environmental Groups appreciate the effort the Regional Board and its staff have put towards developing an MS4 permit for the San Diego Region which effectively and efficiently addresses the environmental concerns of the watershed in a transparent and comprehensive approach. We look forward to a constructive relationship with the Regional Board and hope our comments will assist in the development of a thoughtful and progressive permit.

Respectfully submitted,

Jill Witkowski San Diego Coastkeeper	Colin Kelly Orange County Coastkeeper
Garry Brown Inland Empire Waterkeeper	Nicole Capretz Environmental Health Coalition

[31] *See* Tentative Order R9-2013-0001 §§ II.D.3.a.(1)-(2) at 54.

April 10 and 11, 2013
Item No. 8
Supporting Document No. 5

Julia Chunn-Heer
Surfrider Foundation,
San Diego Chapter

Doug Reese
Surfrider Foundation,
South Orange County Chapter

Van Collinsworth
Preserve Wild Santee

Michael Beanan
South Laguna Civic Association
Laguna Bluebelt Coalition

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

TENTATIVE
ORDER NO. R9-2013-0001
NPDES NO. CAS0109266

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT AND WASTE DISCHARGE REQUIREMENTS FOR DISCHARGES FROM THE MUNICIPAL SEPARATE STORM SEWER SYSTEMS (MS4s) DRAINING THE WATERSHEDS WITHIN THE SAN DIEGO REGION

The San Diego County Copermittees in Table 1a are subject to waste discharge requirements set forth in this Order.

Table 1a. San Diego County Copermittees

City of Carlsbad	City of Oceanside
City of Chula Vista	City of Poway
City of Coronado	City of San Diego
City of Del Mar	City of San Marcos
City of El Cajon	City of Santee
City of Encinitas	City of Solana Beach
City of Escondido	City of Vista
City of Imperial Beach	County of San Diego
City of La Mesa	San Diego County Regional Airport Authority
City of Lemon Grove	San Diego Unified Port District
City of National City	

After the San Diego Water Board receives and considers the Orange County Copermittees' Report of Waste Discharge and makes any necessary changes to the Order, the Orange County Copermittees in Table 1b will become subject to waste discharge requirements set forth in this Order after expiration of Order No. R9-2009-0002, NPDES No. CAS0108740 on or after December 16, 2014.

Table 1b. Orange County Copermittees

City of Aliso Viejo	City of Rancho Santa Margarita
City of Dana Point	City of San Clemente
City of Laguna Beach	City of San Juan Capistrano
City of Laguna Hills	City of Laguna Woods
City of Laguna Niguel	County of Orange
City of Lake Forest	Orange County Flood Control District
City of Mission Viejo	

After the San Diego Water Board receives and considers the Riverside County Copermittees' Report of Waste Discharge and makes any necessary changes to this Order, the Riverside County Copermittees in Table 1c will become subject to waste discharge requirements set forth in this Order after expiration of Order No. R9-2010-0016, NPDES No. CAS0108766 on or after November 10, 2015.

Table 1c. Riverside County Copermittees

City of Murrieta	County of Riverside
City of Temecula	Riverside County Flood Control and Water Conservation District
City of Wildomar	

The Orange County Copermittees and Riverside County Copermittees may become subject to the requirements of this Order at a date earlier than the expiration date of their current Orders subject to the conditions described in Provision F.6 of this Order if the Copermittees in the respective county receive a notification of coverage from the San Diego Water Board.

The term Copermittee in this Order refers to any San Diego County, Orange County, or Riverside County Copermittee covered under this Order, unless specified otherwise.

This Order provides permit coverage for the Copermittee discharges described in Table 2.

Table 2. Discharge Locations and Receiving Waters

Discharge Points	Locations throughout San Diego Region
Discharge Description	Municipal Separate Storm Sewer System (MS4) Discharges
Receiving Waters	Inland Surface Waters, Enclosed Bays and Estuaries, and Coastal Ocean Waters of the San Diego Region

Table 3. Administrative Information

This Order was adopted by the San Diego Water Board on:	**Month Day, 2013**
This Order will become effective on:	**Month Day, 2013**
This Order will expire on:	**Month Day, 2018**
The Copermittees must file a Report of Waste Discharge in accordance with Title 23, California Code of Regulations, as application for issuance of new waste discharge requirements no later than 180 days in advance of the Order expiration date.	

I, David W. Gibson, Executive Officer, do hereby certify that this Order with all attachments is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Diego Region, on Month Day, 2013.

TENTATIVE

David W. Gibson
Executive Officer

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ATTACHMENTS

I. FINDINGS

The California Regional Water Quality Control Board, San Diego Region (San Diego Water Board), finds that:

JURISDICTION

1. **MS4 Ownership or Operation.** Each of the Copermittees owns or operates an MS4, through which it discharges storm water and non-storm water into waters of the U.S. within the San Diego Region. These MS4s fall into one or more of the following categories: (1) a medium or large MS4 that services a population of greater than 100,000 or 250,000 respectively; or (2) a small MS4 that is "interrelated" to a medium or large MS4; or (3) an MS4 which contributes to a violation of a water quality standard; or (4) an MS4 which is a significant contributor of pollutants to waters of the U.S.

2. **Legal and Regulatory Authority.** This Order is issued pursuant to section 402 of the federal Clean Water Act (CWA) and implementing regulations (Code of Federal Regulations [CFR] Title 40, Part 122 [40 CFR 122]) adopted by the United States Environmental Protection Agency (USEPA), and chapter 5.5, division 7 of the California Water Code (CWC) (commencing with section 13370). This Order serves as an NPDES permit for discharges from MS4s to surface waters. This Order also serves as waste discharge requirements (WDRs) pursuant to article 4, chapter 4, division 7 of the CWC (commencing with section 13260).

   The San Diego Water Board has the legal authority to issue a regional MS4 permit pursuant to its authority under CWA section 402(p)(3)(B) and 40 CFR 122.26(a)(1)(v). The USEPA also made it clear that the permitting authority, in this case the San Diego Water Board, has the flexibility to establish system- or region-wide permits (55 Federal Register [FR] 47990, 48039-48042). The regional nature of this Order will ensure consistency of regulation within watersheds and is expected to result in overall cost savings for the Copermittees and San Diego Water Board.

   The federal regulations make it clear that the Copermittees need only comply with permit conditions relating to discharges from the MS4s for which they are operators (40 CFR 122.26(a)(3)(vi)). This Order does not require the Copermittees to manage storm water outside of their jurisdictional boundaries, but rather to work collectively to improve storm water management within watersheds.

3. **CWA NPDES Permit Conditions.** Pursuant to CWA section 402(p)(3)(B), NPDES permits for storm water discharges from MS4s must include requirements to effectively prohibit non-storm water discharges into MS4s, and require controls to reduce the discharge of pollutants in storm water to the maximum extent practicable (MEP), and to require other provisions as the San Diego Water Board determines are appropriate to control such pollutants. This Order prescribes conditions to assure

compliance with the CWA requirements for owners and operators of MS4s to effectively prohibit non-storm water discharges in to the MS4s, and require controls to reduce the discharge of pollutants in storm water from the MS4s to the MEP.

4. **CWA and CWC Monitoring Requirements.** CWA section 308(a) and 40 CFR 122.41(h),(j)-(l) and 122.48 require that NPDES permits must specify monitoring and reporting requirements. Federal regulations applicable to large and medium MS4s also specify additional monitoring and reporting requirements in 40 CFR 122.26(d)(1)(iv)(D), 122.26(d)(1)(v)(B), 122.26(d)(2)(i)(F), 122.26(d)(2)(iii)(D), 122.26(d)(2)(iv)(B)(2) and 122.42(c). CWC section 13383 authorizes the San Diego Water Board to establish monitoring, inspection, entry, reporting and recordkeeping requirements. This Order establishes monitoring and reporting requirements to implement federal and State requirements.

5. **Total Maximum Daily Loads.** CWA section 303(d)(1)(A) requires that "[e]ach state shall identify those waters within its boundaries for which the effluent limitations…are not stringent enough to implement any water quality standard applicable to such waters." The CWA also requires states to establish a priority ranking of impaired water bodies known as Water Quality Limited Segments and to establish Total Maximum Daily Loads (TMDLs) for such waters. This priority list of impaired water bodies is called the Clean Water Act Section 303(d) List of Water Quality Limited Segments, commonly referred to as the 303(d) List. The CWA requires the 303(d) List to be updated every two years.

   TMDLs are numerical calculations of the maximum amount of a pollutant that a water body can assimilate and still meet water quality standards. A TMDL is the sum of the allowable loads of a single pollutant from all contributing point sources (waste load allocations or WLAs) and non-point sources (load allocations or LAs), background contribution, plus a margin of safety. Discharges from MS4s are point source discharges. The federal regulations (40 CFR 122.44(d)(1)(vii)(B)) require that NPDES permits to incorporate water quality based effluent limitations (WQBELs) developed to protect a narrative water quality criterion, a numeric water quality criterion, or both, consistent with the assumptions and requirements of any available WLA for the discharge. Requirements of this Order implement the TMDLs adopted by the San Diego Water Board and approved by USEPA.

6. **Non-Storm Water Discharges.** Pursuant to CWA section 402(p)(3)(B)(ii), this Order requires each Copermittee to effectively prohibit discharges of non-storm water into its MS4. Nevertheless, non-storm water discharges into and from the MS4s continue to be reported to the San Diego Water Board by the Copermittees and other persons. Monitoring conducted by the Copermittees, as well as the 303(d) List, have identified dry weather, non-storm water discharges from the MS4s as a source of pollutants causing or contributing to receiving water quality impairments in the San Diego Region. The federal regulations (40 CFR 122.26(d)(2)(iv)(B)(1)) require the Copermittees to have a program to prevent illicit discharges to the MS4. The federal regulations, however, allow for specific categories of non-storm water discharges or flows to be addressed as illicit discharges only where such discharges

are identified as sources of pollutants to waters of the U.S.

7. **In-Stream Treatment Systems.** Pursuant to federal regulations (40 CFR 131.10(a)), in no case shall a state adopt waste transport or waste assimilation as a designated use for any waters of the U.S. Authorizing the construction of a runoff treatment facility within a water of the U.S., or using the water body itself as a treatment system or for conveyance to a treatment system, would be tantamount to accepting waste assimilation as an appropriate use for that water body. Runoff treatment must occur prior to the discharge of runoff into receiving waters. Treatment control best management practices (BMPs) must not be constructed in waters of the U.S. Construction, operation, and maintenance of a pollution control facility in a water body can negatively impact the physical, chemical, and biological integrity, as well as the beneficial uses, of the water body.

DISCHARGE CHARACTERISTICS AND RUNOFF MANAGEMENT

8. **Point Source Discharges of Pollutants.** Discharges from the MS4s contain waste, as defined in the CWC, and pollutants that adversely affect the quality of the waters of the state. A discharge from an MS4 is a "discharge of pollutants from a point source" into waters of the U.S. as defined in the CWA. Storm water and non-storm water discharges from the MS4s contain pollutants that cause or threaten to cause a violation of surface water quality standards, as outlined in the Water Quality Control Plan for the San Diego Basin (Basin Plan). Storm water and non-storm water discharges from the MS4s are subject to the conditions and requirements established in the Basin Plan for point source discharges.

9. **Potential Beneficial Use Impairment.** The discharge of pollutants and/or increased flows from MS4s may cause or threaten to cause the concentration of pollutants to exceed applicable receiving water quality objectives and impair or threaten to impair designated beneficial uses resulting in a condition of pollution, contamination, or nuisance.

10. **Pollutants Generated by Land Development.** Land development has created and continues to create new sources of non-storm water discharges and pollutants in storm water discharges as human population density increases. This brings higher levels of car emissions, car maintenance wastes, municipal sewage, pesticides, household hazardous wastes, pet wastes, and trash. Pollutants from these sources are dumped or washed off the surface by non-storm water or storm water flows into and from the MS4s. When development converts natural vegetated pervious ground cover to impervious surfaces such as paved highways, streets, rooftops, and parking lots, the natural absorption and infiltration abilities of the land are lost. Therefore, runoff leaving a developed area without BMPs that can maintain pre-development conditions will contain greater pollutant loads and have significantly greater runoff volume, velocity, and peak flow rate than pre-development runoff from the same area.

11. **Runoff Discharges to Receiving Waters.** The MS4s discharge runoff into lakes, drinking water reservoirs, rivers, streams, creeks, bays, estuaries, coastal lagoons, the Pacific Ocean, and tributaries thereto within the eleven hydrologic units comprising the San Diego Region. Historic and current development makes use of natural drainage patterns and features as conveyances for runoff. Rivers, streams and creeks in developed areas used in this manner are part of the Copermittees' MS4s regardless of whether they are natural, anthropogenic, or partially modified features. In these cases, the rivers, streams and creeks in the developed areas of the Copermittees' jurisdictions are both an MS4 and receiving water. Numerous receiving water bodies and water body segments have been designated as impaired by the San Diego Water Board pursuant to CWA section 303(d).

12. **Pollutants in Runoff.** The most common pollutants in runoff discharged from the MS4s include total suspended solids, sediment, pathogens (e.g., bacteria, viruses, protozoa), heavy metals (e.g., cadmium, copper, lead, and zinc), petroleum products and polynuclear aromatic hydrocarbons, synthetic organics (e.g., pesticides, herbicides, and PCBs), nutrients (e.g., nitrogen and phosphorus), oxygen-demanding substances (e.g., decaying vegetation, animal waste), detergents, and trash. As operators of the MS4s, the Copermittees cannot passively receive and discharge pollutants from third parties. By providing free and open access to an MS4 that conveys discharges to waters of the U.S., the operator essentially accepts responsibility for discharges into the MS4 that it does not prohibit or otherwise control. These discharges may cause or contribute to a condition of pollution or a violation of water quality standards.

13. **Human Health and Aquatic Life Impairment.** Pollutants in runoff discharged from the MS4s can threaten and adversely affect human health and aquatic organisms. Adverse responses of organisms to chemicals or physical agents in runoff range from physiological responses such as impaired reproduction or growth anomalies to mortality. Increased volume, velocity, rate, and duration of storm water runoff greatly accelerate the erosion of downstream natural channels. This alters stream channels and habitats and can adversely affect aquatic and terrestrial organisms.

14. **Water Quality Effects.** The Copermittees' water quality monitoring data submitted to date documents persistent exceedances of Basin Plan water quality objectives for runoff-related pollutants at various watershed monitoring stations. Persistent toxicity has also been observed at several watershed monitoring stations. In addition, bioassessment data indicate that the majority of the monitored receiving waters have Poor to Very Poor Index of Biological Integrity (IBI) ratings. These findings indicate that runoff discharges are causing or contributing to water quality impairments, and are a leading cause of such impairments in the San Diego Region. Non-storm water discharges from the MS4s have been shown to contribute significant levels of pollutants and flow in arid, developed Southern California watersheds, and contribute significantly to exceedances of applicable receiving water quality objectives.

15. **Non-Storm Water and Storm Water Discharges.** Non-storm water discharges from the MS4s are not considered storm water discharges and therefore are not subject to the MEP standard of CWA section 402(p)(3)(B)(iii), which is explicitly for "Municipal … *Stormwater Discharges* (emphasis added)" from the MS4s. Pursuant to CWA 402(p)(3)(B)(ii), non-storm water discharges into the MS4s must be effectively prohibited.

16. **Best Management Practices.** Waste and pollutants which are deposited and accumulate in MS4 drainage structures will be discharged from these structures to waters of the U.S. unless they are removed. These discharges may cause or contribute to, or threaten to cause or contribute to, a condition of pollution in receiving waters. For this reason, pollutants in storm water discharges from the MS4s can be and must be effectively reduced in runoff by the application of a combination of pollution prevention, source control, and treatment control BMPs. Pollution prevention is the reduction or elimination of pollutant generation at its source and is the best "first line of defense". Source control BMPs (both structural and non-structural) minimize the contact between pollutants and runoff, therefore keeping pollutants onsite and out of receiving waters. Treatment control BMPs remove pollutants that have been mobilized by storm water or non-storm water flows.

17. **BMP Implementation.** Runoff needs to be addressed during the three major phases of development (planning, construction, and use) in order to reduce the discharge of storm water pollutants to the MEP, effectively prohibit non-storm water discharges, and protect receiving waters. Development which is not guided by water quality planning policies and principles can result in increased pollutant load discharges, flow rates, and flow durations which can negatively affect receiving water beneficial uses. Construction sites without adequate BMP implementation result in sediment runoff rates which greatly exceed natural erosion rates of undisturbed lands, causing siltation and impairment of receiving waters. Existing development can generate substantial pollutant loads which are discharged in runoff to receiving waters. Retrofitting areas of existing development with storm water pollutant control and hydromodification management BMPs is necessary to address storm water discharges from existing development that may cause or contribute to a condition of pollution or a violation of water quality standards.

18. **Long Term Planning and Implementation.** Federal regulations require municipal storm water permits to expire 5 years from adoption, after which the permit must be renewed and reissued. The San Diego Water Board recognizes that the degradation of water quality and impacts to beneficial uses of the waters in the San Diego Region occurred over several decades. The San Diego Water Board further recognizes that a decade or more may be necessary to realize demonstrable improvement to the quality of waters in the Region. This Order includes a long term planning and implementation approach that will require more than a single permit term to complete.

WATER QUALITY STANDARDS

19. **Basin Plan.** The San Diego Water Board adopted the Water Quality Control Plan for the San Diego Basin (Basin Plan) on September 8, 1994 that designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for receiving waters addressed through the plan. The Basin Plan was subsequently approved by the State Water Resources Control Board (State Water Board) on December 13, 1994. Subsequent revisions to the Basin Plan have also been adopted by the San Diego Water Board and approved by the State Water Board. Requirements of this Order implement the Basin Plan.

    The Basin Plan identifies the following existing and potential beneficial uses for inland surface waters in the San Diego Region: Municipal and Domestic Supply (MUN), Agricultural Supply (AGR), Industrial Process Supply (PROC), Industrial Service Supply (IND), Ground Water Recharge (GWR), Contact Water Recreation (REC1), Non-contact Water Recreation (REC2), Warm Freshwater Habitat (WARM), Cold Freshwater Habitat (COLD), Wildlife Habitat (WILD), Rare, Threatened, or Endangered Species (RARE), Freshwater Replenishment (FRSH), Hydropower Generation (POW), and Preservation of Biological Habitats of Special Significance (BIOL). The following additional existing and potential beneficial uses are identified for coastal waters of the San Diego Region: Navigation (NAV), Commercial and Sport Fishing (COMM), Estuarine Habitat (EST), Marine Habitat (MAR), Aquaculture (AQUA), Migration of Aquatic Organisms (MIGR), Spawning, Reproduction, and/or Early Development (SPWN), and Shellfish Harvesting (SHELL).

20. **Ocean Plan.** The State Water Board adopted the Water Quality Control Plan for Ocean Waters of California, California Ocean Plan (Ocean Plan) in 1972 and amended it in 1978, 1983, 1988, 1990, 1997, 2000, and 2005. The State Water Board adopted the latest amendment on April 21, 2005 and it became effective on February 14, 2006. The Ocean Plan is applicable, in its entirety, to point source discharges to the ocean. Requirements of this Order implement the Ocean Plan.

    The Ocean Plan identifies the following beneficial uses of ocean waters of the state to be protected: Industrial water supply; water contact and non-contact recreation, including aesthetic enjoyment; navigation; commercial and sport fishing; mariculture; preservation and enhancement of designated Areas of Special Biological Significance; rare and endangered species; marine habitat; fish spawning and shellfish harvesting

21. **Sediment Quality Control Plan**. On September 16, 2008, the State Water Board adopted the Water Quality Control Plan for Enclosed Bays and Estuaries – Part 1 Sediment Quality (Sediment Quality Control Plan). The Sediment Quality Control Plan became effective on August 25, 2009. The Sediment Quality Control Plan establishes: 1) narrative sediment quality objectives for benthic community protection from exposure to contaminants in sediment and to protect human health,

and 2) a program of implementation using a multiple lines of evidence approach to interpret the narrative sediment quality objectives. Requirements of this Order implement the Sediment Quality Control Plan.

22. **National Toxics Rule and California Toxics Rule.** USEPA adopted the National Toxics Rule (NTR) on December 22, 1992, and later amended it on May 4, 1995 and November 9, 1999. About forty criteria in the NTR applied in California. On May 18, 2000, USEPA adopted the California Toxics Rule (CTR). The CTR promulgated new toxics criteria for California and, in addition, incorporated the previously adopted NTR criteria that were applicable in the state. The CTR was amended on February 13, 2001. These rules contain water quality criteria for priority pollutants.

23. **Antidegradation Policy.** This Order is in conformance with the federal Antidegradation Policy described in 40 CFR 131.12, and State Water Board Resolution No. 68-16, *Statement of Policy with Respect to Maintaining High Quality Waters in California*. Federal regulations at 40 CFR 131.12 require that the State water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy in State Water Board Resolution No. 68-16. State Water Board Resolution No. 68-16 incorporates the federal antidegradation policy where the federal policy applies under federal law. State Water Board Resolution No. 68-16 requires that existing quality of waters be maintained unless degradation is justified based on specific findings. The Basin Plan implements, and incorporates by reference, both the State and federal antidegradation policies.

CONSIDERATIONS UNDER FEDERAL AND STATE LAW

24. **Coastal Zone Act Reauthorization Amendments.** Section 6217(g) of the Coastal Zone Act Reauthorization Amendments of 1990 (CZARA) requires coastal states with approved coastal zone management programs to address non-point source pollution impacting or threatening coastal water quality. CZARA addresses five sources of non-point source pollution: agriculture, silviculture, urban, marinas, and hydromodification. This Order addresses the management measures required for the urban category, with the exception of septic systems. The runoff management programs developed pursuant to this Order fulfills the need for coastal cities to develop a runoff non-point source plan identified in the Non-Point Source Program Strategy and Implementation Plan. The San Diego Water Board addresses septic systems through the administration of other programs.

25. **Endangered Species Act.** This Order does not authorize any act that results in the taking of a threatened or endangered species or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code sections 2050 to 2097) or the Federal Endangered Species Act (16 USC sections 1531 to 1544). This Order requires compliance with receiving water limits, and other requirements to protect the beneficial uses of waters of the State. The Copermittees are responsible for meeting all requirements of the applicable Endangered Species Act.

26. **Report of Waste Discharge Process.** The waste discharge requirements set forth in this Order are based upon the Report of Waste Discharge submitted by the San Diego County Copermittees prior to the expiration of Order No. R9-2007-0001 (NPDES No. CAS0109266). The Orange County and Riverside County Copermittees are not immediately covered by the waste discharge requirements in this Order. The San Diego Water Board understands that each municipality is unique although the Counties share watersheds and geographical boundaries. The Order will continue to use the Report of Waste Discharge process prior to initially making Orange County or Riverside County Copermittees subject to the requirements of this Order.

    The federal regulations (40 CFR 122.21(d)(2)) and CWC section 13376 impose a duty on the Copermittees to reapply for continued coverage through submittal of a Report of Waste Discharge no later than 180 days prior to expiration of a currently effective permit. This requirement is set forth in the Orange County Copermittees' and Riverside County Copermittees' currently effective permits at Provisions K.2.b and K.2.c, respectively. The Orange County Permit, Order No. R9-2009-0002 (NPDES No. CAS0108740) expires on December 16, 2014 and the Riverside County MS4 Permit, Order No. R9-2010-0016 (NPDES No. CAS0108766) expires on November 10, 2015.

    Unless the Orange County or Riverside County Copermittees apply for and receive early coverage under this Order, the Orange County Copermittees' and the Riverside County Copermittees' respective permits will be superseded by this Order upon expiration of their respective permits, subject to any necessary revisions to the requirements of this Order made after the San Diego Water Board considers their respective Reports of Waste Discharge through the public process provided in 40 CFR 124.

27. **Integrated Report and Clean Water Act Section 303(d) List.** The San Diego Water Board and State Water Board submit an Integrated Report to USEPA to comply with the reporting requirements of CWA sections 303(d), 305(b) and 314, which lists the attainment status of water quality standards for water bodies in the San Diego Region. USEPA issued its *Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act* on July 29, 2005, which advocates the use of a five category approach for classifying the attainment status of water quality standards for water bodies in the Integrated Report. Water bodies included in Category 5 in the Integrated Report indicate at least one beneficial use is not being supported or is threatened, and a TMDL is required. Water bodies included in Category 5 in the Integrated Report are placed on the 303(d) List.

    Water bodies with available data and/or information that indicate at least one beneficial use is not being supported or is threatened, but a TMDL is not required, are included in Category 4 in the Integrated Report. Impaired surface water bodies may be included in Category 4 if a TMDL has been adopted and approved (Category 4a); if other pollution control requirements required by a local, state or federal authority are stringent enough to implement applicable water quality standards within a reasonable period of time (Category 4b); or, if the failure to meet an applicable water quality standard is not caused by a pollutant, but caused by other types of pollution (Category 4c).

Implementation of the requirements of this Order may allow the San Diego Water Board to include surface waters impaired by discharges from the Copermittees' MS4s in Category 4 in the Integrated Report for consideration during the next 303(d) List submittal by the State to USEPA.

28. **Economic Considerations.** The California Supreme Court has ruled that although CWC section 13263 requires the State and Regional Water Boards (collectively Water Boards) to consider factors set forth in CWC section 13241 when issuing an NPDES permit, the Water Board may not consider the factors to justify imposing pollutant restrictions that are less stringent than the applicable federal regulations require. (*City of Burbank v. State Water Resources Control Bd.* (2005) 35 Cal.4th 613, 618, 626-627.) However, when pollutant restrictions in an NPDES permit are more stringent than federal law requires, CWC section 13263 requires that the Water Boards consider the factors described in CWC section 13241 as they apply to those specific restrictions.

    As noted in the following finding, the San Diego Water Board finds that the requirements in this permit are not more stringent than the minimum federal requirements. Therefore, a CWC section 13241 analysis is not required for permit requirements that implement the effective prohibition on the discharge of non-storm water into the MS4 or for controls to reduce the discharge of pollutants in storm water to the MEP, or other provisions that the San Diego Water Board has determined appropriate to control such pollutants, as those requirements are mandated by federal law. Notwithstanding the above, the San Diego Water Board has developed an economic analysis of the requirements in this Order. The economic analysis is provided in the Fact Sheet.

29. **Unfunded Mandates.** This Order does not constitute an unfunded local government mandate subject to subvention under Article XIIIB, Section (6) of the California Constitution for several reasons, including, but not limited to, the following:

    a. This Order implements federally mandated requirements under CWA section 402 (33 USC section 1342(p)(3)(B)).

    b. The local agency Copermittees' obligations under this Order are similar to, and in many respects less stringent than, the obligations of non-governmental and new dischargers who are issued NPDES permits for storm water and non-storm water discharges.

    c. The local agency Copermittees have the authority to levy service charges, fees, or assessments sufficient to pay for compliance with this Order.

    d. The Copermittees have requested permit coverage in lieu of compliance with the complete prohibition against the discharge of pollutants contained in CWA section 301(a) (33 USC section 1311(a)) and in lieu of numeric restrictions on their MS4 discharges (i.e. effluent limitations).

e. The local agencies' responsibility for preventing discharges of waste that can create conditions of pollution or nuisance from conveyances that are within their ownership or control under State law predates the enactment of Article XIIIB, Section (6) of the California Constitution.

f. The provisions of this Order to implement TMDLs are federal mandates. The CWA requires TMDLs to be developed for water bodies that do not meet federal water quality standards (33 USC section 1313(d)). Once the USEPA or a state develops a TMDL, federal law requires that permits must contain water quality based effluent limitations consistent with the assumptions and requirements of any applicable wasteload allocation (40 CFR 122.44(d)(1)(vii)(B)).

See the Fact Sheet for further discussion of unfunded mandates.

30. **California Environmental Quality Act.** The issuance of waste discharge requirements and an NPDES permit for the discharge of runoff from MS4s to waters of the U.S. is exempt from the requirement for preparation of environmental documents under the California Environmental Quality Act (CEQA) (Public Resources Code, Division 13, Chapter 3, section 21000 et seq.) in accordance with CWC section 13389.

STATE WATER BOARD DECISIONS

31. **Compliance with Prohibitions and Limitations.** The receiving water limitation language specified in this Order is consistent with language recommended by the USEPA and established in State Water Board Order WQ 99-05, *Own Motion Review of the Petition of Environmental Health Coalition to Review Waste Discharge Requirements Order No. 96-03, NPDES Permit No. CAS0108740*, adopted by the State Water Board on June 17, 1999. The receiving water limitation language in this Order requires storm water discharges from MS4s to not cause or contribute to a violation of water quality standards, which is to be achieved through an iterative approach requiring the implementation of improved and better-tailored BMPs over time. Implementation of the iterative approach to comply with receiving water limitations based on applicable water quality standards is necessary to ensure that storm water discharges from the MS4 will not ultimately cause or contribute to violations of water quality standards and will not create conditions of pollution, contamination, or nuisance.

32. **Special Conditions for Areas of Special Biological Significance.** On March 20, 2012, the State Water Board approved Resolution No. 2012-0012 approving an exception to the Ocean Plan prohibition against discharges to Areas of Special Biological Significance (ASBS) for certain nonpoint source discharges and NPDES permitted municipal storm water discharges. State Water Board Resolution No. 2012-0012 requires monitoring and testing of marine aquatic life and water quality in several ASBS to protect California's coastline during storms when rain water overflows into coastal waters. Specific terms, prohibitions, and special conditions

were adopted to provide special protections for marine aquatic life and natural water quality in ASBS. The City of San Diego's municipal storm water discharges to the San Diego Marine Life Refuge in La Jolla, and the City of Laguna Beach's municipal storm water discharges to the Heisler Park ASBS are subject terms and conditions of State Water Board Resolution No. 2012-0012. The Special Protections contained in Attachment B to Resolution No. 2012-0012, applicable to these discharges, are hereby incorporated into this Order as if fully set forth herein.

ADMINISTRATIVE FINDINGS

33. **Executive Officer Delegation of Authority.** The San Diego Water Board by prior resolution has delegated all matters that may legally be delegated to its Executive Officer to act on its behalf pursuant to CWC section 13223. Therefore, the Executive Officer is authorized to act on the San Diego Water Board's behalf on any matter within this Order unless such delegation is unlawful under CWC section 13223 or this Order explicitly states otherwise.

34. **Standard Provisions.** Standard Provisions, which apply to all NPDES permits in accordance with 40 CFR 122.41, and additional conditions applicable to specified categories of permits in accordance with 40 CFR 122.42, are provided in Attachment B to this Order.

35. **Fact Sheet.** The Fact Sheet for this Order contains background information, regulatory and legal citations, references and additional explanatory information and data in support of the requirements of this Order. The Fact Sheet is hereby incorporated into this Order and constitutes part of the Findings of this Order.

36. **Public Notice.** In accordance with State and federal laws and regulations, the San Diego Water Board notified the Copermittees, and interested agencies and persons of its intent to prescribe waste discharge requirements for the control of discharges into and from the MS4s to waters of the U.S. and has provided them with an opportunity to submit their written comments and recommendations. Details of notification are provided in the Fact Sheet.

37. **Public Hearing.** The San Diego Water Board held a public hearing on Month Day, 2013 and heard and considered all comments pertaining to the terms and conditions of this Order. Details of the public hearing are provided in the Fact Sheet.

38. **Effective Date.** This Order serves as an NPDES permit pursuant to CWA section 401 or amendments thereto, and becomes effective fifty (50) days after the date of its adoption, provided that the Regional Administrator, USEPA, Region IX, does not object to this Order.

39. **Review by the State Water Board.** Any person aggrieved by this action of the San Diego Water Board may petition the State Water Board to review the action in accordance with CWC section 13320 and California Code of Regulations, title 23,

sections 2050, et seq. The State Water Board must receive the petition by 5:00 p.m., 30 days after the San Diego Water Board action, except that if the thirtieth day following the action falls on a Saturday, Sunday or State holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at: http://www.waterboards.ca.gov/public_notices/petitions/water_quality or will be provided upon request.

THEREFORE, IT IS HEREBY ORDERED that the Copermittees, in order to meet the provisions contained in division 7 of the CWC and regulations adopted thereunder, and the provisions of the CWA and regulations adopted thereunder, must each comply with the following:

II. PROVISIONS

A. PROHIBITIONS AND LIMITATIONS

The purpose of this provision is to describe the conditions under which storm water and non-storm water discharges into and from MS4s are prohibited or limited. The goal of the prohibitions and limitations is to protect the water quality and designated beneficial uses of waters of the state from adverse impacts caused or contributed to by MS4 discharges. This goal will be accomplished through the implementation of water quality improvement strategies and runoff management programs that effectively prohibit non-storm water discharges into the Copermittees' MS4s, and reduce pollutants in storm water discharges from the Copermittees' MS4s to the MEP.

1. Discharge Prohibitions

a. Discharges from MS4s in a manner causing, or threatening to cause, a condition of pollution, contamination, or nuisance in receiving waters of the state are prohibited.

b. Non-storm water discharges into MS4s are to be effectively prohibited, unless such discharges are either authorized by a separate NPDES permit, or the discharge is a category of non-storm water discharges or flows that must be addressed pursuant to Provisions E.2.a.(1)-(5) of this Order.

c. Discharges from MS4s are subject to all waste discharge prohibitions in the Basin Plan, included in Attachment A to this Order.

d. Storm water discharges from the City of San Diego's MS4 to the San Diego Marine Life Refuge in La Jolla, and the City of Laguna Beach's MS4 to the Heisler Park ASBS are authorized under this Order subject to the Special Protections contained in Attachment B to State Water Board Resolution No. 2012-0012 applicable to these discharges, included in Attachment A to this Order. All other discharges from the Copermittees' MS4s to ASBS are prohibited.

2. Receiving Water Limitations

a. Discharges from MS4s must not cause or contribute to the violation of water quality standards in any receiving waters, including but not limited to all applicable provisions contained in:

(1) The San Diego Water Board's Basin Plan, including beneficial uses, water quality objectives, and implementation plans;

(2) State Water Board plans for water quality control including the following:

(a) Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries (Thermal Plan), and

(b) The Ocean Plan, including beneficial uses, water quality objectives, and implementation plans;

(3) State Water Board policies for water and sediment quality control including the following:

(a) Water Quality Control Policy for the Enclosed Bays and Estuaries of California,

(b) Sediment Quality Control Plan which includes the following narrative objectives for bays and estuaries:

(i) Pollutants in sediments shall not be present in quantities that, alone or in combination, are toxic to benthic communities, and

(ii) Pollutants shall not be present in sediments at levels that will bioaccumulate in aquatic life to levels that are harmful to human health,

(c) The Statement of Policy with Respect to Maintaining High Quality of Waters in California;[1]

(4) Priority pollutant criteria promulgated by the USEPA through the following:

(a) National Toxics Rule (NTR)[2] (promulgated on December 22, 1992 and amended on May 4, 1995), and

(b) California Toxics Rule (CTR).[3,4]

b. Discharges from MS4s composed of storm water runoff must not alter natural ocean water quality in an ASBS.

[1] State Water Board Resolution No. 68-16
[2] 40 CFR 131.36
[3] 65 Federal Register 31682-31719 (May 18, 2000), adding Section 131.38 to 40 CFR
[4] If a water quality objective and a CTR criterion are in effect for the same priority pollutant, the more stringent of the two applies.

3. Effluent Limitations

a. TECHNOLOGY BASED EFFLUENT LIMITATIONS

Pollutants in storm water discharges from MS4s must be reduced to the MEP.[5]

b. WATER QUALITY BASED EFFLUENT LIMITATIONS

This Order establishes water quality based effluent limitations (WQBELs) consistent with the assumptions and requirements of all available TMDL waste load allocations (WLAs) assigned to discharges from the Copermittees' MS4s. Each Copermittee must comply with applicable WQBELs established for the TMDLs in Attachment E to this Order, pursuant to the applicable TMDL compliance schedules.

4. Compliance with Discharge Prohibitions and Receiving Water Limitations

Each Copermittee must achieve compliance with Provisions A.1.a, A.1.c and A.2.a of this Order through timely implementation of control measures and other actions as specified in Provisions B and E of this Order, including any modifications. The Water Quality Improvement Plans required under Provision B must be designed and adapted to ultimately achieve compliance with Provisions A.1.a, A.1.c and A.2.a.

a. If exceedance(s) of water quality standards persist in receiving waters notwithstanding implementation of this Order, the Copermittees must comply with the following procedures:

(1) For exceedance(s) of a water quality standard in the process of being addressed by the Water Quality Improvement Plan, the Copermittee(s) must implement the Water Quality Improvement Plan as accepted by the San Diego Water Board, and update the Water Quality Improvement Plan, as necessary, pursuant to Provision F.2.c;

(2) Upon a determination by either the Copermittees or the San Diego Water Board that discharges from the MS4 are causing or contributing to a new exceedance of an applicable water quality standard not addressed by the Water Quality Improvement Plan, the Copermittees must submit the following updates to the Water Quality Improvement Plan pursuant to Provision F.2.c or as part of the Annual Report required under Provision F.3.b, unless the San Diego Water Board directs an earlier submittal:

[5] This does not apply to MS4 discharges which receive subsequent treatment to reduce pollutants in storm water discharges to the MEP prior to entering receiving waters (e.g., low flow diversions to the sanitary sewer). Runoff treatment must occur prior to the discharge of runoff into receiving waters per Finding 7.

(a) The water quality improvement strategies being implemented that are effective and will continue to be implemented,

(b) Water quality improvement strategies (i.e. BMPs, retrofitting projects, stream and/or habitat rehabilitation or restoration projects, adjustments to jurisdictional runoff management programs, etc.) that will be implemented to reduce or eliminate any pollutants or conditions that are causing or contributing to the exceedance of water quality standards,

(c) Updates to the schedule for implementation of the existing and additional water quality improvement strategies, and

(d) Updates to the monitoring and assessment program to track progress toward achieving compliance with Provisions A.1.a, A.1.c and A.2.a of this Order;

(3) The San Diego Water Board may require the incorporation of additional modifications to the Water Quality Improvement Plan required under Provision B. The applicable Copermittees must submit any modifications to the update to the Water Quality Improvement Plan within 90 days of notification that additional modifications are required by the San Diego Water Board, or as otherwise directed;

(4) Within 90 days of the San Diego Water Board determination that the update to the Water Quality Improvement Plan meets the requirements of this Order, the applicable Copermittees must revise the jurisdictional runoff management program documents to incorporate the updated water quality improvement strategies that have been and will be implemented, the implementation schedule, and any additional monitoring required; and

(5) Each Copermittee must implement the updated Water Quality Improvement Plan.

b. The procedure set forth above to achieve compliance with Provisions A.1.a, A.1.c and A.2.a of this Order do not have to be repeated for continuing or recurring exceedances of the same water quality standard(s) following implementation of scheduled actions unless directed to do otherwise by the San Diego Water Board.

c. Nothing in Provisions A.4.a and A.4.b prevents the San Diego Water Board from enforcing any provision of this Order while the applicable Copermittees prepare and implement the above update to the Water Quality Improvement Plan and jurisdictional runoff management programs.

B. WATER QUALITY IMPROVEMENT PLANS

The purpose of this provision is to develop Water Quality Improvement Plans that guide the Copermittees' jurisdictional runoff management programs towards achieving the outcome of improved water quality in MS4 discharges and receiving waters. The goal of the Water Quality Improvement Plans is to protect, preserve, enhance, and restore the water quality and designated beneficial uses of waters of the state. This goal will be accomplished through an adaptive planning and management process that identifies the highest priority water quality conditions within a watershed and implements strategies through the jurisdictional runoff management programs to achieve improvements in the quality of discharges from the MS4s and receiving waters.

1. Watershed Management Areas

The Copermittees, in conjunction with a Stakeholder Advisory Group, must develop a Water Quality Improvement Plan for each of the Watershed Management Areas in Table B-1. The Stakeholder Advisory Group will consist of at least one representative of an environmental group with knowledge of the watershed, one independent engineer, hydrologist, geologist, soil specialist or other scientist, and a regional board staff member. The Stakeholder Advisory Group members will be selected by regional board staff after an application process. A total of ten Water Quality Improvement Plans must be developed for the San Diego Region.

Table B-1. Watershed Management Areas

Hydrologic Unit(s)	Watershed Management Area	Major Surface Water Bodies	Responsible Copermittees
San Juan (901.00)	South Orange County	- Aliso Creek - San Juan Creek - San Mateo Creek - Pacific Ocean - Heisler Park ASBS	- City of Aliso Viejo[1] - City of Dana Point[1] - City of Laguna Beach[1] - City of Laguna Hills[1] - City of Laguna Niguel[1] - City of Laguna Woods[1] - City of Lake Forest[1] - City of Mission Viejo[1] - City of Rancho Santa Margarita[1] - City of San Clemente[1] - City of San Juan Capistrano[1] - County of Orange[1] - Orange County Flood Control District[1]
Santa Margarita (902.00)	Santa Margarita River	- Murrieta Creek - Temecula Creek - Santa Margarita River - Santa Margarita Lagoon - Pacific Ocean	- City of Murrieta[2] - City of Temecula[2] - City of Wildomar[2] - County of Riverside[2] - County of San Diego[3] - Riverside County Flood Control and Water Conservation District[2]
San Luis Rey (903.00)	San Luis Rey River	- San Luis Rey River - San Luis Rey Estuary - Pacific Ocean	- City of Oceanside - City of Vista - County of San Diego

Table B-1. Watershed Management Areas

Hydrologic Unit(s)	Watershed Management Area	Major Surface Water Bodies	Responsible Copermittees
Carlsbad (904.00)	Carlsbad	- Loma Alta Slough - Buena Vista Lagoon - Agua Hedionda Lagoon - Batiquitos Lagoon - San Elijo Lagoon - Pacific Ocean	- City of Carlsbad - City of Encinitas - City of Escondido - City of Oceanside - City of San Marcos - City of Solana Beach - City of Vista - County of San Diego
San Dieguito (905.00)	San Dieguito River	- San Dieguito River - San Dieguito Lagoon - Pacific Ocean	- City of Del Mar - City of Escondido - City of Poway - City of San Diego - City of Solana Beach - County of San Diego
Penasquitos (906.00)	Penasquitos	- Los Penasquitos Lagoon - Pacific Ocean	- City of Del Mar - City of Poway - City of San Diego - County of San Diego
	Mission Bay	- Mission Bay - Pacific Ocean - San Diego Marine Life Refuge ASBS	- City of San Diego
San Diego (907.00)	San Diego River	- San Diego River - Pacific Ocean	- City of El Cajon - City of La Mesa - City of San Diego - City of Santee - County of San Diego
Pueblo San Diego (908.00) Sweetwater (909.00) Otay (910.00)	San Diego Bay	- Sweetwater River - Otay River - San Diego Bay - Pacific Ocean	- City of Chula Vista - City of Coronado - City of Imperial Beach - City of La Mesa - City of Lemon Grove - City of National City - City of San Diego - County of San Diego - San Diego County Regional Airport Authority - San Diego Unified Port District
Tijuana (911.00)	Tijuana River	- Tijuana River - Tijuana Estuary - Pacific Ocean	- City of Imperial Beach - City of San Diego - County of San Diego

Notes:
1. The Orange County Copermittees will be covered under this Order after expiration of Order No. R9-2009-0002, or earlier if the Orange County Copermittees meet the conditions in Provision F.6.
2. The Riverside County Copermittees will be covered under this Order after expiration of Order No. R9-2010-0016, or earlier if the Riverside County Copermittees meet the conditions in Provision F.6.
3. The County of San Diego is required to implement the requirements of Provision B for its jurisdiction within the Santa Margarita River Watershed Management Area until the Riverside County Copermittees have been notified of coverage under this Order.

2. Priority Water Quality Conditions

The Copermittees must identify the water quality priorities within each Watershed Management Area that will be addressed by the Water Quality Improvement Plan. Where appropriate, Watershed Management Areas may be separated into subwatersheds to focus water quality prioritization and jurisdictional runoff management program implementation efforts by receiving water.

a. Assessment of Receiving Water Conditions

The Copermittees must consider the following, at a minimum, to identify water quality priorities based on impacts of MS4 discharges on receiving water beneficial uses:

(1) Receiving waters listed as impaired on the CWA Section 303(d) List of Water Quality Limited Segments (303(d) List);

(2) TMDLs adopted and under development by the San Diego Water Board;

(3) Receiving waters recognized as sensitive or highly valued by the Copermittees, including estuaries designated under the National Estuary Program under CWA section 320, wetlands defined by the State or U.S. Fish and Wildlife Service's National Wetlands Inventory as wetlands, and receiving waters identified as ASBS subject to the provisions of Attachment B to State Water Board Resolution No. 2012-0012 (Attachment A);

(4) The receiving water limitations of Provision A.2;

(5) Known historical versus current physical, chemical, and biological water quality conditions;

(6) Available, relevant, and ~~appropriately~~ collected and analyzed using the latest Standard Methods of Water and Waste Water Analysis physical, chemical, and biological receiving water monitoring data, including, but not limited to, data describing:

(a) Chemical constituents,

(b) Water quality parameters (i.e. pH, temperature, conductivity, etc.),

(c) Toxicity Identification Evaluations for both receiving water column and sediment,

(d) Trash impacts,

(e) Bioassessments, and

(f) Physical habitat;

(7) Available evidence of erosional impacts in receiving waters due to accelerated flows (i.e. hydromodification);

(8) Available evidence of adverse impacts to the chemical, physical, and biological integrity of receiving waters; and

(9) The potential improvements in the overall condition of the Watershed Management Area that can be achieved.

b. ASSESSMENT OF IMPACTS FROM MS4 DISCHARGES

The Copermittees must consider the following, at a minimum, to identify the potential impacts to receiving waters that may be caused or contributed to by discharges from the Copermittees' MS4s:

(1) The discharge prohibitions of Provision A.1 and effluent limitations of Provision A.3; and

(2) Available, relevant, and appropriately collected and analyzed storm water and non-storm water monitoring data from the Copermittees' MS4 outfalls;

(3) Locations of each Copermittee's MS4 outfalls that discharge to receiving waters;

(4) Locations of MS4 outfalls that are known to persistently discharge non-storm water to receiving waters likely causing or contributing to impacts on receiving water beneficial uses;

(5) Locations of MS4 outfalls that are known to discharge pollutants in storm water causing or contributing to impacts on receiving water beneficial uses; and

(6) The potential improvements in the quality of discharges from the MS4 that can be achieved.

c. IDENTIFICATION OF PRIORITY WATER QUALITY CONDITIONS

(1) The Copermittees must use the information gathered for Provisions B.2.a and B.2.b to develop a list of priority water quality conditions as pollutants, stressors and/or receiving water conditions that are the highest threat to receiving water quality or that most adversely affect the physical, chemical, and biological integrity of receiving waters. The list must include the following information for each priority water quality condition:

(a) The beneficial use(s) associated with the priority water quality condition;

(b) The geographic extent of the priority water quality condition within the Watershed Management Area, if known;

(c) The temporal extent of the priority water quality condition (e.g., dry weather and/or wet weather);

(d) The Copermittees with MS4s discharges that may cause or contribute to the priority water quality condition; and

(e) An assessment of the adequacy of and data gaps in the monitoring data to characterize the conditions causing or contributing to the priority water quality condition, including a consideration of spatial and temporal variation.

(2) The Copermittees must identify the highest priority water quality conditions to be addressed by the Water Quality Improvement Plan, and provide a rationale for selecting a subset of the water quality conditions identified pursuant to Provision B.2.c.(1) as the highest priorities.

d. IDENTIFICATION OF MS4 SOURCES OF POLLUTANTS AND/OR STRESSORS

The Copermittees must identify and prioritize known and suspected sources of storm water and non-storm water pollutants and/or other stressors associated with MS4 discharges that cause or contribute to the highest priority water quality conditions identified under Provision B.2.c. The identification of known and suspected sources of pollutants and/or stressors that cause or contribute to the highest priority water quality conditions as identified for Provision B.2.c must consider the following:

(1) Pollutant generating facilities, areas, and/or activities within the Watershed Management Area, including:

(a) Each Copermittee's inventory of construction sites, commercial facilities or areas, industrial facilities, municipal facilities, and residential areas,

(b) Publicly owned parks and/or recreational areas,

(c) Open space areas,

(d) All currently operating or closed municipal landfills or other treatment, storage or disposal facilities for municipal waste, and

(e) Areas not within the Copermittees' jurisdictions (e.g., Phase II MS4s, tribal lands, state lands, federal lands) that are known or suspected to be discharging to the Copermittees' MS4s;

(2) Locations of the Copermittees' MS4s, including the following:

(a) All MS4 outfalls that discharge to receiving waters, and

(b) Locations of major structural controls for storm water and non-storm water (e.g., retention basins, detention basins, major infiltration devices, etc.);

(3) Other known and suspected sources of non-storm water or pollutants in storm water discharges to receiving waters within the Watershed Management Area, including the following:

(a) Other MS4 outfalls (e.g., Phase II Municipal and Caltrans),

(b) Other NPDES permitted discharges,

(c) Any other discharges that may be considered point sources (e.g., private outfalls), and

(d) Any other discharges that may be considered non-point sources (e.g., agriculture, wildlife or other natural sources);

(4) Review of available data, including but not limited to:

(a) Findings from the Copermittees' illicit discharge detection and elimination programs,

(b) Findings from the Copermittees' MS4 outfall discharge monitoring,

(c) Findings from the Copermittees' receiving water monitoring,

(d) Findings from the Copermittees' MS4 outfall discharge and receiving water assessments, and

(e) Other available, relevant, and appropriately collected data, information, or studies related to pollutant sources and/or stressors that contribute to the highest priority water quality conditions as identified for Provision B.2.c.

(5) The adequacy of the available data to identify and prioritize sources and/or stressors associated with MS4 discharges that cause or contribute to the highest priority water quality conditions identified under Provision B.2.c.

e. NUMERIC GOALS AND SCHEDULES

The Copermittees must develop and incorporate interim and final numeric goals[6] and schedules into the Water Quality Improvement Plan. Numeric goals must be used to support Water Quality Improvement Plan implementation and measure progress towards addressing the highest priority water quality conditions identified under Provision B.2.c. Each Copermittee within a watershed will be held jointly and severally responsible for ensuring that the numeric goals and schedules are achieved. When establishing numeric goals and corresponding schedules, the Copermittees must consider the following:

(1) Final numeric goals must be based on measureable criteria or indicators, to be achieved in the receiving waters and/or MS4 discharges for the highest priority water quality conditions which will be capable of demonstrating the achievement of the restoration and/or protection of water quality standards in receiving waters;

(2) Interim numeric goals must be based on measureable criteria or indicators capable of demonstrating incremental progress toward achieving the final numeric goals in the receiving waters and/or MS4 discharges; and

(3) Schedules must be adequate for measuring progress toward achieving the interim and final numeric goals required for Provisions B.2.e.(1) and B.2.e.(2). Schedules must incorporate the following:

   (a) Interim dates for achieving the interim numeric goals,

   (b) Compliance schedules for any applicable TMDLs in Attachment E to this Order,

   (c) Compliance schedules for any ASBS subject to the provisions of Attachment B to State Water Board Resolution No. 2012-0012 (see Attachment A),

   (d) Achievement of the final numeric goals in the receiving waters and/or MS4 discharges for the highest water quality priorities must be as soon as possible, and

   (e) Final dates for achieving the final numeric goals must not initially extend more than 10 years beyond the effective date of this Order, unless a

[6] Interim and final numeric goals may take a variety of forms such as TMDL established WQBELs, action levels, pollutant concentration, load reductions, number of impaired water bodies delisted from the List of Water Quality Impaired Segments, Index of Biotic Integrity (IBI) scores, or other appropriate metrics. Interim and final numeric goals are not necessarily limited to one criterion or indicator, but may include multiple criteria and/or indicators. Except for TMDL established WQBELs, interim and final numeric goals and corresponding schedules may be revised through the adaptive management process under Provision B.5.

longer period of time is authorized by the San Diego Water Board Executive Officer or the schedule includes an applicable TMDL in Attachment E to this Order.

3. Water Quality Improvement Strategies and Schedules

The Copermittees must develop specific water quality improvement strategies to address the highest priority water quality conditions identified within a Watershed Management Area. The water quality improvement strategies must address the highest priority water quality conditions by preventing or eliminating non-storm water discharges to and from the MS4, reducing pollutants in storm water discharges from the MS4 to the MEP, and restoring and/or protecting the water quality standards of receiving waters.

a. WATER QUALITY IMPROVEMENT STRATEGIES

The Copermittees must identify and prioritize water quality improvement strategies based on their likely effectiveness and efficiency, and implement strategies to effectively prohibit non-storm water discharges to the MS4, reduce pollutants in storm water discharges from the MS4 to the MEP, improve the physical, chemical, and biological receiving water conditions, and achieve the interim and final numeric goals in accordance with the schedules required for Provision B.2.e.(3). The following water quality improvement strategies must be included and described in the Water Quality Improvement Plan:

(1) Specific strategies and/or activities that ~~may~~ will be implemented by one or more Copermittees within their jurisdictions through the jurisdictional runoff management programs that will address the highest priority water quality conditions within the Watershed Management Area, in accordance with the following requirements:

(a) Strategies and/or activities must, at a minimum, be described for each jurisdictional runoff management program component where strategies to address the highest priority water quality conditions are required under Provision E;

(b) The Water Quality Improvement Plan must describe which Copermittees will implement which strategies ~~the circumstances or conditions when and where the strategies or/activities should be or will be implemented~~, ~~but specific details about how each Copermittee will implement the strategies and/or activities within its jurisdiction are not required~~; and

(c) Descriptions of strategies and/or activities must include any monitoring, information collection, special studies, and/or data analysis that is necessary to assess the effectiveness of the strategy and/or activity toward addressing the highest priority water quality conditions.

~~(c)~~

(2) Additional strategies and/or activities that may be implemented within the Watershed Management Area on a jurisdictional, sub-watershed, or watershed scale by one or more Copermittees, not specifically required under Provision E, which are designed to achieve the interim and final numeric goals identified in Provisions B.2.e.(1) and B.2.e.(2);

b. IMPLEMENTATION SCHEDULES

(1) The Copermittees must develop schedules for implementing the water quality improvement strategies identified under Provision B.3.a to achieve the interim and final numeric goals identified under Provision B.2.e.(1) and B.2.e.(2). Schedules must be developed for both the water quality improvement strategies implemented by each Copermittee within its jurisdiction and for strategies that the Copermittees choose to implement on a collaborative basis.

(2) The Copermittees must incorporate the implementation compliance schedules for any ASBS subject to the provisions of Attachment B to State Water Board Resolution No. 2012-0012 (see Attachment A).

4. Water Quality Improvement Monitoring and Assessment Program

a. The Copermittees in each Watershed Management Area must develop and incorporate an integrated monitoring and assessment program into the Water Quality Improvement Plan that assesses: 1) the progress toward achieving the numeric goals and schedules, 2) the progress toward addressing the highest priority water quality conditions for each Watershed Management Area, and 3) each Copermittee's overall efforts to implement the Water Quality Improvement Plan.

b. The monitoring and assessment program must incorporate the monitoring and assessment requirements of Provision D, which may allow the Copermittees to modify the program to be consistent with and focus on the highest priority water quality conditions for each Watershed Management Area.

c. For Watershed Management Areas with applicable TMDLs, the monitoring and assessment program must incorporate the specific monitoring and assessment requirements of Attachment E.

d. For Watershed Management Areas with any ASBS, the water quality monitoring and assessment program must incorporate the monitoring requirements of Attachment B to State Water Board Resolution No. 2012-0012 (see Attachment A).

5. Iterative Approach and Adaptive Management Process

The Copermittees in each Watershed Management Area must implement the iterative approach pursuant to Provision A.4 to adapt the Water Quality Improvement Plan, monitoring and assessment program, and jurisdictional runoff management programs to become more effective toward achieving compliance with Provisions A.1.a, A.1.c and A.2.a, and must include the following:

a. RE-EVALUATION OF PRIORITY WATER QUALITY CONDITIONS

The priority water quality conditions, and numeric goals and corresponding schedules, included in the Water Quality Improvement Plan pursuant to Provisions B.2.c and B.2.e, may be re-evaluated by the Copermittees as needed during the term of this Order as part of the Annual Report. Re-evaluation and recommendations for modifications to the priority water quality conditions, and numeric goals and corresponding schedules must be provided in the Report of Waste Discharge, and must consider the following:

(1) Achieving the outcome of improved water quality in MS4 discharges and receiving waters through implementation of the water quality improvement strategies identified in the Water Quality Improvement Plan;

(2) Progress toward achieving interim and final numeric goals in receiving waters and/or MS4 discharges for the highest priority water quality conditions in the Watershed Management Area,

(3) Progress toward achieving outcomes according to established schedules;

(4) New information developed when the requirements of Provisions B.2.a-c have been re-evaluated;

(5) New policies or regulations that may affect identified numeric goals;

(6) Spatial and temporal accuracy of monitoring data collected to inform prioritization of water quality conditions and implementation strategies to address the highest priority water quality conditions;

(7) Availability of new information and data from sources other than the jurisdictional runoff management programs within the Watershed Management Area that informs the effectiveness of the actions implemented by the Copermittees;

(8) San Diego Water Board recommendations; and

(9) Recommendations for modifications solicited through a public participation process.

b. ADAPTATION OF STRATEGIES AND SCHEDULES

The water quality improvement strategies and schedules, included in the Water Quality Improvement Plan pursuant to Provisions B.3, must be re-evaluated and adapted as new information becomes available to result in more effective and efficient measures to achieve the numeric goals established pursuant to Provision B.2.e. Re-evaluation of and modifications to the water quality improvement strategies must be provided in the Annual Report, and must consider the following:

(1) Modifications to the priority water quality conditions, and numeric goals and corresponding schedules based on Provision B.5.a;

(2) Measurable or demonstrable reductions of non-storm water discharges to and from each Copermittee's MS4;

(3) Measurable or demonstrable reductions of pollutants in storm water discharges from each Copermittee's MS4 to the MEP;

(4) New information developed when the requirements of Provisions B.2.b and B.2.d have been re-evaluated;

(5) Efficiency in implementing the Water Quality Improvement Plan;

(6) San Diego Water Board recommendations; and

(7) Recommendations for modifications solicited through a public participation process.

c. ADAPTATION OF MONITORING AND ASSESSMENT PROGRAM

The water quality improvement monitoring and assessment program, included in the Water Quality Improvement Plan pursuant to Provisions B.4, must be re-evaluated and adapted when new information becomes available. Re-evaluation and recommendations for modifications to the monitoring and assessment program, pursuant to the requirements of Provision D, may be provided in the Annual Report, but must be provided in the Report of Waste Discharge.

6. Water Quality Improvement Plan Submittal, Updates, and Implementation

a. The Copermittees must submit the Water Quality Improvement Plans in accordance with the requirements of Provision F.1.

b. The Copermittees must submit proposed updates to the Water Quality Improvement Plan for acceptance by the San Diego Water Board Executive Officer in accordance with the requirements of Provision F.2.c.

c. The Copermittees must commence with implementation of the Water Quality Improvement Plans immediately after acceptance by the San Diego Water Board, in accordance with the schedules, or subsequently updated schedules, within the Water Quality Improvement Plan.

C. ACTION LEVELS

The purpose of this provision is for the Copermittees to incorporate numeric action levels in the Water Quality Improvement Plans. The goal of the action levels is to guide Water Quality Improvement Plan implementation efforts and measure progress towards the protection of water quality and designated beneficial uses of waters of the state from adverse impacts caused or contributed to by MS4 discharges. This goal will be accomplished through monitoring and assessing the quality of the MS4 discharges during the implementation of the Water Quality Improvement Plans.

1. Non-Storm Water Action Levels[7]

The Copermittees must develop and incorporate numeric non-storm water action levels (NALs) into the Water Quality Improvement Plan to: 1) support the development and prioritization of water quality improvement strategies for addressing non-storm water discharges to and from the MS4s, 2) assess the effectiveness of the water quality improvement strategies toward addressing MS4 non-storm water discharges, required pursuant to Provision D.4.b.(1), and 3) support the detection and elimination of non-storm water and illicit discharges to and from the MS4, required pursuant to Provision E.2.[8]

a. The following NALs must be incorporated:

(1) Non-Storm Water Discharges from MS4s to Ocean Surf Zone

Table C-1. Non-Storm Water Action Levels for Discharges from MS4s to Ocean Surf Zone

Parameter	Units	AMAL	MDAL	Instantaneous Maximum	Basis
Total Coliform	MPN/100 ml	1,000	-	10,000/1,000[1]	OP
Fecal Coliform	MPN/100 ml	200[2]	-	400	OP
Enterococci	MPN/100 ml	35	-	104[3]	OP

Abbreviations/Acronyms
AMAL – average monthly action level
MDAL – maximum daily action level
OP – Ocean Plan water quality objective
MPN/100 ml – most probable number per 100 milliliters

Notes:
1. Total coliform density NAL is 1,000 MPN/100 ml when the fecal/total coliform ratio exceeds 0.1.
2. Fecal coliform density NAL is 200 MPN per 100 ml during any 30 day period.
3. This value has been set to the Basin Plan water quality objective for saltwater "designated beach areas."

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[7] NALs are not considered by the San Diego Water Board to be enforceable limitations.
[8] The Copermittees may utilize NALs or other benchmarks currently established by the Copermittees as interim NALs until the Water Quality Improvement Plans are accepted by the San Diego Water Board Executive Officer.

(2) Non-Storm Water Discharges from MS4s to Bays, Harbors, and Lagoons/Estuaries

Table C-2. Non-Storm Water Action Levels for Discharges from MS4s to Bays, Harbors, and Lagoons/Estuaries

Parameter	Units	AMAL	MDAL	Instantaneous Maximum	Basis
Turbidity	NTU	75	-	225	OP
pH	Units	Within limit of 6.0 to 9.0 at all times			OP
Fecal Coliform	MPN/100 ml	200[1]	-	400[2]	BP
Enterococci	MPN/100 ml	35	-	104[3]	BP
Priority Pollutants	ug/L	See Table C-3			

Abbreviations/Acronyms:
AMAL – average monthly action level
MDAL – maximum daily action level
OP – Ocean Plan water quality objective
BP – Basin Plan water quality objective
NTU – Nephelometric Turbidity Units
MPN/100 ml – most probable number per 100 milliliters
ug/L – micrograms per liter

Notes:
1. Based on a minimum of not less than five samples for any 30-day period.
2. The NAL is reached if more than 10 percent of total samples exceed 400 MPN per 100 ml during any 30 day period.
3. This value has been set to the Basin Plan water quality objective for saltwater "designated beach areas" and is not applicable to waterbodies that are not designated with the water contact recreation (REC-1) beneficial use.

Table C-3. Non-Storm Water Action Levels for Priority Pollutants

Parameter	Units	Freshwater (CTR)		Saltwater (CTR)	
		MDAL	AMAL	MDAL	AMAL
Cadmium	ug/L	**	**	16	8
Copper	ug/L	*	*	5.8	2.9
Chromium III	ug/L	**	**	-	-
Chromium VI	ug/L	16	8.1	83	41
Lead	ug/L	*	*	14	2.9
Nickel	ug/L	**	**	14	6.8
Silver	ug/L	*	*	2.2	1.1
Zinc	ug/L	*	*	95	47

Abbreviations/Acronyms:
CTR – California Toxic Rule
ug/L – micrograms per liter
AMAL – average monthly action level
MDAL – maximum daily action level

Notes:
* Action levels developed on a case-by-case basis (see below)
** Action levels developed on a case-by-case basis (see below), but calculated criteria are not to exceed Maximum Contaminant Levels (MCLs) under the California Code of Regulations, Title 22, Division 4, Chapter 15, Article 4, Section 64431

The Cadmium, Copper, Chromium (III), Lead, Nickel, Silver and Zinc NALs for MS4 discharges to freshwater receiving waters will be developed on a case-by-case basis because the freshwater criteria are based on site-specific water quality data (receiving water hardness). For these priority pollutants, the following equations (40 CFR 131.38.b.2) will be required:

Cadmium (Total Recoverable) = exp(0.7852[ln(hardness)] - 2.715)
Chromium III (Total Recoverable) = exp(0.8190[ln(hardness)] + 0.6848)
Copper (Total Recoverable) = exp(0.8545[ln(hardness)] - 1.702)
Lead (Total Recoverable) = exp(1.273[ln(hardness)] - 4.705)
Nickel (Total Recoverable) = exp(.8460[ln(hardness)] + 0.0584)
Silver (Total Recoverable) = exp(1.72[ln(hardness)] - 6.52)
Zinc (Total Recoverable) = exp(0.8473[ln(hardness)] + 0.884)

(3) Non-Storm Water Discharges from MS4s to Inland Surface Waters

Table C-4. Non-Storm Water Action Levels for Discharges from MS4s to Inland Surface Waters

Parameter	Units	AMAL	MDAL	Instantaneous Maximum	Basis
Dissolved Oxygen	mg/L	Not less than 5.0 in WARM waters and not less than 6.0 in COLD waters			BP
Turbidity	NTU	-	20	See MDAL	BP
pH	Units	Within limit of 6.5 to 8.5 at all times			BP
Fecal Coliform	MPN/100 ml	200[1]	-	400[2]	BP
Enterococci	MPN/100 ml	33	-	61[3]	BP
Total Nitrogen	mg/L	-	1.0	See MDAL	BP
Total Phosphorus	mg/L	-	0.1	See MDAL	BP
MBAS	mg/L	-	0.5	See MDAL	BP
Iron	mg/L	-	0.3	See MDAL	BP
Manganese	mg/L	-	0.05	See MDAL	BP
Priority Pollutants	ug/L	See Table C-3			

Abbreviations/Acronyms:
AMAL – average monthly action level
BP – Basin Plan water quality objective
COLD – cold freshwater habitat beneficial use
NTU – Nephelometric Turbidity Units
mg/L – milligrams per liter
MDAL – maximum daily action level
WARM – warm freshwater habitat beneficial use
MBAS – Methylene Blue Active Substances
MPN/100 ml – most probable number per 100 milliliters
ug/L – micrograms per liter

Notes:
1. Based on a minimum of not less than five samples for any 30-day period.
2. The NAL is reached if more than 10 percent of total samples exceed 400 MPN per 100 ml during any 30 day period.
3. This value has been set to the Basin Plan water quality objective for freshwater “designated beach areas” and is not applicable to waterbodies that are not designated with the water contact recreation (REC-1) beneficial use.

b. If not identified in Provision C.1.a, NALs must be identified, developed and incorporated in the Water Quality Improvement Plan for any pollutants or waste constituents that cause or contribute, or are threatening to cause or contribute to a condition of pollution or nuisance in waters of the state associated with the highest priority water quality conditions related to non-storm water discharges from the MS4s. NALs must be based on:

(1) Applicable water quality standards which may be dependent upon site-specific or receiving water-specific conditions or assumptions to be identified by the Copermittees; or

(2) Applicable numeric WQBELs required to meet the WLAs established for the TMDLs in Attachment E to this Order.

c. For the NALs incorporated into the Water Quality Improvement Plan, the Copermittees may develop and incorporate secondary NALs specific to the Watershed Management Area at levels greater than the NALs required by Provisions C.1.a and C.1.b which can be utilized to further refine the prioritization and assessment of water quality improvement strategies for addressing non-storm water discharges to and from the MS4s, as well as the detection and elimination of non-storm water and illicit discharges to and from the MS4. The secondary NALs may be developed using an approach acceptable to the San Diego Water Board.

d. Dry weather monitoring data from MS4 outfalls collected in accordance with Provision D.2.b may be utilized to develop or revise NALs based on watershed-specific data, subject to San Diego Water Board Executive Officer approval.

2. Storm Water Action Levels[9]

The Copermittees must develop and incorporate numeric storm water action levels (SALs) in the Water Quality Improvement Plans to: 1) support the development and prioritization of water quality improvement strategies for reducing pollutants in storm water discharges from the MS4s, and 2) assess the effectiveness of the water quality improvement strategies toward reducing pollutants in storm water discharges, required pursuant to Provision D.4.b.(2).[10]

a. The following SALs for discharges of storm water from the MS4 must be incorporated:

Table C-5. Storm Water Action Levels for Discharges from MS4s to Receiving Waters

Parameter	Units	Action Level
Turbidity	NTU	126
Nitrate & Nitrite (Total)	mg/L	2.6
Phosphorus (Total P)	mg/L	1.46
Cadmium (Total Cd)*	µg/L	3.0
Copper (Total Cu)*	µg/L	127
Lead (Total Pb)*	µg/L	250
Zinc (Total Zn)*	µg/L	976

Abbreviations/Acronyms:
NTU – Nephelometric Turbidity Units
mg/L – milligrams per liter
ug/L – micrograms per liter

Notes:
* The sampling must include a measure of receiving water hardness at each MS4 outfall. If a total metal concentration exceeds the corresponding metals SAL in Table C-5, that concentration must be compared to the California Toxics Rule criteria and the USEPA 1-hour maximum concentration for the detected level of receiving water hardness associated with that sample. If it is determined that the sample's total metal concentration for that specific metal exceeds that SAL, but does not exceed the applicable USEPA 1-hour maximum concentration criterion for the measured level of hardness, then the sample result will not be considered above the SAL for that measurement.

[9] SALs are not considered by the San Diego Water Board to be enforceable limitations.
[10] The Copermittees may utilize SALs or other benchmarks currently established by the Copermittees as interim SALs until the Water Quality Improvement Plans are accepted by the San Diego Water Board Executive Officer.

b. If not identified in Provision C.2.a, SALs must be identified, developed and incorporated in the Water Quality Improvement Plan for pollutants or waste constituents that cause or contribute, or are threatening to cause or contribute to a condition of pollution or nuisance in waters of the state associated with the highest water quality priorities related to storm water discharges from the MS4s. SALs must be based on:

(1) Federal and State water quality guidance and/or water quality standards; and

(2) Site-specific or receiving water-specific conditions; or

(3) Applicable numeric WQBELs required to meet the WLAs established for the TMDLs in Attachment E to this Order.

c. For the SALs incorporated into the Water Quality Improvement Plan, the Copermittees may develop and incorporate secondary SALs specific to the Watershed Management Area at levels greater than the SALs required by Provisions C.2.a and C.2.b which can be utilized to further refine the prioritization and assessment of water quality improvement strategies for reducing pollutants in storm water discharges from the MS4s. The secondary SALs may be developed based on the approaches recommended by the State Water Board's Storm Water Panel[11] or using an approach acceptable to the San Diego Water Board.

d. Wet weather monitoring data from MS4 outfalls collected in accordance with Provision D.2.c may be used to develop or revise SALs based upon watershed-specific data, subject to San Diego Water Board Executive Officer approval.

[11] Storm Water Panel Recommendations to the California State Water Resources Control Board: The Feasibility of Numeric Effluent Limits Applicable to Discharges of Storm Water Associated with Municipal, Industrial and Construction Activities (June 2006)

D. MONITORING AND ASSESSMENT PROGRAM REQUIREMENTS

The purpose of this provision is for the Copermittees to monitor and assess the impact on the chemical, physical, and biological conditions of receiving waters caused by discharges from the Copermittees' MS4s under wet weather and dry weather conditions. The goal of the monitoring and assessment program is to inform the Copermittees about the nexus between the health of receiving waters and the water quality condition of the discharges from their MS4s. This goal will be accomplished through monitoring and assessing the conditions of the receiving waters, discharges from the MS4s, pollutant sources and/or stressors, and effectiveness of the water quality improvement strategies implemented as part of the Water Quality Improvement Plans.

1. Receiving Water Monitoring Requirements

The Copermittees must develop and conduct a program to monitor the condition of the receiving waters in each Watershed Management Area during dry weather and wet weather. Following acceptance of the Water Quality Improvement Plans for each Watershed Management Area, the Copermittees must conduct long-term receiving water monitoring during implementation of the Water Quality Improvement Plan to assess the long term trends and determine if conditions in receiving waters are improving. Any available monitoring data not collected specifically for this Order that meet the quality assurance criteria of the Copermittees and the monitoring requirements of this Order may be utilized by the Copermittees. The Copermittees must conduct the following receiving water monitoring procedures:

a. TRANSITIONAL RECEIVING WATER MONITORING

Until the monitoring requirements of Provisions D.1.b-e are incorporated into a Water Quality Improvement Plan that is accepted by the San Diego Water Board pursuant to Provision F.1, the Copermittees must conduct the following receiving water monitoring in the Watershed Management Area:

(1) Continue the receiving water monitoring programs required in Order Nos. R9-2007-0001, R9-2009-0002, and R9-2010-0016;

(2) Continue the monitoring in the Hydromodification Management Plans approved by the San Diego Water Board;

(3) Participate in the following regional receiving water monitoring programs, as applicable to the Watershed Management Area:

(a) Storm Water Monitoring Coalition Regional Monitoring,

(b) Southern California Bight Regional Monitoring, and

(c) Sediment Quality Monitoring;

(4) Implement the monitoring programs developed as part of any implementation plans or load reduction plans (e.g. Bacteria Load Reduction Plans, Comprehensive Load Reduction Plans) for the TMDLs in Attachment E to this Order; and

(5) For Watershed Management Areas with ASBS, implement the monitoring requirements of Attachment B to State Water Board Resolution No. 2012-0012, included in Attachment A to this Order.

b. LONG-TERM RECEIVING WATER MONITORING STATIONS

The Copermittees must select at least one long-term receiving water monitoring station from among the existing mass loading stations, temporary watershed assessment stations, bioassessment stations, and stream assessment stations previously established by the Copermittees to be representative of the receiving water quality in the Watershed Management Area. Additional long-term receiving water monitoring stations must be selected where necessary to support the implementation and adaptation of the Water Quality Improvement Plan.

c. DRY WEATHER RECEIVING WATER MONITORING

During the term of the Order, the Copermittees must perform monitoring during at least three dry weather monitoring events at each of the long-term receiving water monitoring stations. At least one monitoring event must be conducted during the dry season (May 1 – September 30) and at least one monitoring event must be conducted during a dry weather period during the wet season (October 1 – April 30), after the first wet weather event of the season, with an antecedent dry period of at least 72 hours following a storm event producing measureable rainfall of greater than 0.1 inch.

(1) <u>Dry Weather Receiving Water Field Observations</u>

For each dry weather monitoring event, the Copermittees must record field observations consistent with Table D-1 at each long-term receiving water monitoring station.

Table D-1. Field Observations for Receiving Water Monitoring Stations

Field Observations
• Station identification and location • Presence of flow, or pooled or ponded water • If flow is present: - Flow estimation (i.e. width of water surface, approximate depth of water, approximate flow velocity, flow rate) - Flow characteristics (i.e. presence of floatables, surface scum, sheens, odor, color) • If pooled or ponded water is present: - Characteristics of pooled or ponded water (i.e. presence of floatables, surface scum, sheens, odor, color) • Station description (i.e. deposits or stains, vegetation condition, structural condition, and observable biology) • Presence and assessment of trash in and around station

(2) Dry Weather Receiving Water Field Monitoring

For each dry weather monitoring event, if conditions allow the collection of the data, the Copermittees must monitor and record the parameters in Table D-2 at each long-term receiving water monitoring station.

Table D-2. Field Monitoring Parameters for Receiving Water Monitoring Stations

Parameters
• pH • Temperature • Specific conductivity • Dissolved oxygen • Turbidity

(3) Dry Weather Receiving Water Analytical Monitoring

For each dry weather monitoring event, the Copermittees must collect and analyze samples from each long-term receiving water monitoring station as follows:

(a) Analytes that are field measured are not required to be analyzed by a laboratory;

(b) The Copermittees must implement consistent sample collection methods for regional comparability of data, unless site-specific conditions indicate the need for alternate methods;

(c) Grab samples may be collected for pH, temperature, specific conductivity, dissolved oxygen, turbidity, hardness, and indicator bacteria;

(d) For all other constituents, composite samples must be collected for a duration adequate to be representative of changes in pollutant concentrations and runoff flows using one of the following techniques:

(i) Time-weighted composites composed of 24 discrete hourly samples, which may be collected through the use of automated equipment, or

(ii) Flow-weighted composites collected over a typical 24-hour period, which may be collected through the use of automated equipment;

(e) Only one analysis of the composite of aliquots is required;

(f) Analysis for the following constituents is required:

(i) Constituents contributing to the highest priority water quality conditions identified in the Water Quality Improvement Plan,

(ii) Constituents listed as a cause for impairment of receiving waters in the Watershed Management Area listed on the CWA section 303(d) List,

(iii) Constituents for implementation plans or load reduction plans (e.g. Bacteria Load Reduction Plans, Comprehensive Load Reduction Plans) developed for watersheds where the Copermittees are listed responsible parties under the TMDLs in Attachment E to this Order,

(iv) Applicable NAL constituents, and

(v) Constituents listed in Table D-3.

Table D-3. Analytical Monitoring Constituents for Receiving Water Monitoring Stations

Conventionals, Nutrients	Metals (Total and Dissolved)	Pesticides	Indicator Bacteria
• Total Dissolved Solids • Total Suspended Solids • Turbidity • Total Hardness • Total Organic Carbon • Dissolved Organic Carbon • Sulfate • Methylene Blue Active Substances (MBAS) • Total Phosphorus • Orthophosphate • Nitrite[1] • Nitrate[1] • Total Kjeldhal Nitrogen • Ammonia	• Arsenic • Cadmium • Chromium • Copper • Iron • Lead • Mercury • Nickel • Selenium • Thallium • Zinc	• Organophosphate Pesticides • Pyrethroid Pesticides	• Total Coliform • Fecal Coliform[2] • *Enterococcus*

Notes:
1. Nitrite and nitrate may be combined and reported as nitrite+nitrate.
2. *E. Coli* may be substituted for Fecal Coliform.

(4) Dry Weather Receiving Water Toxicity Monitoring

For each dry weather monitoring event, the Copermittees must collect grab or composite samples from each long-term receiving water monitoring station to be analyzed for toxicity in accordance with Table D-4:

Table D-4. Dry Weather Toxicity Testing for Receiving Water Monitoring Stations

Freshwater Organism	Test Approach	USEPA Protocol[2]
Pimephales promelas	1 acute 1 chronic[1]	EPA-821-R-02-012
Hyalella Azteca	1 acute 1 chronic[1]	EPA-821-R-02-012
Psuedokirchneriella subcapitata	1 acute 1 chronic[1]	EPA-821-R-02-013

Notes:
1. Chronic toxicity testing is not required at receiving water monitoring stations located at mass loading stations if the channel flows are diverted year-round during dry weather conditions to the sanitary sewer for treatment.
2. USEPA protocols must be utilized for toxicity testing unless alternate toxicity testing protocols have been approved by the San Diego Water Board.

(5) Dry Weather Receiving Water Bioassessment Monitoring

Bioassessment monitoring for each long-term receiving water monitoring station is required at least once during the term of this Order. The Copermittees must conduct bioassessment monitoring during at least one dry weather monitoring event at each long-term receiving water monitoring station as follows:

(a) The following bioassessment samples and measurements must be collected:

(i) Macroinvertebrate samples must be collected in accordance with the "Reachwide Benthos (Multihabitat) Procedure" in the most current Surface Water Ambient Monitoring Program (SWAMP) Bioassessment Standard Operating Procedures (SOP), and amendments, as applicable;[12]

(ii) The "Full" suite of physical habitat characterization measurements must be collected in accordance with the most current SWAMP Bioassessment SOP, and as summarized in the SWAMP Stream Habitat Characterization Form – Full Version;[13] and

(iii) Freshwater algae samples must be collected in accordance with the SWAMP Standard Operating Procedures for Collecting Algae

[12] Ode, P.R.. 2007. Standard operating procedures for collecting macroinvertebrate samples and associated physical and chemical data for ambient bioassessments in California. California State Water Resources Control Board Surface Water Ambient Monitoring Program (SWAMP) Bioassessment SOP 001. http://www.swrcb.ca.gov/water_issues/programs/swamp/tools.shtml#monitoring
[13] Available at:
http://www.waterboards.ca.gov/water_issues/programs/swamp/docs/reports/fieldforms_fullversion052908.pdf

Samples.[14] Analysis of samples must include algal taxonomic composition (diatoms and soft algae) and algal biomass.

(b) The bioassessment samples, measurements, and appropriate water chemistry data must be used to calculate the following:

(i) An Index of Biological Integrity (IBI) for macroinvertebrates for each monitoring station where bioassessment monitoring was conducted, based on the most current calculation method;[15] and

(ii) An IBI for algae for each monitoring station where bioassessment monitoring was conducted, when a calculation method is developed.[16]

(c) In lieu of the requirements of Provision D.1.c.(5)(a), the Copermittees may conduct the bioassessment monitoring in accordance with the "Triad" assessment approach[17] to calculate the IBIs required for Provision D.1.c.(5)(b). The Copermittees must conduct sampling, analysis, and reporting of specified in-stream biological and habitat data according to the protocols specified in the SCCWRP Technical Report No. 539, or subsequent protocols, if developed.

(6) Dry Weather Receiving Water Hydromodification Monitoring

In addition to the hydromodification monitoring conducted as part of the Copermittees' Hydromodification Management Plans, hydromodification monitoring for each long-term receiving water monitoring station is required at least once during the term of this Order. The Copermittees must collect the following hydromodification monitoring observations and measurements within an appropriate domain of analysis during at least one dry weather monitoring event for each long-term receiving water monitoring station:

(a) Channel conditions, including:

(i) Channel dimensions,

[14] Fetscher et al. 2009. Standard Operating Procedures for Collecting Stream Algae Samples and Associated Physical Habitat and Chemical Data for Ambient Bioassessments in California.
[15] The most current calculation method at the time the Order was adopted is outlined in "A Quantitative Tool for Assessing the Integrity of Southern California Coastal Streams" (Ode, et al. 2005. Environmental Management. Vol. 35, No. 1, pp. 1-13). If an updated or new calculation method is developed, either both (i.e. current and updated/new) methods must be used, or historical IBIs must be recalculated with the updated or new calculation method.
[16] When a calculation method is developed, IBIs must be calculated for all available and appropriate historical data.
[17] Stormwater Monitoring Coalition Model Monitoring Technical Committee, 2004. Model Monitoring Program for Municipal Separate Storm Sewer Systems in Southern California. Technical Report #419. August 2004.

(ii) Hydrologic and geomorphic conditions, and

(iii) Presence and condition of vegetation and habitat;

(b) Location of discharge points;

(c) Habitat integrity;

(d) Photo documentation of existing erosion and habitat impacts, with location (i.e. latitude and longitude coordinates) where photos were taken;

(e) Measurement or estimate of dimensions of any existing channel bed or bank eroded areas, including length, width, and depth of any incisions; and

(f) Known or suspected cause(s) of existing downstream erosion or habitat impact, including flow, soil, slope, and vegetation conditions, as well as upstream land uses and contributing new and existing development.

d. WET WEATHER RECEIVING WATER MONITORING

During the term of the Order, the Copermittees must perform monitoring during at least three wet weather monitoring events at each long-term receiving water monitoring station. At least one wet weather monitoring event must be conducted during the first wet weather event of the wet season (October 1 – April 30), and at least one wet weather monitoring event during a wet weather event that occurs after February 1.

(1) Wet Weather Receiving Water Field Observations

For each wet weather monitoring event, the following narrative descriptions and observations must be recorded at each long-term receiving water monitoring station:

(a) A narrative description of the station that includes the location, date and duration of the storm event(s) sampled, rainfall estimates of the storm event, and the duration between the storm event sampled and the end of the previous measurable (greater than 0.1 inch rainfall) storm event;

(b) The flow rates and volumes measured or estimated (data from nearby USGS gauging stations may be utilized, or flow rates may be measured or estimated in accordance with the USEPA Storm Water Sampling Guidance Document (EPA-833-B-92-001), section 3.2.1, or other method proposed by the Copermittees that is acceptable to the San Diego Water Board);

(c) Station condition (i.e. deposits or stains, vegetation condition, structural condition, observable biology); and

(d) Presence and assessment of trash in and around station.

(2) Wet Weather Receiving Water Field Monitoring

For each wet weather monitoring event, the Copermittees must monitor and record the parameters in Table D-2 at each long-term receiving water monitoring station.

(3) Wet Weather Receiving Water Analytical Monitoring

For each wet weather monitoring event, the Copermittees must collect and analyze samples from each long-term receiving water monitoring station as follows:

(a) Analytes that are field measured are not required to be analyzed by a laboratory;

(b) The Copermittees must implement consistent sample collection methods for regional comparability of data, unless site-specific conditions indicate the need for alternate methods;

(c) Grab samples may be collected for pH, temperature, specific conductivity, dissolved oxygen, turbidity, hardness, and indicator bacteria;

(d) For all other constituents, composite samples must be collected for a duration adequate to be representative of changes in pollutant concentrations and runoff flows using one of the following techniques:

(i) Time-weighted composites composed of 24 discrete hourly samples, which may be collected through the use of automated equipment, or

(ii) Flow-weighted composites collected over the length of the storm event or a typical 24-hour period, which may be collected through the use of automated equipment;

(e) Only one analysis of the composite of aliquots is required;

(f) Analysis for the following constituents is required:

(i) Constituents contributing to the highest priority water quality conditions identified in the Water Quality Improvement Plan,

(ii) Constituents listed as a cause for impairment of receiving waters in the Watershed Management Area listed on the CWA section 303(d) List,

(iii) Constituents for implementation plans or load reduction plans (e.g. Bacteria Load Reduction Plans, Comprehensive Load Reduction Plans) developed for watersheds where the Copermittees are listed responsible parties under the TMDLs in Attachment E to this Order,

(iv) Applicable SAL constituents, and

(v) Constituents listed in Table D-3.

(4) Wet Weather Receiving Water Toxicity Monitoring

For each wet weather monitoring event, the Copermittees must collect grab or composite samples from each long-term receiving water monitoring station to be analyzed for toxicity in accordance with Table D-5:

Table D-5. Wet Weather Toxicity Testing for Receiving Water Monitoring Stations

Freshwater Organism	Test Approach	USEPA Protocol[1]
Pimephales promelas	1 acute	EPA-821-R-02-012
Hyalella Azteca	1 acute	EPA-821-R-02-012
Psuedokirchneriella subcapitata	1 acute	EPA-821-R-02-013

Notes:
1. USEPA protocols must be utilized for toxicity testing unless alternate toxicity testing protocols have been approved by the San Diego Water Board.

e. Other Receiving Water Monitoring Requirements

(1) Regional Monitoring

The Copermittees must participate in the following regional receiving waters monitoring programs, as applicable to the Watershed Management Area:

(a) Storm Water Monitoring Coalition Regional Monitoring; and

(b) Southern California Bight Regional Monitoring.

(2) Sediment Quality Monitoring

The Copermittees must perform sediment monitoring to assess compliance with sediment quality receiving water limits applicable to MS4 discharges to enclosed bays and estuaries. The monitoring may be performed either by individual or multiple Copermittees to assess compliance with receiving water limits, or through participation in a water body monitoring coalition. The Copermittees must identify sediment sampling stations that are spatially representative of the sediment within the water body segment or region of interest. Sediment quality monitoring must be conducted in conformance with the monitoring requirements set forth in the State Water Board Sediment Quality Control Plan.

(3) ASBS Monitoring

For Watershed Management Areas with ASBS, the Copermittees must implement the monitoring requirements of Attachment B to State Water Board Resolution No. 2012-0012, included in Attachment A to this Order.

f. ALTERNATIVE WATERSHED MONITORING REQUIREMENTS

The San Diego Water Board may direct the Copermittees to participate in an effort to develop alternative watershed monitoring with other regulated entities, other interested parties, and the San Diego Water Board to refine, coordinate, and implement regional monitoring and assessment programs to determine the status and trends of water quality conditions in 1) coastal waters, 2) enclosed bays, harbors, estuaries, and lagoons, and 3) streams.

2. MS4 Outfall Discharge Monitoring Requirements

The Copermittees must develop and conduct a program to monitor the discharges from the MS4 outfalls in each Watershed Management Area during dry weather and wet weather. Following acceptance of the Water Quality Improvement Plans for each Watershed Management Area, the Copermittees must conduct MS4 outfall discharge monitoring during implementation of the Water Quality Improvement Plan to assess the effectiveness of their jurisdictional runoff management programs toward effectively prohibiting non-storm water discharges and reducing pollutants in storm water discharges to and from their MS4s. Any available monitoring data not collected specifically for this Order that meet the quality assurance criteria of the Copermittees and the monitoring requirements of this Order may be utilized by the Copermittees. The Copermittees must conduct the following MS4 outfall monitoring procedures:

a. TRANSITIONAL MS4 OUTFALL DISCHARGE MONITORING

Until the monitoring requirements of Provisions D.2.b-c are incorporated into a Water Quality Improvement Plan that is accepted by the San Diego Water Board pursuant to Provision F.1, the Copermittees must conduct the following MS4 outfall discharge monitoring in the Watershed Management Area:

(1) MS4 Outfall Discharge Monitoring Station Inventory

Each Copermittee must identify all major MS4 outfalls that discharge directly to receiving waters within its jurisdiction and geo-locate those outfalls on a map of the MS4 pursuant to Provision E.2.b.(1). This information must be compiled into a MS4 outfall discharge monitoring station inventory, and must include the following information:

(a) Latitude and longitude of MS4 outfall point of discharge;

(b) Watershed Management Area;

(c) Hydrologic subarea;

(d) Outlet size;

(e) Accessibility (i.e. safety and without disturbance of critical habitat);

(f) Approximate drainage area; and

(g) Classification of whether the MS4 outfall is known to have persistent dry weather flows, transient dry weather flows, no dry weather flows, or unknown dry weather flows.

(2) Transitional Dry Weather MS4 Outfall Discharge Field Screening Monitoring

Until the monitoring requirements of Provision D.2.b are incorporated into a Water Quality Improvement Plan that is accepted by the San Diego Water Board pursuant to Provision F.1, each Copermittee must perform dry weather MS4 outfall field screening monitoring to identify non-storm water and illicit discharges within its jurisdiction in accordance with Provision E.2.c, to determine which discharges are transient flows and which are persistent flows, and prioritize the dry weather MS4 discharges that will be investigated and eliminated in accordance with Provision E.2.d. Each Copermittee must conduct the following dry weather MS4 outfall discharge field screening monitoring within its jurisdiction:

(a) Transitional Dry Weather MS4 Outfall Discharge Field Screening Monitoring Frequency

Each Copermittee must field screen the MS4 outfalls in its inventory developed pursuant to Provision D.2.a.(1) as follows:

(i) For Copermittees with less than 125 major MS4 outfalls that discharge to receiving waters within a Watershed Management Area, at least 80 percent of the outfalls must be visually inspected two times per year during dry weather conditions.

(ii) For Copermittees with 125 major MS4 outfalls or more, but less than or equal to 500, that discharge to receiving waters within a Watershed Management Area all the outfalls must be visually inspected at least annually during dry weather conditions.

(iii) For Copermittees with more than 500 major MS4 outfalls that discharge to receiving waters within a Watershed Management Area, at least 500 outfalls must be visually inspected at least annually during dry weather conditions. Copermittees with more than 500 major MS4 outfalls within a Watershed Management Area must identify and prioritize at least 500 outfalls to be inspected considering the following:

[a] Assessment of connectivity of the discharge to a flowing receiving water;
[b] Reported exceedances of NALs in water quality monitoring data;
[c] Surrounding land uses;
[d] Presence of constituents listed as a cause for impairment of receiving waters in the Watershed Management Area listed on the CWA section 303(d) List; and
[e] Flow rate.

(iv) For Copermittees with more than 500 major MS4 outfalls within its jurisdiction that are located in more than one Watershed Management Area, at least 500 major MS4 outfalls within its inventory must be visually inspected at least annually during dry weather conditions. Copermittees with more than 500 major MS4 outfalls in more than one Watershed Management Area must identify and prioritize at least 500 outfalls to be inspected considering the following:

[a] Assessment of connectivity of the discharge to a flowing receiving water;
[b] Reported exceedances of NALs in water quality monitoring data;
[c] Surrounding land uses;
[d] Presence of constituents listed as a cause for impairment of receiving waters in the Watershed Management Area listed on the CWA section 303(d) List; and
[e] Flow rate.

(v) Inspections of major MS4 outfalls conducted in response to public reports and staff or contractor reports and notifications may count toward the required visual inspections of MS4 outfall discharge monitoring stations.

(b) Transitional Dry Weather MS4 Outfall Discharge Field Screening Visual Observations

(i) An antecedent dry period of at least 72 hours following any storm event producing measurable rainfall greater than 0.1 inch is required prior to conducting field screening visual observations during a field screening monitoring event.

(ii) During the field screening monitoring event, each Copermittee must record visual observations consistent with Table D-6 at each MS4 outfall discharge monitoring station inspected.

Table D-6. Field Screening Visual Observations for MS4 Outfall Discharge Monitoring Stations

Field Observations
• Station identification and location • Presence of flow, or pooled or ponded water • If flow is present: - Flow estimation (i.e. width of water surface, approximate depth of water, approximate flow velocity, flow rate) - Flow characteristics (i.e. presence of floatables, surface scum, sheens, odor, color) - Flow source(s) suspected or identified from non-storm water source investigation - Flow source(s) eliminated during non-storm water source identification • If pooled or ponded water is present: - Characteristics of pooled or ponded water (i.e. presence of floatables, surface scum, sheens, odor, color) - Known or suspected source(s) of pooled or ponded water • Station description (i.e. deposits or stains, vegetation condition, structural condition, observable biology) • Presence and assessment of trash in and around station • Evidence or signs of illicit connections or illegal dumping

(iii) Each Copermittee must implement the requirements of Provisions E.2.d.(2)(c)-(e) based on the field observations.

(iv) Each Copermittee must evaluate field observations together with existing information available from prior reports, inspections and monitoring results to determine whether any observed flowing, pooled, or ponded waters are likely to be transient or persistent flow.[18]

(c) Transitional Dry Weather MS4 Outfall Discharge Field Screening Monitoring Records

Based upon the results of the transitional dry weather MS4 outfall discharge field screening monitoring conducted pursuant to Provisions D.2.a.(2)(a)-(b), each Copermittee must update its MS4 outfall discharge monitoring station inventory, compiled pursuant to Provision D.2.a.(1), with any new information on the classification of whether the MS4 outfall produces persistent flow, transient flow, or no dry weather flow.

(3) Transitional Wet Weather MS4 Outfall Discharge Monitoring

Until the monitoring requirements of Provision D.2.c are incorporated into a Water Quality Improvement Plan that is accepted by the San Diego Water Board pursuant to Provision F.1, the Copermittees must conduct the following

[18] Persistent flow is defined as the presence of flowing, pooled, or ponded water more than 72 hours after a measureable rainfall event of 0.1 inch or greater during three consecutive monitoring and/or inspection events. All other flowing, pooled, or ponded water is considered transient.

wet weather MS4 outfall discharge monitoring within the Watershed Management Area:

(a) Transitional Wet Weather MS4 Outfall Discharge Monitoring Stations

The Copermittees must select at least five wet weather MS4 outfall discharge monitoring stations from the inventories developed pursuant to Provision D.2.a.(1) that are representative of storm water discharges from areas consisting primarily of residential, commercial, industrial, and typical mixed-use land uses present within the Watershed Management Area.

(b) Transitional Wet Weather MS4 Outfall Discharge Monitoring Frequency

Each wet weather MS4 outfall discharge monitoring station selected pursuant to Provision D.2.a.(3)(a) must be monitored twice during the wet season (October 1 – April 30). One wet weather monitoring event must be conducted during the first wet weather event of the wet season, and one wet weather monitoring event at least a month after the first wet weather event of the wet season.

(c) Transitional Wet Weather MS4 Outfall Discharge Field Observations

For each wet weather monitoring event, the following narrative descriptions and observations must be recorded at each wet weather MS4 outfall discharge monitoring station:

(i) A narrative description of the station that includes the location, date and duration of the storm event(s) sampled, rainfall estimates of the storm event, and the duration between the storm event sampled and the end of the previous measurable (greater than 0.1 inch rainfall) storm event; and

(ii) The flow rates and volumes measured or estimated (data from nearby USGS gauging stations may be utilized, or flow rates may be measured or estimated in accordance with the USEPA Storm Water Sampling Guidance Document (EPA-833-B-92-001), section 3.2.1, or other method proposed by the Copermittees that is acceptable to the San Diego Water Board);

(iii) Station condition (i.e. deposits or stains, vegetation condition, structural condition, observable biology); and

(iv) Presence and assessment of trash in and around station.

(d) Transitional Wet Weather MS4 Outfall Discharge Field Monitoring

For each wet weather monitoring event, the Copermittees must monitor and record the parameters in Table D-2 at each wet weather MS4 outfall discharge monitoring station.

(e) Transitional Wet Weather MS4 Outfall Discharge Analytical Monitoring

For each wet weather monitoring event, the Copermittees must collect and analyze samples from each wet weather MS4 outfall discharge monitoring station as follows:

(i) Analytes that are field measured are not required to be analyzed by a laboratory;

(ii) The Copermittees must implement consistent sample collection methods for regional comparability of data, unless site-specific conditions indicate the need for alternate methods;

(iii) Grab samples may be collected for pH, temperature, specific conductivity, dissolved oxygen, turbidity, and indicator bacteria;

(iv) For all other constituents, composite samples must be collected for a duration adequate to be representative of changes in pollutant concentrations and runoff flows using one of the following techniques:

[a] Time-weighted composites composed of 24 discrete hourly samples, which may be collected through the use of automated equipment, or
[b] Flow-weighted composites collected over the length of the storm event or a typical 24 hour period, whichever is shorter, which may be collected through the use of automated equipment, or
[c] If automated compositing is not feasible, a composite sample may be collected using a minimum of 4 grab samples, collected during the first 24 hours of the storm water discharge, or for the entire storm water discharge if the storm event is less than 24 hours;

(v) Only one analysis of the composite of aliquots is required;

(vi) The samples must be analyzed for the following constituents:

[a] Constituents listed as a cause for impairment of receiving waters in the Watershed Management Area listed on the CWA section 303(d) List,
[b] Constituents for implementation plans or load reduction plans (e.g. Bacteria Load Reduction Plans, Comprehensive Load Reduction Plans) developed for watersheds where the Copermittees are listed responsible parties under the TMDLs in Attachment E to this Order, and
[c] Constituents listed in in Table D-7.

Table D-7. Analytical Monitoring Constituents for Wet Weather MS4 Outfall Discharge Monitoring Stations

Conventionals, Nutrients	Metals (Total and Dissolved)	Indicator Bacteria
• Total Dissolved Solids • Total Suspended Solids • Turbidity • Total Hardness • Total Organic Carbon • Dissolved Organic Carbon • Sulfate • Methylene Blue Active Substances (MBAS) • Total Phosphorus • Orthophosphate • Nitrite[1] • Nitrate[1] • Total Kjeldhal Nitrogen • Ammonia	• Arsenic • Cadmium • Chromium • Copper • Iron • Lead • Nickel • Selenium • Thallium • Zinc	• Total Coliform • Fecal Coliform[2] • *Enterococcus*

Notes:
1. Nitrite and nitrate may be combined and reported as nitrite+nitrate.
2. *E. Coli* may be substituted for Fecal Coliform.

(f) Other Transitional Wet Weather MS4 Outfall Discharge Monitoring

The San Diego County Copermittees must continue the wet weather MS4 outfall monitoring program developed under Order No. R9-2007-0001, as approved by the San Diego Water Board, through its planned completion.

b. DRY WEATHER MS4 OUTFALL DISCHARGE MONITORING

Each Copermittee must perform dry weather MS4 outfall monitoring to identify non-storm water and illicit discharges within its jurisdiction pursuant to Provision E.2.c, and to prioritize the dry weather MS4 discharges that will be investigated and eliminated pursuant to Provision E.2.d. Each Copermittee must conduct the following dry weather MS4 outfall discharge monitoring within its jurisdiction:

(1) Dry Weather MS4 Outfall Discharge Field Screening Monitoring

Each Copermittee must continue to perform the dry weather MS4 outfall discharge field screening monitoring in accordance with the requirements of Provision D.2.a.(2). The Copermittee may adjust the field screening monitoring frequencies and locations for the MS4 outfalls in its inventory, as needed, to identify and eliminate sources of persistent flow non-storm water discharges in accordance with the highest priority water quality conditions identified in the Water Quality Improvement Plan, provided the number of visual inspections performed is equivalent to the number of visual inspections required under Provision D.2.a.(2)(a).

(2) Non-Storm Water Persistent Flow MS4 Outfall Discharge Monitoring

Each Copermittee must perform non-storm water persistent flow MS4 outfall discharge monitoring to determine which persistent non-storm water discharges contain concentrations of pollutants below NALs, and which persistent non-storm water discharges impact receiving water quality during dry weather. Each Copermittee must conduct the following non-storm water persistent flow MS4 outfall discharge monitoring within its jurisdiction:

(a) Prioritization of Non-Storm Water Persistent Flow MS4 Outfalls

Based upon the dry weather MS4 outfall discharge field screening monitoring records developed pursuant to Provision D.2.a.(2)(c), each Copermittee must identify and prioritize the MS4 outfalls with persistent flows based on the highest priority water quality conditions identified in the Water Quality Improvement Plan and any additional criteria developed by the Copermittee, which may include historical data and data from sources other than what the Copermittee collects.

(b) Non-Storm Water Persistent Flow MS4 Outfall Discharge Monitoring Frequency

(i) Based on the prioritization of major MS4 outfalls developed under Provision D.2.b.(2)(a), each Copermittee must identify, at a minimum, the 10 highest priority major MS4 outfalls with non-storm water persistent flows that the Copermittee will monitor within each Watershed Management Area within its jurisdiction. The location of the highest priority non-storm water persistent flow MS4 outfall monitoring stations must be identified on the map required pursuant to Provision E.2.b.(1).

(ii) Each of the highest priority non-storm water persistent flow MS4 outfall monitoring stations identified pursuant to Provision D.2.b.(2)(b)(i) must be monitored under dry weather conditions at least semi-annually until one of the following occurs:

[a] The non-storm water discharges have been effectively eliminated (i.e. no flowing, pooled, or ponded water) for three consecutive dry weather monitoring events; or

[b] The source(s) of the persistent flows has been identified as a category of non-storm water discharges that does not require an NPDES permit and does not have to be addressed as an illicit discharge because it was not identified as a source of pollutants (i.e. constituents in non-storm water discharge do not exceed NALs), and the persistent flow can be re-prioritized to a lower priority; or

[c] The constituents in the persistent flow non-storm water discharge do not exceed NALs, and the persistent flow can be re-prioritized to a lower priority; or

[d] The source(s) of the persistent flows has been identified as a non-storm water discharge authorized by a separate NPDES permit.

(iii) Where the criteria under Provision D.2.b.(2)(c)(ii) are not met, but the threat to water quality has been reduced by the Copermittee, the highest priority persistent flow MS4 outfall monitoring stations may be reprioritized accordingly for continued dry weather MS4 outfall discharge field screening monitoring required pursuant to Provision D.2.b.(1).

(iv) Each Copermittee must document removal or re-prioritization of the highest priority persistent flow MS4 outfall monitoring stations identified under Provision D.2.b.(2)(b) in the Annual Report. Persistent flow MS4 outfall monitoring stations that have been removed must be replaced with the next highest prioritized MS4 major outfall in the Watershed Management Area within its jurisdiction, unless there are no remaining qualifying major MS4 outfalls within the Copermittee's jurisdiction in the Watershed Management Area.

(c) Non-Storm Water Persistent Flow MS4 Outfall Discharge Field Observations

During each semi-annual monitoring event, each Copermittee must record field observations consistent with Table D-6 at each of the highest priority persistent flow MS4 outfall monitoring stations within its jurisdiction.

(d) Non-Storm Water Persistent Flow MS4 Outfall Discharge Field Monitoring

During each semi-annual monitoring event, if conditions allow the collection of the data, each Copermittee must monitor and record the parameters in Table D-2 at each of the highest priority persistent flow MS4 outfall monitoring stations within its jurisdiction.

(e) Non-Storm Water Persistent Flow MS4 Outfall Discharge Analytical Monitoring

During each semi-annual monitoring event in which measurable flow is present, each Copermittee must collect and analyze samples from each of the highest priority persistent flow MS4 outfall monitoring stations within its jurisdiction as follows:

(i) Analytes that are field measured are not required to be analyzed by a laboratory;

(ii) The Copermittees must implement consistent sample collection methods for regional comparability of data, unless site-specific conditions indicate the need for alternate methods;

(iii) Collect grab or composite samples to be analyzed for the following constituents:

[a] Constituents contributing to the highest priority water quality conditions identified in the Water Quality Improvement Plan,
[b] Constituents listed as a cause for impairment of receiving waters in the Watershed Management Area listed on the CWA section 303(d) List,
[c] Constituents for implementation plans or load reduction plans (e.g. Bacteria Load Reduction Plans, Comprehensive Load Reduction Plans) developed for watersheds where the Copermittees are listed responsible parties under the TMDLs in Attachment E to this Order,
[d] Applicable NAL constituents, and
[e] Constituents listed in Table D-8, unless the Copermittee has historical data that can demonstrate or provide justification that the analysis of the constituent is not necessary.

Table D-8. Analytical Monitoring Constituents for Persistent Flow MS4 Outfall Discharge Monitoring Stations

Conventionals, Nutrients	Metals (Total and Dissolved)	Indicator Bacteria
• Total Dissolved Solids • Total Suspended Solids • Total Hardness • Total Phosphorus • Orthophosphate • Nitrite[1] • Nitrate[1] • Total Kjeldhal Nitrogen • Ammonia	• Cadmium • Copper • Lead • Zinc	• Total Coliform • Fecal Coliform[2] • *Enterococcus*

Notes:
1. Nitrite and nitrate may be combined and reported as nitrite+nitrate.
2. *E. Coli* may be substituted for Fecal Coliform.

(iv) If the Copermittee identifies and eliminates the source of the persistent flow non-storm water discharge, analysis of the sample is not required.

c. Wet Weather MS4 Outfall Discharge Monitoring

The Copermittees must perform wet weather MS4 outfall monitoring to identify sources of pollutants in storm water discharges from the MS4s in the Watershed Management Area. The Copermittees must conduct the following wet weather MS4 outfall discharge monitoring within the Watershed Management Area:

(1) Wet Weather MS4 Outfall Discharge Monitoring Stations

The Copermittees may adjust the wet weather MS4 outfall discharge monitoring locations and frequencies in the Watershed Management Area, as needed, to identify sources of pollutants in storm water discharges from MS4s in the Watershed Management Area in accordance with the highest priority water quality conditions identified in the Water Quality Improvement Plan, provided the number of stations is at least equivalent to the number of stations required under Provision D.2.a.(3)(a).

(2) Wet Weather MS4 Outfall Discharge Monitoring Frequency

The Copermittees must monitor the wet weather MS4 outfall discharge monitoring stations in the Watershed Management Area at an appropriate frequency to identify sources of pollutants in storm water discharges from the MS4s causing or contributing to the highest priority water quality conditions identified in the Water Quality Improvement Plan.

(3) Wet Weather MS4 Outfall Discharge Field Observations

For each wet weather monitoring event, the following narrative descriptions and observations must be recorded at each wet weather MS4 outfall discharge monitoring station:

(a) A narrative description of the station that includes the location, date and duration of the storm event(s) sampled, rainfall estimates of the storm event, and the duration between the storm event sampled and the end of the previous measurable (greater than 0.1 inch rainfall) storm event; and

(b) The flow rates and volumes measured or estimated (data from nearby USGS gauging stations may be utilized, or flow rates may be measured or estimated in accordance with the USEPA Storm Water Sampling Guidance Document (EPA-833-B-92-001), section 3.2.1, or other method proposed by the Copermittees that is acceptable to the San Diego Water Board);

(c) Station condition (i.e. deposits or stains, vegetation condition, structural condition, observable biology); and

(d) Presence and assessment of trash in and around station.

(4) Wet Weather MS4 Outfall Discharge Field Monitoring

For each wet weather monitoring event, the Copermittees must monitor and record the parameters in Table D-2 at each wet weather MS4 outfall discharge monitoring station.

(5) Wet Weather MS4 Outfall Discharge Analytical Monitoring

For each wet weather monitoring event, the Copermittees must collect and analyze samples from each wet weather MS4 outfall discharge monitoring station as follows:

(a) Analytes that are field measured are not required to be analyzed by a laboratory;

(b) The Copermittees must implement consistent sample collection methods for regional comparability of data, unless site-specific conditions indicate the need for alternate methods;

(c) Grab samples may be collected for pH, temperature, specific conductivity, dissolved oxygen, turbidity, hardness, and indicator bacteria;

(d) For all other constituents, composite samples must be collected for a duration adequate to be representative of changes in pollutant concentrations and runoff flows using one of the following techniques:

(i) Time-weighted composites composed of 24 discrete hourly samples, which may be collected through the use of automated equipment, or

(ii) Flow-weighted composites collected over the length of the storm event or a typical 24 hour period, whichever is shorter, which may be collected through the use of automated equipment, or

(iii) If automated compositing is not feasible, a composite sample may be collected using a minimum of 4 grab samples, collected during the first 24 hours of the storm water discharge, or for the entire storm water discharge if the storm event is less than 24 hours.

(e) Only one analysis of the composite of aliquots is required;

(f) Analysis for the following constituents is required:

(i) Constituents contributing to the highest priority water quality conditions identified in the Water Quality Improvement Plan,

(ii) Constituents listed as a cause for impairment of receiving waters in the Watershed Management Area listed on the CWA section 303(d) List,

(iii) Constituents for implementation plans or load reduction plans (e.g. Bacteria Load Reduction Plans, Comprehensive Load Reduction Plans) developed for watersheds where the Copermittees are listed responsible parties under the TMDLs in Attachment E to this Order, and

(iv) Applicable SAL constituents.

3. Special Studies

a. Within the term of this Order, the Copermittees must develop and implement the following special studies:

(1) At least three special studies in each Watershed Management Area to address pollutant and/or stressor data gaps and/or develop information necessary to more effectively address the pollutants and/or stressors that cause or contribute to highest priority water quality conditions identified in the Water Quality Improvement Plan.

(2) At least two special studies for the San Diego Region to address pollutant and/or stressor data gaps and/or develop information necessary to more effectively address the pollutants and/or stressors that are impacting receiving waters on a regional basis in the San Diego Region.

(3) One of the three special studies in each Watershed Management Area may be replaced by a special study implemented pursuant to Provision D.3.a.(2).

b. The special studies must, at a minimum, be in conformance with the following criteria:

(1) The special studies must be related to the highest priority water quality conditions identified by the Copermittees in the Watershed Management Area and/or for the entire San Diego Region;

(2) The special studies developed pursuant to Provision D.3.a.(1) must:

(a) Be implemented within the applicable Watershed Management Area, and

(b) Require some form of participation by all the Copermittees within the Watershed Management Area;

(3) The special studies developed pursuant to Provision D.3.a.(2) must:

(a) Be implemented within the San Diego Region, and

(b) Require some form of participation by all Copermittees covered under the requirements of this Order.

c. Special studies developed to identify sources of pollutants and/or stressors should be pollutant and/or stressor specific and based on historical monitoring data and monitoring performed pursuant to Provisions D.1 and D.2. Development of source identification special studies should include the following:

(1) A compilation of known information on the specific pollutant and/or stressor, including data on potential sources and movement of the pollutant and/or stressor within the watershed. Data generated by the Copermittees and others, as well as information available from a literature research on the pollutant and/or stressor should be compiled and analyzed as appropriate.

(2) An identification of data gaps, based on the compiled information generated on the specific pollutant and/or stressor in Provision D.3.d.(1). Source identification special studies should be developed to fill identified data gaps.

(3) A monitoring plan that will collect and provide data the Copermittees can utilize to do the following:

(a) Quantify the relative loading or impact of a pollutant and/or stressor from a particular source or pollutant generating activity;

(b) Improve understanding of the fate of a pollutant and/or stressor in the environment;

(c) Develop an inventory of known and suspected sources of a pollutant and/or stressor in the Watershed Management Area; and/or

(d) Prioritize known and suspected sources of a pollutant and/or stressor based on relative magnitude in discharges, geographical distribution (i.e., regional or localized), frequency of occurrence in discharges, human health risk, and controllability.

d. Special studies initiated prior to the acceptance of the Water Quality Improvement Plan that meet the requirements of Provision D.3.b and are completed during the term of this Order may be utilized to fulfill the special study requirements of Provision D.3.a.

e. The Copermittees must submit the monitoring plans for the special studies in the Water Quality Improvement Plans required pursuant to Provision F.1.

f. The Copermittees are encouraged to share the results of the special studies regionally among the Copermittees to provide information useful in improving and adapting the management of non-storm water and storm water runoff through the implementation of the Water Quality Improvement Plans.

4. Assessment Requirements

Each Copermittee must evaluate the data collected pursuant to Provisions D.1, D.2 and D.3, and information collected during the implementation of the jurisdictional runoff management programs required pursuant to Provision E, to assess the progress of the water quality improvement strategies in the Water Quality Improvement Plan toward achieving compliance with Provisions A.1.a, A.1.c and A.2.a. Assessments must be performed as described in the following provisions:

a. RECEIVING WATERS ASSESSMENTS

(1) The Copermittees must assess and report the conditions of the receiving waters in the Watershed Management Area as follows:

(a) Based on data collected pursuant to Provision D.1.a, the assessments under Provision D.4.a.(2) must be included in the first Annual Report required pursuant to Provision F.3.b.(1).

(b) Based on the data collected pursuant to Provisions D.1.a-e, the assessments required under Provision D.4.a.(2) must be included in the Report of Waste Discharge required pursuant to Provision F.5.b.

(2) The Copermittees must assess the status and trends of receiving water quality conditions in 1) coastal waters, 2) enclosed bays, harbors, estuaries, and lagoons, and 3) streams under dry weather and wet weather conditions. For each of the three types of receiving waters in each Watershed Management Area the Copermittees must:

(a) Determine whether or not the conditions of the receiving waters are protective of the designated beneficial uses;

(b) Identify the most critical beneficial uses that must be protected or restored to ensure overall health of the receiving water;

(c) Determine whether or not those critical beneficial uses are being protected and where those beneficial used must be restored;

(d) Identify short-term and/or long-term improvements or degradation of those critical beneficial uses;

(e) Identify data gaps in the monitoring data necessary to assess Provisions D.4.a.(2)(a)-(d).

b. MS4 OUTFALL DISCHARGES ASSESSMENTS

(1) Non-Storm Water Discharges Reduction Assessments

(a) Each Copermittee must assess and report the progress of its illicit discharge detection and elimination program, required to be implemented pursuant to Provision E.2, toward reducing and effectively prohibiting non-storm water and illicit discharges into the MS4 within its jurisdiction as follows:

(i) Based on data collected pursuant to Provisions D.2.a.(2), the assessments under Provision D.4.b.(1)(b) must be included in the first Annual Report required pursuant to Provision F.3.b.(1).

(ii) Based on the data collected pursuant to Provisions D.2.b, the assessments required under Provision D.4.b.(1)(c) must be included in the first Annual Report required pursuant to Provision F.3.b.(1), and annually thereafter.

(iii) Based on the data collected pursuant to Provisions D.2.b, the assessment required under Provision D.4.b.(1)(c) must be included in the Report of Waste Discharge required pursuant to F.5.b.

(b) Based on the transitional dry weather MS4 outfall discharge field screening monitoring required pursuant to Provision D.2.a.(2), each Copermittee must assess and report the following:

(i) Identify the known and suspected controllable sources (e.g. facilities, areas, land uses, pollutant generating activities) of transient and persistent flows within the Copermittee's jurisdiction in the Watershed Management Area;

(ii) Identify sources of transient and persistent flows within the Copermittee's jurisdiction in the Watershed Management Area that have been reduced or eliminated; and

(iii) Identify modifications to the field screening monitoring locations and frequencies for the MS4 outfalls in its inventory necessary to identify and eliminate sources of persistent flow non-storm water discharges pursuant to Provision D.2.b.(1).

(c) Based on the dry weather MS4 outfall discharge field screening monitoring required pursuant to Provision D.2.b, each Copermittee must assess and report the following:

(i) The assessments required pursuant to Provision D.4.b.(1)(b);

(ii) Based on the data collected and applicable NALs in the Water Quality Improvement Plan, rank the MS4 outfalls in the Copermittee's jurisdiction according to potential threat to receiving water quality, and produce a prioritized list of major MS4 outfalls for follow-up action to update the Water Quality Improvement Plan, with the goal of eliminating persistent flow non-storm water discharges and/or pollutant loads in order of the ranked priority list through targeted programmatic actions and source investigations;

(iii) For the highest priority major MS4 outfalls with persistent flows that are in exceedance of NALs, identify the known and suspected sources within the Copermittee's jurisdiction in the Watershed Management Area that may cause or contribute to the NAL exceedances;

(iv) Each Copermittee must analyze the data collected pursuant to Provision D.2.b, and utilize a model or other method, to calculate or estimate the non-storm water volumes and pollutant loads discharged from all the major MS4s outfalls in its jurisdiction identified as having persistent dry weather flows during the monitoring year. These calculations or estimates must be updated annually. Each Copermittee must calculate or estimate:

[a] Annual non-storm water volumes and pollutant loads discharged from the Copermittee's major MS4 outfalls to receiving waters within the Copermittee's jurisdiction, with an estimate of the percent contribution from each known and suspected source for each MS4 outfall;
[b] Annual non-storm water volumes and pollutant loads from areas or facilities subject to the Copermittee's legal authority that are discharged from the Copermittee's major MS4 outfalls to downstream receiving waters.

(v) Each Copermittee must review the data collected pursuant to Provision D.2.b and findings from the assessments required pursuant to Provision D.4.b.(1)(c)(i)-(iv) on an annual basis to:

[a] Identify reductions and progress in achieving reductions in non-storm water and illicit discharges to the Copermittee's MS4 in the Watershed Management Area;
[b] Assess the effectiveness of water quality improvement strategies being implemented by the Copermittees within the Watershed Management Area toward reducing or eliminating non-storm water and pollutant loads discharging from the MS4 to receiving waters within its jurisdiction, with an estimate, if possible, of the non-storm water volume and/or pollutant load reductions attributable to specific water quality strategies implemented by the Copermittee; and
[c] Identify modifications necessary to increase the effectiveness of the water quality improvement strategies implemented by the Copermittee in the Watershed Management Area toward reducing

or eliminating non-storm water and pollutant loads discharging from the MS4 to receiving waters within its jurisdiction.

(vi) Identify data gaps in the monitoring data necessary to assess Provisions D.4.b.(2)(c)(i)-(v).

(2) Storm Water Pollutant Discharges Reduction Assessments

(a) The Copermittees must assess and report the progress of the water quality improvement strategies, required to be implemented pursuant to Provisions B and E, toward reducing pollutants in storm water discharges from the MS4s within the Watershed Management Area as follows:

(i) Based on data collected pursuant to Provisions D.2.a.(3), the assessments under Provision D.4.b.(2)(b) must be included in the first Annual Report required pursuant to Provision F.3.b.(1).

(ii) Based on the data collected pursuant to Provisions D.2.c, the assessments required under Provision D.4.b.(2)(c) must be included in the first Annual Report required pursuant to Provision F.3.b.(1), and annually thereafter.

(iii) Based on the data collected pursuant to Provisions D.2.c, the assessment required under Provisions D.4.b.(2)(c)-(d) must be included in the Report of Waste Discharge required pursuant to F.5.b.

(b) Based on the transitional wet weather MS4 outfall discharge monitoring required pursuant to Provision D.2.a.(3) the Copermittees must assess and report the following:

(i) The Copermittees must analyze the monitoring data collected pursuant to Provision D.2.a.(3), and utilize a watershed model or other method, to calculate or estimate storm water volumes and pollutant loads discharged from the MS4s in each Copermittee's jurisdiction within the Watershed Management Area. The Copermittees must calculate or estimate the following for each monitoring year:

[a] The average storm water runoff coefficient for each land use type within the Watershed Management Area;
[b] The volume of storm water discharged from each of the Copermittee's major MS4 outfalls in its jurisdiction to receiving waters within the Watershed Management Area for each storm event with measurable rainfall greater than 0.1 inch;
[c] The pollutant loads discharged from each of the Copermittee's major MS4 outfalls in its jurisdiction to receiving waters within the Watershed Management Area for each storm event with measurable rainfall greater than 0.1 inch; and

[d] The percent contribution of storm water volumes and pollutant loads discharged from each land use type within the drainage basin to each of the Copermittee's major MS4 outfalls in its jurisdiction to receiving waters within the Watershed Management Area for each storm event with measurable rainfall greater than 0.1 inch.

(ii) Identify modifications to the wet weather MS4 outfall discharge monitoring locations and frequencies necessary to identify sources pollutants in storm water discharges from the MS4s in the Watershed Management Area pursuant to Provision D.2.c.(1).

(c) Based on the wet weather MS4 outfall discharge monitoring required pursuant to Provision D.2.c the Copermittees must assess and report the following:

(i) The assessments required pursuant to Provision D.4.b.(2)(b);

(ii) Based on the data collected and applicable SALs in the Water Quality Improvement Plan, rank the MS4 outfalls in the Watershed Management Area according to potential threat to receiving water quality, and produce a prioritized list of major MS4 outfalls for follow-up action to update the Water Quality Improvement Plan;

(iii) The Copermittees must review the data collected pursuant to Provision D.2.c and findings from the assessments required pursuant to Provisions D.4.b.(2)(c)(i)-(ii) on an annual basis to:

[a] Identify reductions and progress in achieving reductions in pollutant concentrations and/or pollutant loads from different land uses and/or drainage areas discharging from the Copermittees' MS4s in the Watershed Management Area;

[b] Assess the effectiveness of water quality improvement strategies being implemented by the Copermittees within the Watershed Management Area toward reducing pollutants in storm water discharges from the MS4s to receiving waters within the Watershed Management Area to the MEP, with an estimate, if possible, of the pollutant load reductions attributable to specific water quality strategies implemented by the Copermittees; and

[c] Identify modifications necessary to increase the effectiveness of the water quality improvement strategies implemented by the Copermittees in the Watershed Management Area toward reducing pollutants in storm water discharges from the MS4s to receiving waters in the Watershed Management Area to the MEP.

(iv) Identify data gaps in the monitoring data necessary to assess Provisions D.4.b.(2)(c)(i)-(iii).

(d) The Copermittees must evaluate all the data collected pursuant to Provision D.2.c, and incorporate new outfall monitoring data into time series plots for each long-term monitoring constituent for the Watershed Management Area, and perform statistical trends analysis on the cumulative long-term wet weather MS4 outfall discharge water quality data set.

c. SPECIAL STUDIES ASSESSMENTS

The Copermittees must annually evaluate the results and findings from the special studies developed and implemented pursuant to Provision D.3, and assess their relevance to the Copermittees' efforts to characterize receiving water conditions, understand sources of pollutants and/or stressors, and control and reduce the discharges of pollutants from the MS4 outfalls to receiving waters in the Watershed Management Area. The Copermittees must report the results of the special studies assessments applicable to the Watershed Management Area, and identify any necessary modifications or updates to the Water Quality Improvement Plan based on the results in the Annual Reports required pursuant to Provision F.3.b.

d. INTEGRATED ASSESSMENT OF WATER QUALITY IMPROVEMENT PLAN

As part of the iterative approach and adaptive management process required for the Water Quality Improvement Plan pursuant to Provision B.5, the Copermittees in each Watershed Management Area must integrate the data collected pursuant to Provisions D.1-D.3, the findings from the assessments required pursuant to Provisions D.4.a-c, and information collected during the implementation of the jurisdictional runoff management programs required pursuant to Provision E to assess the effectiveness of, and identify necessary modifications to, the Water Quality Improvement Plan as follows:

(1) The Copermittees must re-evaluate the priority water quality conditions and numeric goals for the Watershed Management Area, as needed, during the term of this Order pursuant to Provision B.5.a. The re-evaluation and recommendations for modifications to the priority water quality conditions, and/or numeric goals and corresponding schedules may be provided in the Annual Reports required pursuant to Provision F.3.b, but must at least be provided in the Report of Waste Discharge pursuant to Provision F.5.b. The priority water quality conditions and numeric goals for the Watershed Management Area must be re-evaluated as follows:

(a) Re-evaluate the receiving water conditions in the Watershed Management Area in accordance with Provision B.2.a;

(b) Re-evaluate the impacts on receiving waters in the Watershed Management Area from MS4 discharges in accordance with Provision B.2.b;

(c) Re-evaluate the identification of MS4 sources of pollutants and/or stressors in accordance with Provision B.2.d;

(d) Identify beneficial uses of the receiving waters that are protected or must be restored in accordance with Provision D.4.a;

(e) Evaluate the progress toward achieving the interim and final numeric goals for restoring impacted beneficial uses in the receiving waters.

(2) The Copermittees must re-evaluate the water quality improvement strategies for the Watershed Management Area during the term of this Order pursuant to Provision B.5.b. The re-evaluation and recommendations for modifications to the water quality improvement strategies and schedules must be provided in the Annual Reports required pursuant to Provision F.3.b, and provided in the Report of Waste Discharge pursuant to Provision F.5.b. The water quality improvement strategies for the Watershed Management Area must be re-evaluated as follows:

(a) Identify the non-storm water and storm water pollutant loads from the Copermittees' MS4 outfalls in the Watershed Management Area, calculated or estimated pursuant to Provisions D.4.b;

(b) Identify the non-storm water and storm water pollutant load reductions, or other improvements to receiving water or water quality conditions, that are necessary to attain the interim and final numeric goals for restoring impacted beneficial uses in the receiving waters;

(c) Identify the non-storm water and storm water pollutant load reductions, or other improvements to the quality of MS4 discharges, that are necessary for the Copermittees to demonstrate that non-storm water and storm water discharges from their MS4s are not causing or contributing to exceedances of receiving water limitations;

(d) Evaluate the progress of the water quality improvement strategies toward achieving the interim and final numeric goals for restoring impacted beneficial uses in the receiving waters.

(3) The Copermittees must re-evaluate and adapt the water quality monitoring and assessment program for the Watershed Management Area when new information becomes available to improve the monitoring and assessment program pursuant to Provision B.5.c. The re-evaluation and recommendations for modifications to the monitoring and assessment program may be provided in the Annual Reports required pursuant to Provision F.3.b, but must at least be provided in the Report of Waste Discharge pursuant to Provision F.5.b. Modifications to the water quality monitoring and assessment program must be consistent with the

requirements of Provision D.1-D.3. The re-evaluation of the water quality monitoring and assessment program for the Watershed Management Area must consider the data gaps identified by the assessments required pursuant to Provisions D.4.a-b, and results of the special studies implemented pursuant to Provision D.4.c.

5. Monitoring Provisions

Each Copermittee must comply with all the monitoring, reporting, and recordkeeping provisions of the Standard Permit Provisions and General Provisions contained in Attachment B to this Order.

E. JURISDICTIONAL RUNOFF MANAGEMENT PROGRAMS

The purpose of this provision is for each Copermittee to implement a program to control the contribution of pollutants to and the discharges from the MS4 with its jurisdiction. The goal of the jurisdictional runoff management programs is to implement strategies that effectively prohibit non-storm water discharges to the MS4 and reduce the discharge of pollutants in storm water to the MEP. This goal will be accomplished through implementing the jurisdictional runoff management programs in accordance with the strategies identified in the Water Quality Improvement Plans.

Each Copermittee must update its jurisdictional runoff management program document, in accordance with Provision F.2.a, to incorporate all the requirements of Provision E. Until the Copermittee has updated its jurisdictional runoff management program document with the requirements of Provision E, the Copermittee must continue implementing its current jurisdictional runoff management program.

1. Legal Authority Establishment and Enforcement

a. Each Copermittee must establish, maintain, and enforce adequate legal authority within its jurisdiction to control pollutant discharges into and from its MS4 through statute, ordinance, permit, contract, order, or similar means. This legal authority must, at a minimum, authorize the Copermittee to:

(1) Prohibit and eliminate all illicit discharges and illicit connections to its MS4;

(2) Control the contribution of pollutants in discharges of runoff associated with industrial and construction activity to its MS4 and control the quality of runoff from industrial and construction sites, including industrial and construction sites which have coverage under the statewide General Permit for Discharges of Storm Water Associated with Industrial Activities (Industrial General Permit) or General Permit for Discharges of Storm Water Associated with Construction Activities (Construction General Permit), as well as to those sites which do not;

(3) Control the discharge of spills, dumping, or disposal of materials other than storm water into its MS4;

(4) Control through interagency agreements among Copermittees the contribution of pollutants from one portion of the MS4 to another portion of the MS4;

(5) Control, by coordinating and cooperating with other owners of the MS4 such as Caltrans, the U.S. federal government, or sovereign Native American Tribes through interagency agreements, where possible, the contribution of pollutants from their portion of the MS4 to the portion of the MS4 within the Copermittee's jurisdiction;

(6) Require compliance with conditions in its statutes, ordinances, permits, contracts, orders, or similar means to hold dischargers to its MS4 accountable for their contributions of pollutants and flows;

(7) Require the use of BMPs to prevent or reduce the discharge of pollutants in storm water from its MS4 to the MEP;

(8) Require documentation on the effectiveness of BMPs implemented to prevent or reduce the discharge of pollutants in storm water from its MS4 to the MEP;

(9) Utilize enforcement mechanisms to require compliance with its statutes, ordinances, permits, contracts, orders, or similar means; and

(10) Carry out all inspections, surveillance, and monitoring procedures necessary to determine compliance and noncompliance with its statutes, ordinances, permits, contracts, orders, or similar means and with the requirements of this Order, including the prohibition of illicit discharges and connections to its MS4; the Copermittee must also have authority to enter, monitor, inspect, take measurements, review and copy records, and require regular reports from industrial facilities, including construction sites, discharging into its MS4.

b. With the first Annual Report required pursuant to Provision F.3.b, each Copermittee must submit a statement certified by its Principal Executive Officer, Ranking Elected Official, or Duly Authorized Representative that the Copermittee has taken the necessary steps to obtain and maintain full legal authority within its jurisdiction to implement and enforce each of the requirements contained in this Order.

2. Illicit Discharge Detection and Elimination

Each Copermittee must implement a program to actively detect and eliminate illicit discharges and improper disposal into the MS4, or otherwise require the discharger to apply for and obtain a separate NPDES permit. The illicit discharge detection and elimination program must be implemented in accordance with the strategies identified in the Water Quality Improvement Plan and include, at a minimum, the following requirements:

a. NON-STORM WATER DISCHARGES

Each Copermittee must address all non-storm water discharges as illicit discharges, unless a non-storm water discharge is either identified as a discharge authorized by a separate NPDES permit, or identified as a category of non-storm water discharges or flows that must be addressed pursuant to the following requirements:

(1) Discharges of non-storm water to the MS4 from the following categories must be addressed as illicit discharges unless the discharge has coverage under NPDES Permit No. CAG919001 (Order No. R9-2007-0034, or subsequent order) for discharges to San Diego Bay, or NPDES Permit No. CAG919002 (Order No. R9-2008-0002, or subsequent order) for discharges to surface waters other than San Diego Bay:

(a) Uncontaminated pumped ground water;

(b) Discharges from foundation drains;[19]

(c) Water from crawl space pumps; and

(d) Water from footing drains.[19]

(2) Discharges of non-storm water from water line flushing and water main breaks to the MS4 must be addressed as illicit discharges unless the discharge has coverage under NPDES Permit No. CAG 679001 (Order No. R9-2010-0003, or subsequent order). This category includes water line flushing and water main break discharges from water purveyors issued a water supply permit by the California Department of Public Health or federal military installations. Discharges from recycled or reclaimed water lines to the MS4 must be addressed as illicit discharges, unless the discharges have coverage under a separate NPDES permit.

(3) Discharges of non-storm water to the MS4 from the following categories must be addressed by the Copermittee as illicit discharges only if the Copermittee or the San Diego Water Board identifies the discharge as a source of pollutants to receiving waters:

(a) Diverted stream flows;

(b) Rising ground waters;

(c) Uncontaminated ground water infiltration to MS4s;

(d) Springs;

(e) Flows from riparian habitats and wetlands;

(f) Discharges from potable water sources;

[19] Provision E.2.a.(1) only applies to this category on non-storm water if the system is designed to be located at or below the highest historical groundwater table to actively or passively extract groundwater during any part of the year.

(g) Discharges from foundation drains;[20] and

(h) Discharges from footing drains.[20]

(4) Discharges of non-storm water to the MS4 from the following categories must be controlled by the requirements given below through statute, ordinance, permit, contract, order, or similar means. Discharges of non-storm water to the MS4 from the following categories not controlled by the requirements given below through statute, ordinance, permit, contract, order, or similar means must be addressed by the Copermittee as illicit discharges.

(a) Air conditioning condensation

The discharge of air conditioning condensation must be directed to landscaped areas or other pervious surfaces where feasible.

(b) Individual residential vehicle washing

(i) The discharge of wash water must be directed to landscaped areas or other pervious surfaces where feasible; and

(ii) Minimize the use of water for vehicle washing, use as little washing detergent and other vehicle wash products as possible, wash vehicles at commercial wash facilities, and implement other practices or behaviors that will prevent the discharge of pollutants associated with individual residential vehicle washing from entering the MS4.

(c) Dechlorinated swimming pool discharges

(i) Eliminate residual chlorine, algaecide, filter backwash, or other pollutants from swimming pools prior to discharging to the MS4; and

(ii) The discharge of saline swimming pool water must be directed to the sanitary sewer, landscaped areas, or other pervious surfaces that can accommodate the volume of water, unless the saline swimming pool water can be discharged via a pipe or concrete channel directly to a naturally saline water body (e.g. Pacific Ocean).

(5) Firefighting discharges to the MS4 must be addressed by the Copermittee as illicit discharges only if the Copermittee or the San Diego Water Board identifies the discharge as a significant source of pollutants to receiving waters. Firefighting discharges to the MS4 not identified as a significant source of pollutants to receiving waters, must be addressed, at a minimum, as follows:

[20] Provision E.2.a.(3) only applies to this category of non-storm water discharge if the system is designed to be located above the highest historical groundwater table at all times of the year, and the system is only expected to discharge non-storm water under unusual circumstances.

(a) Non-emergency firefighting discharges

(i) Building fire suppression system maintenance discharges (e.g. sprinkler line flushing) to the MS4 must be addressed as illicit discharges.

(ii) Non-emergency firefighting discharges (i.e., discharges from controlled or practice blazes, firefighting training, and maintenance activities not associated with building fire suppression systems) must be addressed by a program, to be developed and implemented by the Copermittee, to reduce or eliminate pollutants in such discharges from entering the MS4.

(b) Emergency firefighting discharges

Each Copermittee should develop and encourage implementation of BMPs to reduce or eliminate pollutants in emergency firefighting discharges to the MS4s and receiving waters within its jurisdiction. During emergency situations, priority of efforts should be directed toward life, property, and the environment (in descending order). BMPs should not interfere with immediate emergency response operations or impact public health and safety.

(6) If the Copermittee or San Diego Water Board identifies any category of non-storm water discharges listed under Provisions E.2.a.(1)-(4) as a source of pollutants to receiving waters, the category must be prohibited through ordinance, order, or similar means and addressed as an illicit discharge.

(7) Each Copermittee must, where feasible, reduce or eliminate non-storm water discharges listed under Provisions E.2.a.(1)-(4) into its MS4 whether or not the non-storm water discharge has been identified as an illicit discharge, unless a non-storm water discharge is identified as a discharge authorized by a separate NPDES permit.

b. PREVENT AND DETECT ILLICIT DISCHARGES AND CONNECTIONS

Each Copermittee must include the following measures within its program to prevent and detect illicit discharges to the MS4:

(1) Each Copermittee must maintain an updated map of its entire MS4 and the corresponding drainage areas. The accuracy of the MS4 map must be confirmed during the field screening required pursuant to Provision E.2.c. The MS4 map must be included as part of the jurisdictional runoff management program document. Any geographic information system (GIS) layers or files used by the Copermittee to maintain the MS4 map must be made available to the San Diego Water Board upon request. The MS4 map must identify the following:

(a) All segments of the MS4 owned, operated, and maintained by the Copermittee;

(b) All known locations of inlets that discharge and/or collect runoff into the Copermittee's MS4;

(c) All known locations of connections with other MS4s not owned or operated by the Copermittee (e.g. Caltrans MS4s);

(d) All known locations of MS4 outfalls and private outfalls that discharge runoff collected from areas within the Copermittee's jurisdiction;

(e) All segments of receiving waters within the Copermittee's jurisdiction that receive and convey runoff discharged from the Copermittee's MS4 outfalls;

(f) Locations of the MS4 outfalls, identified pursuant to Provision D.2.a.(1), within its jurisdiction; and

(g) Locations of the non-storm water persistent flow MS4 outfall discharge monitoring stations, identified pursuant to Provision D.2.b.(2)(b), within its jurisdiction.

(2) Each Copermittee must use Copermittee personnel and contractors to assist in identifying and reporting illicit discharges and connections during their daily employment activities.

(3) Each Copermittee must promote, publicize, and facilitate public reporting of the presence of illicit discharges or water quality impacts associated with discharges to or from the MS4, including the following methods for public reporting:

(a) Operate a public hotline, which can be Copermittee-specific or shared by the Copermittees, and must be capable of receiving reports in both English and Spanish 24 hours per day and seven days per week; and

(b) Designate an e-mail address for receiving electronic reports from the public, which can be Copermittee-specific or shared by the Copermittees, and must be prominently displayed on the Copermittee's webpage and the Regional Clearinghouse required pursuant to Provision F.4.

(4) Each Copermittee must implement practices and procedures (including a notification mechanism) to prevent, respond to, contain, and clean up any spills that may discharge into the MS4 within its jurisdiction from any source. The Copermittee must coordinate, to the extent possible, with spill response teams to prevent entry of spills into the MS4, and prevent contamination of surface water, ground water, and soil. The Copermittee must coordinate spill

prevention, containment, and response activities throughout all appropriate Copermittee departments, programs, and agencies.

(5) Each Copermittee must implement practices and procedures to prevent and limit infiltration of seepage from sanitary sewers (including private laterals and failing septic systems) to the MS4.

(6) Each Copermittee must coordinate, when necessary, with upstream Copermittees and/or entities to prevent illicit discharges from upstream sources into the MS4 within its jurisdiction.

c. FIELD SCREENING

Each Copermittee must conduct field screening (i.e. visual observations, field testing, and/or analytical testing) of MS4 outfalls and other portions of its MS4 within its jurisdiction to detect non-storm water and illicit discharges and connections to the MS4 in accordance with the dry weather MS4 outfall discharge monitoring requirements in Provisions D.2.a.(2) and D.2.b.(1).

d. INVESTIGATE AND ELIMINATE ILLICIT DISCHARGES AND CONNECTIONS

Each Copermittee must include the following measures within its program to investigate and eliminate illicit discharges to the MS4:

(1) Each Copermittee must prioritize and determine when follow-up investigations will be performed in response to visual observations and/or water quality monitoring data collected during an investigation of a detected non-storm water or illicit discharge to or from the MS4. The criteria for prioritizing investigations must consider the following:

(a) Pollutants identified as causing or contributing to the highest water quality priorities identified in the Water Quality Improvement Plan;

(b) Pollutants identified as causing or contributing, or threatening to cause or contribute to impairments in water bodies on the 303(d) List and/or in environmentally sensitive areas (ESAs), located within its jurisdiction;

(c) Pollutants identified from sources or land uses known to exist within the area, drainage basin, or watershed that discharges to the portion of the MS4 within its jurisdiction included in the investigation;

(d) Pollutants identified as causing or contributing to an exceedance of a NAL in the Water Quality Improvement Plan; and

(e) Pollutants identified as a threat to human health or the environment.

(2) Each Copermittee must implement procedures to investigate and inspect portions of its MS4 that, based on reports or notifications, field screening, or other appropriate information, indicate a reasonable potential of receiving, containing, or discharging pollutants due to illicit discharges, illicit connections, or other sources of non-storm water. The procedures must include the following:

(a) Each Copermittee must develop criteria to:

(i) Assess the validity of each report or notification received; and

(ii) Prioritize the response to each report or notification received.

(b) Each Copermittee must prioritize and respond to each valid report or notification (e.g., public reports, staff or contractor reports and notifications, etc.) of an incident in a timely manner.

(c) Each Copermittee must investigate and seek to identify the source(s) of discharges of non-storm water where flows are observed in and from the MS4 during the field screening required pursuant to Provision D.2.b.(1) as follows:

(i) Obvious illicit discharges must be immediately investigated to identify the source(s) of non-storm water discharges;

(ii) The investigation must include field investigations to identify sources or potential sources for the discharge, unless the source or potential source has already been identified during previous investigations; and

(iii) The investigation may include follow-up field investigations and/or reviewing Copermittee inventories and other land use data to identify potential sources of the discharge.

(d) Each Copermittee must maintain records and a database of the following information:

(i) Location of incident, including hydrologic subarea, portion of MS4 receiving the non-storm water or illicit discharge, and point of discharge or potential discharge from MS4 to receiving water;

(ii) Source of information initiating the investigation (e.g., public reports, staff or contractor reports and notifications, field screening, etc.);

(iii) Date the information used to initiate the investigation was received;

(iv) Date the investigation was initiated;

(v) Dates of follow-up investigations;

(vi) Identified or suspected source of the illicit discharge or connection, if determined;

(vii) Known or suspected related incidents, if any;

(viii) Result of the investigation; and

(ix) If a source cannot be identified and the investigation is not continued, a rationale for why a discharge does not pose a threat to water quality and/or does not require additional investigation.

(e) Each Copermittee must track and seek to identify the source(s) of non-storm water discharges from the MS4 where there is evidence of non-storm water having been discharged into or from the MS4 (e.g., pooled water), in accordance with MS4 outfall discharge monitoring requirements in Provisions D.2.a.(2) and D.2.b.

(3) Each Copermittee must initiate the implementation of procedures, in a timely manner, to eliminate all detected and identified illicit discharges and connections within its jurisdiction. The procedures must include the following responses:

(a) Each Copermittee must enforce its legal authority, as required under Provision E.1, to eliminate illicit discharges and connections to the MS4.

(b) If the Copermittee identifies the source as a controllable source of non-storm water or illicit discharge or connection, the Copermittee must implement its Enforcement Response Plan pursuant to Provision E.6 and enforce its legal authority to prohibit and eliminate illicit discharges and connections to its MS4.

(c) If the Copermittee identifies the source of the discharge as a category of non-storm water discharges in Provision E.2.a, and the discharge is in exceedance of NALs in the Water Quality Improvement Plan, then the Copermittee must determine if: (1) this is an isolated incident or set of circumstances that will be addressed through its Enforcement Response Plan pursuant to Provision E.6, or (2) the category of discharge must be addressed through the prohibition of that category of discharge as an illicit discharge pursuant to Provision E.2.a.(6).

(d) If the Copermittee suspects the source of the non-storm water discharge as natural in origin (i.e. non-anthropogenically influenced) and in conveyance into the MS4, then the Copermittee must document and provide the data and evidence necessary to demonstrate to the San Diego Water Board that it is natural in origin and does not require further investigation.

(e) If the Copermittee is unable to identify and document the source of a recurring non-storm water discharge to or from the MS4, then the Copermittee must address the discharge as an illicit discharge and update its jurisdictional runoff management program to address the common and suspected sources of the non-storm water discharge within its jurisdiction in accordance with the Copermittee's priorities.

(4) Each Copermittee must submit a summary of the non-storm water discharges and illicit discharges and connections investigated and eliminated within its jurisdiction with each Annual Report required under Provision F.3.b of this Order.

e. STRATEGIES TO ADDRESS THE HIGHEST PRIORITY WATER QUALITY CONDITIONS

Each Copermittee must describe in its jurisdictional runoff management program document the strategies and/or activities that will be implemented as part of the illicit discharge detection and elimination program to address non-storm water and illicit discharges and connections that the Copermittee has identified as potential sources of pollutants and/or stressors that contribute to the highest priority water quality conditions in the Watershed Management Area as follows:

(1) Provide specific details about how the strategies and/or activities will be implemented (e.g. designate additional BMPs, focus education, and/or increase/decrease frequency of inspections in specific areas); and

(2) The strategies and/or activities must be consistent with the requirements of Provisions E.2.a-d and the strategies identified in the Water Quality Improvement Plan.

3. Development Planning

Each Copermittee must use their land use and planning authorities to implement a development planning program in accordance with the strategies identified in the Water Quality Improvement Plan and includes, at a minimum, the following requirements:

a. BMP REQUIREMENTS FOR ALL DEVELOPMENT PROJECTS

Each Copermittee must prescribe the following BMP requirements during the planning process (i.e. prior to project approval and issuance of local permits) for all development projects (regardless of project type or size), where local permits are issued, including unpaved roads and flood management projects:

(1) <u>General Requirements</u>

(a) Onsite BMPs must be located so as to remove pollutants from runoff prior to its discharge to any receiving waters, and as close to the source as possible; and

(b) Structural BMPs must not be constructed within a waters of the U.S. or waters of the state.

(2) Source Control BMP Requirements

The following source control BMPs must be implemented at all development projects where applicable and feasible:

(a) Prevention of illicit discharges into the MS4;

(b) Storm drain system stenciling or signage;

(c) Properly designed outdoor material storage areas;

(d) Properly designed outdoor work areas;

(e) Properly designed trash storage areas; and

(f) Any additional BMPs necessary to minimize pollutant generation at each project.

(3) Low Impact Development (LID) BMP Requirements

The following LID BMPs must be implemented at all development projects where applicable and feasible:

(a) Maintenance or restoration of natural storage reservoirs and drainage corridors (including topographic depressions, areas of permeable soils, natural swales, and ephemeral and intermittent streams);[21]

(b) Buffer zones for natural water bodies (where buffer zones are technically infeasible, require project applicant to include other buffers such as trees, access restrictions, etc.);

(c) Conservation of natural areas within the project footprint including existing trees, other vegetation, and soils;

(d) Construction of streets, sidewalks, or parking lot aisles to the minimum widths necessary, provided public safety is not compromised;

(e) Minimization of the impervious footprint of the project;

(f) Minimization of soil compaction to landscaped areas;

[21] Development projects proposing to dredge or fill materials in waters of the U.S. must obtain a CWA Section 401 Water Quality Certification. Projects proposing to dredge or fill waters of the state must obtain waste discharge requirements.

(g) Disconnection of impervious surfaces through distributed pervious areas;

(h) Landscaped or other pervious areas designed and constructed to effectively receive and infiltrate, retain and/or treat runoff from impervious areas, prior to discharging to the MS4;

(i) Small collection strategies located at, or as close as possible to, the source (i.e. the point where storm water initially meets the ground) to minimize the transport of runoff and pollutants to the MS4 and receiving waters;

(j) Use of permeable materials for projects with low traffic areas and appropriate soil conditions;

(k) Landscaping with native or drought tolerant species; and

(l) Harvesting and using precipitation.

b. PRIORITY DEVELOPMENT PROJECTS

(1) Definition of Priority Development Project

Priority Development Projects include the following:

(a) All new development projects that fall under the Priority Development Project categories listed under Provision E.3.b.(2) (where a new development project feature, such as a parking lot, falls into a Priority Development Project category, the entire project footprint is subject to Priority Development Project requirements); and

(b) Those redevelopment projects that create, add, or replace at least 5,000 square feet of impervious surfaces on an already developed site, and the redevelopment project is a Priority Development Project category listed under Provision E.3.b.(2) (where redevelopment results in an increase of less than fifty percent of the impervious surfaces of a previously existing development, and the existing development was not subject to Priority Development Project requirements, the performance requirements of Provisions E.3.c.(1) and E.3.c.(2) apply only to the addition or replacement, and not to the entire development; where redevelopment results in an increase of more than fifty percent of the impervious surfaces of a previously existing development, the performance requirements of Provisions E.3.c.(1) and E.3.c.(2) apply to the entire development).

(2) Priority Development Project Categories

(a) New development projects that create 10,000 square feet or more of impervious surfaces (collectively over the entire project site). This category includes commercial, industrial, residential, mixed-use, and public development projects on public or private land which fall under the planning and building authority of the Copermittee.

(b) Automotive repair shops. This category is defined as a facility that is categorized in any one of the following Standard Industrial Classification (SIC) codes: 5013, 5014, 5541, 7532-7534, or 7536-7539.

(c) Restaurants. This category is defined as a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC code 5812), where the land area for development is 5,000 square feet or more.

(d) Hillside development projects. This category includes any development which creates 5,000 square feet or more of impervious surface which is located in an area with known erosive soil conditions, where the development will grade on any natural slope that is twenty-five percent or greater.

(e) Environmentally sensitive areas (ESAs). This category includes any development located within, directly adjacent to, or discharging directly to an ESA, which either creates 2,500 square feet of impervious surface on a proposed project site or increases the area of imperviousness of a proposed project site to 10 percent or more of its naturally occurring condition. “Directly adjacent to” means situated within 200 feet of the ESA. “Discharging directly to” means outflow from a drainage conveyance system that collects runoff from the subject development or redevelopment site and terminates at or in receiving waters within the ESA.

(f) Parking lots. This category is defined as a land area or facility for the temporary parking or storage of motor vehicles used personally, for business, or for commerce that has 5,000 square feet or more of impervious surface.

(g) Streets, roads, highways, freeways, and driveways. This category is defined as any paved impervious surface that is 5,000 square feet or more used for the transportation of automobiles, trucks, motorcycles, and other vehicles.

(h) Retail gasoline outlets (RGOs). This category includes RGOs that meet the following criteria: (a) 5,000 square feet or more or (b) a projected Average Daily Traffic (ADT) of 100 or more vehicles per day.

(i) Large development projects. This category includes any post-construction pollutant-generating new development projects that result in the disturbance of one acre or more of land.

(3) Priority Development Project Exemptions

Each Copermittee has the discretion to exempt the following projects from being defined as Priority Development Projects:

(a) New paved sidewalks, bicycle lanes, or trails that meet the following criteria:

(i) Designed and constructed to direct storm water runoff to adjacent vegetated areas, or other non-erodible permeable areas; OR

(ii) Designed and constructed to be hydraulically disconnected from paved streets or roads; OR

(iii) Designed and constructed with permeable pavements or surfaces in accordance with USEPA Green Streets guidance.[22]

(b) Retrofitting of existing paved alleys, streets or roads that meet the following criteria:

(i) Must be two lanes or less; AND

(ii) Must be a retrofitting project implemented as part of an alternative compliance project option under Provision E.3.c.(3)(b)(v) to achieve the performance requirements of Provisions E.3.c.(1) and/or E.3.c.(2) for a Priority Development Project; AND

(iii) Designed and constructed in accordance with the USEPA Green Streets guidance.[23]

(c) New single family residences that meet the following criteria:

(i) Must not be constructed as part of a larger development or proposed subdivision; AND

(ii) Designed and constructed to be certified under the U.S. Green Building Council (USGCB) Leadership in Energy and Environmental Design (LEED) for Homes green building certification program, receiving at least four (4) Surface Water Management credits under the Sustainable Sites category;[24] OR

[22] See "Managing Wet Weather with Green Infrastructure – Municipal Handbook: Green Streets" (USEPA, 2008).
[23] Ibid.
[24] See LEED for Homes rating system at http://www.usgbc.org

(iii) Designed and constructed with structural BMPs that will achieve the performance requirements of Provisions E.3.c.(1) and E.3.c.(2) onsite.

(d) Redevelopment of existing single family residences that meet the following criteria:

(i) Designed and constructed to be certified under the USGCB LEED for Homes green building certification program, receiving at least four (4) Surface Water Management credits under the Sustainable Sites category;[25] OR

(ii) Designed and constructed with structural BMPs that will achieve the performance requirements of Provisions E.3.c.(1) and E.3.c.(2) onsite.

c. Priority Development Project Structural BMP Performance Requirements

In addition to the BMP requirements listed for all development projects under Provision E.3.a, Priority Development Projects must also implement structural BMPs that conform to performance requirements below.

(1) Storm Water Pollutant Control BMP Requirements

Each Copermittee must require each Priority Development Project to implement onsite structural BMPs to control pollutants in storm water that may be discharged from a project as follows:

(a) Each Priority Development Project must be required to implement LID BMPs that are designed to retain (i.e. intercept, store, infiltrate, evaporate, and evapotranspire) onsite the pollutants contained in the design capture volume. The design capture volume is equivalent to:

(i) The volume of storm water produced from a 24-hour 85th percentile storm event;[26] OR

(ii) The volume of storm water that would be retained onsite if the site was fully undeveloped and naturally vegetated, as determined using continuous simulation modeling techniques based on site-specific soil conditions and typical native vegetative cover.

[25] See LEED for Homes rating system at http://www.usgbc.org
[26] This volume is not a single volume to be applied to all areas covered by this Order. The size of the 85th percentile storm event is different for various parts of the San Diego Region. The Copermittees are encouraged to calculate the 85th percentile storm event for each of its jurisdictions using local rain data pertinent to its particular jurisdiction. In addition, isopluvial maps may be used to extrapolate rainfall data to areas where insufficient data exists in order to determine the volume of the local 85th percentile storm event in such areas. Where the Copermittees will use isopluvial maps to determine the 85th percentile storm event in areas lacking rain data, the Copermittees must describe their method for using isopluvial maps in its BMP Design Manuals.

(b) A Priority Development Project may be allowed to utilize alternative compliance under Provision E.3.c.(3) to comply with the storm water pollutant control BMP performance requirements of Provision E.3.c.(1)(a).

(c) If a Priority Development project is allowed to utilize alternative compliance pursuant to Provisions E.3.c.(1)(b), flow-thru conventional treatment control BMPs must be implemented to treat the portion of the design capture volume that is not retained onsite. Additionally, project applicants must mitigate for the portion of the pollutant load in the design capture volume that is not retained onsite through one or more alternative compliance options under Provision E.3.c.(3). Conventional treatment control BMPs must be sized and designed to:

(i) Remove pollutants from storm water to the MEP;

(ii) Filter or treat either: 1) the maximum flow rate of runoff produced from a rainfall intensity of 0.2 inch of rainfall per hour, for each hour of a storm event, or 2) the maximum flow rate of runoff produced by the 85th percentile hourly rainfall intensity (for each hour of a storm event), as determined from the local historical rainfall record, multiplied by a factor of two;

(iii) Be ranked with high or medium pollutant removal efficiency for the Priority Development Project's most significant pollutants of concern. Conventional treatment control BMPs with a low removal efficiency ranking must only be approved by a Copermittee when a feasibility analysis has been conducted which exhibits that implementation of conventional treatment control BMPs with high or medium removal efficiency rankings are infeasible for a Priority Development Project or portion of a Priority Development Project.

(2) <u>Hydromodification Management BMP Requirements</u>

Each Copermittee must require each Priority Development Project to implement onsite structural BMPs to manage hydromodification that may be caused by storm water runoff discharged from a project as follows:

(a) Post-project runoff flow rates and durations must not exceed pre-development (naturally occurring) runoff flow rates and durations by more than 10 percent (for the range of flows that result in increased potential for erosion, or degraded instream habitat conditions downstream of Priority Development Projects).

(i) In evaluating the range of flows that results in increased potential for erosion of natural (non-hardened) channels, the lower boundary must correspond with the critical channel flow that produces the critical shear stress that initiates channel bed movement or that erodes the toe of channel banks.

(ii) For artificially hardened channels, analysis to identify the lower boundary must use characteristics of a natural stream segment similar to that found in the watershed. The lower boundary must correspond with the critical channel flow that produces the critical shear stress that initiates channel bed movement or erodes the toe of the channel banks.

(iii) The Copermittees may use monitoring results collected pursuant to Provision D.1.a.(2) to re-define the range of flows resulting in increased potential for erosion, or degraded instream habitat conditions, as warranted by the data.

(b) Post-project runoff flow rates and durations must compensate for the loss of sediment supply due to the development project, should loss of sediment supply occur as a result of the development project.

(c) A Priority Development Project may be allowed to utilize alternative compliance under Provision E.3.c.(3) to comply with the performance requirements of Provisions E.3.c.(2)(a)-(b).

(d) Exemptions

Each Copermittee has the discretion to exempt a Priority Development Project from the hydromodification management BMP performance requirements of Provisions E.3.c.(2)(a)-(b) where the project:

(i) Discharges storm water runoff into existing underground storm drains discharging directly to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean;

(ii) Is a redevelopment Priority Development Project that meets the alternative compliance requirements of Provision E.3.c.(3)(b)(ii); or

(iii) Discharges storm water runoff into other areas identified by the San Diego Water Board as exempt from the requirements of Provisions E.3.c.(2)(a)-(b).

(3) <u>Alternative Compliance to Onsite Structural BMP Performance Requirements</u>

(a) Applicability

At the discretion of each Copermittee, Priority Development Projects may be allowed to utilize an alternative option to comply with the onsite structural BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2) under the following conditions:

(i) The Copermittee must determine that implementation of the alternative compliance option will have a greater overall water quality benefit for the Watershed Management Area than fully complying with the performance requirements of Provisions E.3.c.(1) and E.3.c.(2) onsite;

(ii) The alternative compliance options must be designed by a registered professional engineer, geologist, architect, or landscape architect;

(iii) The alternative compliance options must be implemented within the same hydrologic unit as the Priority Development Project, and preferably within the same hydrologic subarea;

(iv) Receiving waters must not be utilized to convey storm water runoff to the alternative compliance options;

(v) The pollutants in storm water runoff from the Priority Development Project must be treated to the MEP by the alternative compliance options prior to being discharged to receiving waters;

(vi) Unless otherwise allowed by Provision E.3.c.(3)(b), the alternative compliance options must have a net result of at least the same level of pollutant removal as would have been achieved if the Priority Development Project had fully complied with the storm water pollutant control BMP performance requirements of Provision E.3.c.(1) onsite;

(vii) Unless otherwise allowed by Provision E.3.c.(3)(b), the alternative compliance options must have a net result of at least the same level of protection from potential downstream and upstream erosion in the receiving water as would have been achieved if the Priority Development Project had fully complied with the hydromodification management BMP performance requirements of Provision E.3.c.(2) onsite; and

(viii) The alternative compliance options utilized by the Priority Development Project to comply with the performance requirements of Provisions E.3.c.(1) and E.3.c.(2) must have reliable sources of funding for operation and maintenance.

(b) Alternative Compliance Project Options

The Copermittee may allow implementation of one or more of the following project options as part of an alternative approach to complying with the onsite structural BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2):

(i) *Onsite LID Biofiltration Treatment Control BMPs*

The Copermittee may allow Priority Development Projects to utilize onsite LID biofiltration treatment control BMPs to comply with the storm water pollutant control BMP performance requirements of Provision E.3.c.(1). Onsite LID biofiltration treatment control BMPs must be sized and designed to:

[a] Remove pollutants from storm water to the MEP; AND
[b] Have an appropriate surface loading rate to prevent erosion, scour and channeling within the BMP; AND
[c] Biofilter at least 1.5 times the design capture volume that is not reliably retained onsite; OR
[d] Biofilter up to the design capture volume that is not reliably retained onsite, AND 1) treat the remaining portion of the design capture volume not retained onsite with conventional treatment control BMPs in accordance with Provision E.3.c.(1)(c), and 2) if necessary, mitigate for the portion of the pollutant load in the design capture volume not retained onsite through one or more alternative compliance project, in-lieu fee and/or water quality credit system options below.

(ii) *LEED Certified Redevelopment Projects*

The Copermittee may allow redevelopment Priority Development Projects to comply with the hydromodification management BMP performance requirements of Provision E.3.c.(2) where the project is designed and constructed to be certified under the USGCB LEED for New Construction and Major Renovations green building certification program. The Priority Development Project must receive at least one (1) Site Design credit and two (2) Stormwater Design credits under the Sustainable Sites category.[27] In addition, the existing and future configuration of the receiving water must not be unnaturally altered or adversely impacted by storm water flow rates and durations discharged from the site.

(iii) *Watershed-Based Planned Development Projects*

The Copermittee may allow Priority Development Projects greater than 100 acres in total project size (or smaller than 100 acres in size yet part of a larger common plan of development that is over 100 acres) to comply with the onsite structural BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2). The Priority Development Project must comply with the following conditions:

[a] The Priority Development Project was planned utilizing watershed and/or subwatershed based water quality, hydrologic, and fluvial geomorphologic planning principles that implement regional LID BMPs in accordance with the performance and location criteria of this Order and acceptable to the San Diego Water Board;
[b] Regional LID BMPs may be used provided that the BMPs capture and retain the volume of runoff produced from the design capture volume defined in Provision E.3.c.(1)(a)(i) and that such controls are located upstream of receiving waters;

[27] See LEED for New Construction and Major Renovations rating system at http://www.usgbc.org

[c] Regional LID BMPs must clearly exhibit that they will not result in a net impact from pollutant loadings over and above the impact caused by capture and retention of the design capture volume;

[d] Any portion of the design capture volume that is not retained by the regional LID BMPs must be treated using biofiltration BMPs; and

[e] Where regional LID BMPs are demonstrated to the Copermittee as technically infeasible to retain the entire design capture volume, any volume up to and including the design capture volume not retained by regional LID BMPs, nor treated by biofiltration BMPs, must be treated using conventional treatment control BMPs and the project applicant must implement additional alternative compliance project, in-lieu fee and/or water quality credit system options below.

(iv) *Offsite Regional BMPs*

[a] The Copermittee may allow Priority Development Projects to utilize offsite regional BMPs to comply with the storm water pollutant control BMP performance requirements of Provision E.3.c.(1) if the offsite regional BMPs have the capacity to receive and retain at least 1.1 times the design capture volume that is not reliably retained onsite.

[b] The Copermittee may allow Priority Development Projects to utilize offsite regional BMPs to comply with the hydromodification management BMP performance requirements of Provision E.3.c.(2) if the offsite regional BMPs have the capacity to manage the storm water flows rates and durations from the site such that the receiving waters are protected from the potential for increased erosion that would be caused if the unmanaged portion of the runoff was discharged from the site.

(v) *Offsite Retrofitting Projects*

The Copermittee may allow Priority Development Projects to utilize offsite retrofitting projects to comply with the storm water pollutant control and hydromodification management BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2) if the retrofitting projects have been identified within the strategies included in the Water Quality Improvement Plan, or identified as potential retrofitting projects by the Copermittee pursuant to Provision E.5.

(vi) *Offsite Channel, Stream, or Habitat Rehabilitation Projects*

The Copermittee may allow Priority Development Projects to utilize offsite channel, stream, or habitat rehabilitation projects to comply with the hydromodification management BMP performance requirements of Provision E.3.c.(2) if the rehabilitation projects have been identified within the strategies included in the Water Quality

Improvement Plan, or identified as potential channel rehabilitation projects by the Copermittee pursuant to Provision E.5. The channel, stream, or habitat rehabilitation project cannot be utilized for pollutant treatment except where artificial wetlands are constructed and located upstream of receiving waters.

(vii) *Offsite Regional Water Supply Augmentation Projects*

The Copermittee may allow Priority Development Projects to utilize offsite regional water supply augmentation projects (i.e. groundwater recharge, recycled water, storm water harvesting) to comply with the storm water pollutant control and hydromodification management BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2) if the projects have been identified within the strategies included in the Water Quality Improvement Plan.

(viii) *Project Applicant Proposed Alternative Compliance Projects*

The Copermittee may allow one or more Priority Development Project applicant(s) to propose and implement alternative compliance projects to comply with the storm water pollutant control and hydromodification management BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2) if the alternative compliance projects are consistent with, and will address the highest water quality priorities of the Water Quality Improvement Plan, and comply with the requirements of Provision E.3.c.(3)(a).

(c) Alternative Compliance In-Lieu Fee Option

The Copermittee may develop and implement an alternative compliance in-lieu fee option, individually or with other Copermittees and/or entities, as a means for designing, developing, constructing, operating and maintaining offsite alternative compliance projects under Provision E.3.c.(3)(b). Priority Development Projects allowed to utilize the alternative compliance in-lieu fee option must comply with the following conditions:

(i) The in-lieu fee must be transferred to the Copermittee (for public projects) or an escrow account (for private projects) prior to the date construction of the Priority Development Project is initiated.

(ii) If the in-lieu fee is applied to the development, design and construction of offsite alternative compliance projects, the following conditions must be met:

[a] The offsite alternative compliance projects must allow the Priority Development Project to comply with the onsite BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2);

[b] The offsite alternative compliance projects must be constructed as soon as possible, but no later than 4 years after the certificate of occupancy is granted for the first Priority Development Project that contributed funds toward the construction of the offsite alternative compliance projects, unless a longer period of time is authorized by the San Diego Water Board Executive Officer;

[c] The in-lieu fee for the Priority Development Project must include mitigation of the pollutant loads and increased storm water flow rates and durations that are allowed to discharge from the site before the offsite alternative compliance projects are constructed; and

[d] The in-lieu fee must also include the cost to operate and maintain the offsite alternative compliance projects.

(iii) If the in-lieu fee is applied to the operation and maintenance of offsite alternative compliance projects that have already been constructed, the offsite alternative compliance projects must allow the Priority Development Project to comply with the onsite structural BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2).

(d) Alternative Compliance Water Quality Credit System Option

The Copermittee may develop and implement an alternative compliance water quality credit system option, individually or with other Copermittees and/or entities, provided that such a credit system clearly exhibits that it will not allow discharges from Priority Development Projects to cause or contribute to a net impact over and above the impact caused by projects meeting the onsite structural BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2). Any credit system that a Copermittee chooses to implement must be submitted to the San Diego Water Board Executive Officer for review and acceptance as part of the Water Quality Improvement Plan.

(4) Long-Term Structural BMP Maintenance

Each Copermittee must require the project applicant to submit proof of the mechanism under which ongoing long-term maintenance of all structural BMPs will be conducted.

(5) Infiltration and Groundwater Protection

(a) Structural BMPs designed to primarily function as large, centralized infiltration devices (such as large infiltration trenches and infiltration basins) must not cause or contribute to an exceedance of an applicable groundwater quality objective. At a minimum, such infiltration BMPs must be in conformance with the design criteria listed below, unless the development project applicant demonstrates to the Copermittee that one or more of the specific design criteria listed below are not necessary to protect groundwater quality. The design criteria listed below do not apply to small infiltration systems dispersed throughout a development project.

(i) Runoff must undergo pretreatment such as sedimentation or filtration prior to infiltration;

(ii) Pollution prevention and source control BMPs must be implemented at a level appropriate to protect groundwater quality at sites where infiltration BMPs are to be used;

(iii) Infiltration BMPs must be adequately maintained to remove pollutants in storm water to the MEP;

(iv) The vertical distance from the base of any infiltration BMP to the seasonal high groundwater mark must be at least 10 feet. Where groundwater basins do not support beneficial uses, this vertical distance criteria may be reduced, provided groundwater quality is maintained;

(v) The soil through which infiltration is to occur must have physical and chemical characteristics (e.g., appropriate cation exchange capacity, organic content, clay content, and infiltration rate) which are adequate for proper infiltration durations and treatment of runoff for the protection of groundwater beneficial uses;

(vi) Infiltration BMPs must not be used for areas of industrial or light industrial activity, and other high threat to water quality land uses and activities as designated by each Copermittee, unless first treated or filtered to remove pollutants prior to infiltration; and

(vii) Infiltration BMPs must be located a minimum of 100 feet horizontally from any water supply wells.

(b) The Copermittee may develop, individually or with other Copermittees, alternative mandatory design criteria to that listed above for infiltration BMPs which are designed to primarily function as centralized infiltration devices. Before implementing the alternative design criteria in the development planning process the Copermitee(s) must:

(i) Notify the San Diego Water Board of the intent to implement the alternative design criteria submitted; and

(ii) Comply with any conditions set by the San Diego Water Board.

d. BMP DESIGN MANUAL UPDATE

Each Copermittee must update its BMP Design Manual[28] pursuant to Provision F.2.b. Until the Copermittee has updated its BMP Design Manual with the

[28] The BMP Design Manual was formerly known as the Standard Storm Water Mitigation Plan under Order Nos. R9-2007-0001, R9-2009-0002, and R9-2010-0016.

requirements of Provisions E.3.a-c, the Copermittee must continue implementing its current BMP Design Manual. Unless directed otherwise by the San Diego Water Board, the Copermittee must implement the BMP Design Manual within 180 days of completing the update. The update of the BMP Design Manual must include the following:

(1) Updated procedures to determine the nature and extent of storm water requirements applicable to a potential development or redevelopment projects. These procedures must inform project applicants of the storm water management requirements applicable to their project including, but not limited to, general requirements for all development projects, structural BMP design procedures and requirements, hydromodification management requirements, requirements specific to phased projects, and procedures specific to private developments and public improvement projects;

(2) Updated procedures to identify pollutants and conditions of concern for selecting the most appropriate structural BMPs that consider, at a minimum, the following:

(a) Receiving water quality (including pollutants for which receiving waters are listed as impaired under the CWA section 303(d) List);

(b) Pollutants, stressors, and/or receiving water conditions that cause or contribute to the highest priority water quality conditions identified in the Water Quality Improvement Plan;

(c) Land use type of the project and pollutants associated with that land use type; and

(d) Pollutants expected to be present onsite.

(3) Updated procedures for designing structural BMPs, including any updated performance requirements to be consistent with the requirements of Provision E.3.c for all structural BMPs listed in the BMP Design Manual;

(4) Long-term maintenance criteria for each structural BMP listed in the BMP Design Manual; and

(5) Alternative compliance criteria, in accordance with the requirements under Provision E.3.c.(3), if the Copermittee elects to allow Priority Development Projects within its jurisdiction to utilize alternative compliance.

e. PRIORITY DEVELOPMENT PROJECT BMP IMPLEMENTATION AND OVERSIGHT

Each Copermittee must implement a program that requires and confirms structural BMPs on all Priority Development Projects are designed, constructed, and maintained to remove pollutants in storm water to the MEP.

(1) Structural BMP Approval and Verification Process

(a) Each Copermittee must require and confirm that for all Priority Development Project applications that have not received prior lawful approval by the Copermittee by 18 months after the commencement of coverage under this Order, the requirements of Provision E.3 are implemented. For project applications that have received prior lawful approval by 18 months after the commencement of coverage under this Order, the Copermittee may allow previous land development requirements to apply.

(b) Each Copermittee must identify the roles and responsibilities of various municipal departments in implementing the structural BMP requirements, including each stage of a project from application review and approval through BMP maintenance and inspections.

(c) Each Copermittee must require and confirm that appropriate easements and ownerships are properly recorded in public records and the information is conveyed to all appropriate parties when there is a change in project or site ownership.

(d) Each Copermittee must require and confirm that prior to occupancy and/or intended use of any portion of the Priority Development Project, each structural BMP is inspected to verify that it has been constructed and is operating in compliance with all of its specifications, plans, permits, ordinances, and the requirements of this Order.

(2) Priority Development Project Inventory and Prioritization

(a) Each Copermittee must develop, maintain, and update at least annually, a watershed-based database to track and inventory all Priority Development Projects and associated structural BMPs within its jurisdiction. Inventories must be accurate and complete beginning from January 2002 for the San Diego County Copermittees, February 2003 for the Orange County Copermittees, and July 2005 for the Riverside County Copermittees. The use of an automated database system, such as GIS, is highly recommended. The database must include, at a minimum, the following information:

(i) Priority Development Project location (address and hydrologic subarea);

(ii) Descriptions of structural BMP type(s);

(iii) Date(s) of construction;

(iv) Party responsible for structural BMP maintenance;

(v) Dates and findings of structural BMP maintenance verifications; and

(vi) Corrective actions and/or resolutions.

(b) Each Copermittee must prioritize the Priority Development Projects with structural BMPs within its jurisdiction. The designation of Priority Development Projects as high priority must consider the following:

(i) The highest water quality priorities identified in the Water Quality Improvement Plan;

(ii) Receiving water quality;

(iii) Number and sizes of structural BMPs;

(iv) Recommended maintenance frequency of structural BMPs;

(v) Likelihood of operation and maintenance issues of structural BMPs;

(vi) Land use and expected pollutants generated; and

(vii) Compliance record.

(3) <u>Structural BMP Maintenance Verifications and Inspections</u>

Each Copermittee is required to verify that structural BMPs on each Priority Development Project are adequately maintained, and continue to operate effectively to remove pollutants in storm water to the MEP through inspections, self-certifications, surveys, or other equally effective approaches.

(a) All (100 percent) of the structural BMPs at Priority Development Projects that are designated as high priority must be inspected directly by the Copermittee annually prior to each rainy season;

(b) For verifications performed through a means other than direct Copermittee inspection, adequate documentation must be required by the Copermittee to provide assurance that the required maintenance of structural BMPs at each Priority Development Project has been completed; and

(c) Appropriate follow-up measures (including re-inspections, enforcement, etc.) must be conducted to ensure that structural BMPs at each Priority Development Project continue to reduce pollutants in storm water to the MEP as originally designed.

f. DEVELOPMENT PROJECT ENFORCEMENT

Each Copermittee must enforce its legal authority established pursuant to Provision E.1 for all development projects, as necessary, to achieve compliance with the requirements of this Order, in accordance with its Enforcement Response Plan pursuant to Provision E.6.

g. STRATEGIES TO ADDRESS THE HIGHEST PRIORITY WATER QUALITY CONDITIONS

Each Copermittee must describe in its jurisdictional runoff management program document the strategies and/or activities that will be implemented as part of the development planning program to address development and redevelopment projects that may become sources of pollutants and/or stressors that contribute to the highest priority water quality conditions in the Watershed Management Area as follows:

(1) Provide specific details about how the strategies and/or activities will be implemented (e.g. designate additional BMPs, focus education, increase frequency of verifications and/or inspections, alternative compliance options);

(2) Each Copermittee must identify areas within its jurisdiction where Priority Development Projects may be allowed or should be encouraged to implement or contribute toward the implementation of alternative compliance retrofitting and/or stream, channel, or habitat rehabilitation projects;

(3) Each Copermittee should collaborate and cooperate with other Copermittees and/or entities in the Watershed Management Area to identify regional alternative compliance projects that Priority Development Projects may be allowed or should be encouraged to implement or participate in implementing; and

(4) The strategies and/or activities must be consistent with the requirements of Provisions E.3.a-c and E.3.e-f and the strategies identified in the Water Quality Improvement Plan.

4. Construction Management

Each Copermittee must implement a construction management program in accordance with the strategies identified in the Water Quality Improvement Plan and includes, at a minimum, the following requirements:

a. PROJECT APPROVAL PROCESS

Prior to issuance of any local permit(s) that allows the commencement of construction projects that involve ground disturbance or soil disturbing activities that can potentially generate pollutants in storm water runoff, each Copermittee must:

(1) Require a site-specific pollution control, construction BMP, and/or erosion and sediment control plan, to be submitted by the project applicant to the Copermittee;

(2) Confirm the pollution control, construction BMP, and/or erosion and sediment control plan, complies with the local grading ordinance, other applicable local ordinances, and the requirements of this Order;

(3) Confirm the pollution control, construction BMP, and/or erosion and sediment control plan, includes seasonally appropriate and effective BMPs and management measures described in Provision E.4.c, as applicable to the project; and

(4) Verify that the project applicant has obtained coverage under applicable permits, including, but not limited to the Construction General Permit, Clean Water Act Section 401 Water Quality Certification and Section 404 Permit, and California Department of Fish and Game Streambed Alteration Agreement.

b. CONSTRUCTION SITE INVENTORY AND TRACKING

(1) Each Copermittee must maintain, and update at least monthly, a watershed-based inventory of all construction projects issued a local permit that allows ground disturbance or soil disturbing activities that can potentially generate pollutants in storm water runoff. The use of an automated database system, such as GIS, is highly recommended. The inventory must include:

(a) Relevant contact information for each site (e.g., name, address, phone, and email for the owner and contractor);

(b) The basic site information including location (address and hydrologic subarea), Waste Discharge Identification (WDID) number (if applicable), size of the site, and approximate area of disturbance;

(c) Whether or not the site is considered a high threat to water quality, as defined in Provision E.4.b.(2) below;

(d) The project start and anticipated completion dates;

(e) Current construction phase;

(f) The required inspection frequency, as defined in the Copermittee's jurisdictional runoff management program document;

(g) The date the Copermittee accepted and/or approved the site-specific pollution control, construction BMP, and/or erosion and sediment control plan; and

(h) Whether or not there are ongoing enforcement actions administered to the site.

(2) Each Copermittee must identify all construction sites within its jurisdiction that represent a high threat to downstream surface water quality. The designation of construction sites as high threat to water quality must consider the following:

(a) Sites located within a hydrologic subarea where sediment is known or suspected to contribute to the highest priority water quality conditions identified in the Water Quality Improvement Plan;

(b) Sites located within the same hydrologic subarea and tributary to a water body segment listed as impaired for sediment on the CWA section 303(d) List;

(c) Sites located within, directly adjacent to, or discharging directly to a receiving water within an ESA; and

(d) Other sites determined by the Copermittees or the San Diego Water Board as a high threat to water quality.

c. CONSTRUCTION SITE BMP IMPLEMENTATION

Each Copermittee must implement, or require the implementation of effective BMPs to reduce discharges of pollutants in storm water from construction sites to the MEP, and prevent non-storm water discharges from construction sites into the MS4. These BMPs must be site specific, seasonally appropriate, and construction phase appropriate. BMPs must be implemented at each construction site year round. Dry season BMP implementation must plan for and address unseasonal rain events that may occur during the dry season (May 1 through September 30). Copermittees must implement, or require the implementation of, BMPs in the following categories:

(1) Project Planning;

(2) Good Site Management “Housekeeping”, including waste management;

(3) Non-storm Water Management;

(4) Erosion Control;

(5) Sediment Control;

(6) Run-on and Run-off Control; and

(7) Active/Passive Sediment Treatment Systems, where applicable.

d. CONSTRUCTION SITE INSPECTIONS

Each Copermittee must conduct construction site inspections to require and confirm compliance with its local permits and applicable local ordinances, and the requirements of this Order. Priority for site inspections must consider threat to water quality pursuant to Provision E.4.b as well as the nature of the construction activity, topography, and the characteristics of soils and receiving water quality.

(1) Inspection Frequency

(a) Each Copermittee must conduct inspections at all inventoried sites, including high threat to water quality sites, at an appropriate frequency for each phase of construction to ensure the site reduces the discharge of pollutants in storm water from construction sites to the MEP, and prevents non-storm water discharges from entering the MS4.

(b) Each Copermittee must establish appropriate inspection frequencies for high threat to water quality sites, and all other sites, for each phase of construction. Inspection frequencies appropriate for addressing the highest water quality priorities identified in the Water Quality Improvement Plan, and for complying with the requirements of this Order must be identified in each Copermittee's jurisdictional runoff management program document.

(c) Based upon inspection findings, each Copermittee must implement all follow-up actions (i.e., re-inspection, enforcement) necessary to require and confirm site compliance with its local permits and applicable local ordinances, and the requirements of this Order.

(2) Inspection Content

Inspections of construction sites by the Copermittee must include, at a minimum:

(a) Verification of coverage under the Construction General Permit (Notice of Intent (NOI) and/or WDID number) during initial inspections, when applicable;

(b) Assessment of compliance with its local permits and applicable local ordinances related to pollution prevention, including the implementation and maintenance of applicable BMPs;

(c) Assessment of BMP adequacy and effectiveness;

(d) Visual observations of actual non-storm water discharges;

(e) Visual observations of actual or potential discharge of sediment and/or construction related materials from the site;

(f) Visual observations of actual or potential illicit connections; and

(g) If any violations are found and BMP corrections are needed, inspectors must take and document appropriate actions in accordance with the Enforcement Response Plan pursuant to Provision E.6.

(3) Inspection Tracking and Records

Each Copermittee must track all inspections and re-inspections at all inventoried construction sites. The Copermittee must retain all inspection records in an electronic database or tabular format, which must be made available to the San Diego Water Board upon request. Inspection records must include, at a minimum:

(a) Site name, location (address and hydrologic subarea), and WDID number (if applicable);

(b) Inspection date;

(c) Approximate amount of rainfall since last inspection;

(d) Description of problems observed with BMPs and indication of need for BMP addition/repair/replacement and any scheduled re-inspection, and date of re-inspection;

(e) Descriptions of any other specific inspection comments which must, at a minimum, include rationales for longer compliance time;

(f) Description of enforcement actions issued in accordance with the Enforcement Response Plan pursuant to Provision E.6; and

(g) Resolution of problems noted and date problems fixed.

e. CONSTRUCTION SITE ENFORCEMENT

Each Copermittee must enforce its legal authority established pursuant to Provision E.1 for all its inventoried construction sites, as necessary, to achieve compliance with the requirements of this Order, in accordance with its Enforcement Response Plan pursuant to Provision E.6.

f. STRATEGIES TO ADDRESS THE HIGHEST PRIORITY WATER QUALITY CONDITIONS

Each Copermittee must describe in its jurisdictional runoff management program document the strategies and/or activities that will be implemented as part of the construction management program to address construction sites that the Copermittee has identified as potential sources of pollutants and/or stressors that contribute to the highest priority water quality conditions in the Watershed Management Area as follows:

(1) Provide specific details about how the strategies and/or activities will be implemented (e.g. designate additional BMPs, focus education, and/or increase/decrease frequency of inspections for specific types of sites and/or activities); and

(2) The strategies and/or activities must be consistent with the requirements of Provisions E.4.c-e and the strategies identified in the Water Quality Improvement Plan.

5. Existing Development Management

Each Copermittee must implement an existing development management program in accordance with the strategies identified in the Water Quality Improvement Plan and includes, at a minimum, the following requirements:

a. EXISTING DEVELOPMENT INVENTORY AND TRACKING

Each Copermittee must maintain, and update at least annually, a watershed-based inventory of the existing development within its jurisdiction that may discharge a pollutant load to and from the MS4. The use of an automated database system, such as GIS, is highly recommended. The inventory must, at a minimum, include:

(1) Name, location (hydrological subarea and address, if applicable) of the following types of existing development with its jurisdiction:

(a) Commercial facilities or areas;

(b) Industrial facilities;

(c) Municipal facilities, including:

(i) MS4 and related structures,[29]

(ii) Roads, streets, and highways,

(iii) Parking facilities,

(iv) Municipal airfields,

(v) Parks and recreation facilities,

(vi) Flood management and flood control devices and structures,

(vii) Operating or closed municipal landfills,

(viii) Publicly owned treatment works (including water and wastewater treatment plants) and sanitary sewer collection systems,

(ix) Corporate yards, including maintenance and storage yards for materials, waste, equipment, and vehicles,

(x) Hazardous waste collection facilities,

[29] The inventory may refer to the MS4 map required to be maintained pursuant to Provision E.2.b.(1).

(xi) Other treatment, storage or disposal facilities for municipal waste, and

(xii) Other municipal facilities that the Copermittee determines may contribute a significant pollutant load to the MS4; and

(d) Residential areas, which may be designated by one or more of the following:

(i) Residential management area,

(ii) Drainage basin or area,

(iii) Land use (e.g., single family, multi-family, rural),

(iv) Neighborhood,

(v) Common Interest Area,

(vi) Home Owner Association,

(vii) Mobile home park, and/or

(viii) Other designations accepted by the San Diego Water Board Executive Officer.

(2) A description of the facility or area, including the following information:

(a) Classification as commercial, industrial, municipal, or residential;

(b) Status of facility or area as active or inactive;

(c) Identification if a business is a mobile business;

(d) SIC Code or NAICS Code, if applicable;

(e) Industrial General Permit NOI and/or WDID number, if applicable;

(f) Identification if a residential area is or includes a Common Interest Area / Home Owner Association, or mobile home park;

(g) Identification of pollutants generated and potentially generated by the facility or area;

(h) Whether the facility or area is adjacent to an ESA;

(i) Whether the facility or area is tributary to and within the same hydrologic subarea as a water body segment listed as impaired on the CWA section 303(d) List and generates pollutants for which the water body segment is impaired; and

(j) Whether the facility or area contributes or potentially contributes to the highest priority water quality conditions identified in the Water Quality Improvement Plan.

(3) An annually updated map showing the location of inventoried existing development, watershed boundaries, and water bodies.

b. EXISTING DEVELOPMENT BMP IMPLEMENTATION AND MAINTENANCE

Each Copermittee must designate a minimum set of BMPs required for all inventoried existing development, including special event venues. The designated minimum BMPs must be specific to facility or area types and pollutant generating activities, as appropriate.

(1) <u>Commercial, Industrial, and Municipal Facilities and Areas</u>

(a) Pollution Prevention

Each Copermittee must require the use of pollution prevention methods by the commercial, industrial, and municipal facilities and areas in its inventoried existing development.

(b) BMP Implementation

Each Copermittee must implement, or require the implementation of, designated BMPs at commercial facilities and areas, industrial facilities, and municipal facilities in its inventoried existing development.

(c) BMP Operation and Maintenance

(i) Each Copermittee must properly operate and maintain, or require the proper operation and maintenance of designated BMPs at commercial facilities and areas, industrial facilities, and municipal facilities in its inventoried existing development.

(ii) Each Copermittee must implement a schedule of operation and maintenance activities for its MS4 and related structures (including but not limited to catch basins, storm drain inlets, detention basins, etc.), and verify proper operation of all its municipal structural treatment controls designed to reduce pollutants (including floatables) in storm water discharges to or from its MS4s and related drainage structures. Operation and maintenance activities may include, but is not limited to, the following:

[a] Inspections of the MS4 and related structures;
[b] Cleaning of the MS4 and related structures; and
[c] Proper disposal of materials removed from cleaning of the MS4 and related structures.

(iii) Each Copermittee must implement a schedule of operation and maintenance for public streets, unpaved roads, paved roads, and paved highways and freeways within its jurisdiction to minimize pollutants that can be discharged in storm water.

(iv) Each Copermittee must implement controls to prevent infiltration of sewage into the MS4 from leaking sanitary sewers. Copermittees that operate both a municipal sanitary sewer system and a MS4 must implement controls and measures to prevent and eliminate seeping sewage from infiltrating the MS4. Copermittees that do not operate both a municipal sanitary sewer system and a MS4 must coordinate with sewering agencies to keep themselves informed of relevant and appropriate maintenance activities and sanitary sewage projects in their jurisdiction that may cause or contribute to seepage of sewage into the MS4.

(d) Pesticides, Herbicides, and Fertilizers BMPs

Each Copermittee must implement BMPs, or require the implementation of BMPs, to reduce pollutants in storm water discharges to the MEP and effectively prohibit non-storm water discharges associated with the application, storage, and disposal of pesticides, herbicides and fertilizers from commercial facilities and areas, industrial facilities, and municipal facilities in its inventoried existing development. Such BMPs must include, as appropriate, educational activities, permits, certifications and other measures for applicators and distributors.

(2) Residential Areas

(a) Pollution Prevention

Each Copermittee must promote and encourage the use of pollution prevention methods, where appropriate, by the residential areas in its inventoried existing development.

(b) BMP Implementation

Each Copermittee must promote and encourage the implementation of designated BMPs at residential areas in its inventoried existing development.

(c) BMP Operation and Maintenance

Each Copermittee must properly operate and maintain, or require the proper operation and maintenance of designated BMPs at residential areas in its inventoried existing development.

(d) Pesticides, Herbicides, and Fertilizers BMPs

Each Copermittee must promote and encourage the implementation of BMPs to reduce pollutants in storm water discharges to the MEP and effectively prohibit non-storm water discharges associated with the application, storage, and disposal of pesticides, herbicides and fertilizers from residential areas in its inventoried existing development.

c. EXISTING DEVELOPMENT INSPECTIONS

Each Copermittee must conduct inspections of inventoried existing development to ensure compliance with applicable local ordinances and permits, and the requirements of this Order.

(1) Inspection Frequency

(a) Each Copermittee must establish appropriate inspection frequencies for inventoried existing development in accordance with the following requirements:

(i) At a minimum, inventoried existing development must be inspected once every five years utilizing one or more of the following methods:

[a] Drive-by inspections by Copermittee municipal and contract staff,
[b] Onsite inspections by Copermittee municipal and contract staff, and/or
[c] Inspections by volunteer monitoring or patrol programs trained by the Copermittee;

(ii) The frequency of inspections must be appropriate to confirm that BMPs are being implemented to reduce the discharge of pollutants in storm water from the MS4 to the MEP and effectively prohibit non-storm water discharges to the MS4;

(iii) The frequency of inspections must be based on the potential for a facility or area to discharge non-storm water and pollutants in storm water, and should reflect the priorities set forth in the Water Quality Improvement Plan;

(iv) Each Copermittee must annually perform onsite inspections of an equivalent of at least 20 percent of the commercial facilities and areas, industrial facilities, and municipal facilities in its inventoried existing development;[30] and

(v) Inventoried existing development must be inspected by the Copermittee, as needed, in response to valid public complaints and

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[30] If any commercial, industrial, or municipal facilities or areas require multiple onsite inspections during any given year, those additional inspection may count toward the total annual inspection requirement. This requirement excludes linear municipal facilities (i.e., MS4, streets, roads and highways).

findings from the Copermittee's municipal and contract staff or volunteer monitoring or patrol program inspections.

(b) Based upon inspection findings, each Copermittee must implement all follow-up actions (i.e. education and outreach, re-inspection, enforcement) necessary to require and confirm compliance with its applicable local ordinances and permits and the requirements of this Order, in accordance with its Enforcement Response Plan pursuant to Provision E.6.

(2) <u>Inspection Content</u>

(a) Inspections of existing development by the Copermittee or volunteer monitoring or patrol programs must include, at a minimum:

(i) Visual inspections for actual non-storm water discharges;

(ii) Visual inspections for actual or potential discharge of pollutants;

(iii) Visual inspections for actual or potential illicit connections; and

(iv) Verification that the description of the facility or area in the inventory, required pursuant to Provision E.5.a.(2), has not changed.

(b) Onsite inspections of existing development by the Copermittee must include, at a minimum:

(i) Assessment of compliance with its applicable local ordinances and permits related to non-storm water and storm water discharges and runoff;

(ii) Assessment of the implementation of the designated BMPs;

(iii) Verification of coverage under the Industrial General Permit, when applicable; and

(iv) If any problems or violations are found, inspectors must take and document appropriate actions in accordance with the Enforcement Response Plan pursuant to Provision E.6.

(3) <u>Inspection Tracking and Records</u>

Each Copermittee must track all inspections and re-inspections at all inventoried existing development. The Copermittee must retain all inspection records in an electronic database or tabular format, which must be made available to the San Diego Water Board upon request. Inspection records must include, at a minimum:

(a) Name and location of facility or area (address and hydrologic subarea) consistent with the inventory name and location, pursuant to Provision E.5.a.(1);

(b) Inspection and re-inspection date(s);

(c) Inspection method(s) (i.e. drive-by, onsite);

(d) Observations and findings from the inspection(s);

(e) For onsite inspections of existing development by Copermittee municipal or contract staff, the records must also include, as applicable:

(i) Description of any problems or violations found during the inspection(s),

(ii) Description of enforcement actions issued in accordance with the Enforcement Response Plan pursuant to Provision E.6, and

(iii) The date problems or violations were resolved.

d. EXISTING DEVELOPMENT ENFORCEMENT

Each Copermittee must enforce its legal authority established pursuant to Provision E.1 for all its inventoried existing development, as necessary, to achieve compliance with the requirements of this Order, in accordance with its Enforcement Response Plan pursuant to Provision E.6.

e. STRATEGIES TO ADDRESS THE HIGHEST PRIORITY WATER QUALITY CONDITIONS

Each Copermittee must implement the water quality improvement strategies, where necessary, to address areas of existing development within its jurisdiction that are identified as sources of pollutants and/or stressors contributing to the highest priority water quality conditions in the Watershed Management Area. For the existing development management program, the following strategies must be implemented:

(1) <u>Specific Existing Development Management Program Strategies</u>

Each Copermittee must describe in its jurisdictional runoff management program document the strategies and/or activities that will be implemented within its jurisdiction to address areas of existing development that the Copermittee has identified as sources of pollutants and/or stressors that contribute to the highest priority water quality conditions in the Watershed Management Area as follows:

(a) Provide specific details about how the strategies and/or activities will be implemented (e.g. designate additional BMPs, focus education, and/or increase/decrease frequency of inspections for specific types of facilities, areas and/or activities);

(b) The facilities and/or areas within the Copermittee's jurisdiction where the strategies and/or activities will be implemented; and

(c) The strategies and/or activities must be consistent with the requirements of Provisions E.5.b-d and the strategies identified in the Water Quality Improvement Plan.

(2) Retrofitting Areas of Existing Development

Each Copermittee must describe in its jurisdictional runoff management program document, a program to retrofit areas of existing development within its jurisdiction to address identified sources of pollutants and/or stressors that contribute to the highest priority water quality conditions in the Watershed Management Area. The program must be implemented as follows:

(a) Each Copermittee must identify areas of existing development as candidates for retrofitting, focusing on areas where retrofitting will address pollutants and/or stressors that contribute to the highest priority water quality conditions identified in the Water Quality Improvement Plan;

(b) Candidates for retrofitting projects may be utilized to reduce pollutants that may be discharged in storm water from areas of existing development, and/or address storm water runoff flows and durations from areas of existing development that cause or contribute to hydromodification in receiving waters;

(c) Each Copermittee must develop a strategy to facilitate the implementation of retrofitting projects in areas of existing development identified as candidates;

(d) Each Copermittee should identify areas of existing development where Priority Development Projects may be allowed or should be encouraged to implement or contribute toward the implementation of alternative compliance retrofitting projects; and

(e) Where retrofitting projects within specific areas of existing development are determined to be infeasible to address the highest priority water quality conditions in the Water Quality Improvement Plan, the Copermittee should collaborate and cooperate with other Copermittees and/or entities in the Watershed Management Area to identify, develop, and implement regional retrofitting projects (i.e. projects that can receive and/or treat storm water from one or more areas of existing development and will result in a net benefit to water quality and the environment) adjacent to and/or downstream of the areas of existing development.

(3) Stream, Channel and/or Habitat Rehabilitation in Areas of Existing Development

Each Copermittee must describe in its jurisdictional runoff management program document, a program to rehabilitate streams, channels, and/or habitats in areas of existing development within its jurisdiction to address the highest priority water quality conditions in the Watershed Management Area. The program must be implemented as follows:

(a) Each Copermittee must identify streams, channels, and/or habitats in areas of existing development as candidates for rehabilitation, focusing on areas where stream, channel, and/or habitat rehabilitation projects will address the highest priority water quality conditions identified in the Water Quality Improvement Plan;

(b) Candidates for stream, channel, and/or habitat rehabilitation projects may be utilized to address storm water runoff flows and durations from areas of existing development that cause or contribute to hydromodification in receiving waters, rehabilitate channelized or hydromodified streams, restore wetland and riparian habitat, restore watershed functions, and/or restore beneficial uses of receiving waters;

(c) Each Copermittee must develop a strategy to facilitate the implementation of stream, channel, and/or habitat rehabilitation projects in areas of existing development identified as candidates;

(d) Each Copermittee should identify areas of existing development where Priority Development Projects may be allowed or should be encouraged to implement or contribute toward the implementation of alternative compliance stream, channel, and/or habitat rehabilitation projects; and

(e) Where stream, channel, and/or habitat rehabilitation projects within specific areas of existing development are determined to be infeasible to address the highest priority water quality conditions in the Water Quality Improvement Plan, the Copermittee should collaborate and cooperate with other Copermittees and/or entities in the Watershed Management Area to identify, develop, and implement regional stream, channel, and/or habitat rehabilitation projects (i.e. projects that can receive storm water from one or more areas of existing development and will result in a net benefit to water quality and the environment).

6. Enforcement Response Plans

Each Copermittee must develop and implement an Enforcement Response Plan as part of its jurisdictional runoff management program document. The Enforcement Response Plan must describe the applicable approaches and options to enforce its legal authority established pursuant to Provision E.1, as necessary, to achieve compliance with the requirements of this Order. The Enforcement Response Plan must include the following:

a. Enforcement Response Plan Components

The Enforcement Response Plan must include the following individual components:

(1) Illicit Discharge Detection and Elimination Enforcement Component;

(2) Development Planning Enforcement Component;

(3) Construction Management Enforcement Component; and

(4) Existing Development Enforcement Component.

b. Enforcement Response Approaches and Options

Each component of the Enforcement Response Plan must describe the enforcement response approaches that the Copermittee will implement to compel compliance with its statutes, ordinances, permits, contracts, orders, or similar means, and the requirements of this Order. The description must include the protocols for implementing progressively stricter enforcement responses. The enforcement response approaches must include appropriate sanctions to compel compliance, including, at a minimum, the following tools or their equivalent:

(1) Verbal and written notices of violation;

(2) Cleanup requirements;

(3) Fines;

(4) Bonding requirements;

(5) Administrative and criminal penalties;

(6) Liens;

(7) Stop work orders; and

(8) Permit and occupancy denials.

c. CORRECTION OF VIOLATIONS

(1) Violations must be corrected in a timely manner with the goal of correcting the violations within 30 calendar days after the violations are discovered, or prior to the next predicted rain event, whichever is sooner.

(2) If more than 30 calendar days are required to achieve compliance, then a rationale must be recorded in the applicable electronic database or tabular system used to track violations.

d. ESCALATED ENFORCEMENT

(1) The Enforcement Response Plan must include a definition of "escalated enforcement." Escalated enforcement must include any enforcement scenario where a violation or other non-compliance is determined to cause or contribute to the highest priority water quality conditions identified in the Water Quality Improvement Plan. Escalated enforcement may be defined differently for development planning, construction sites, commercial facilities or areas, industrial facilities, municipal facilities, and residential areas.

(2) Where the Copermittee determines escalated enforcement is not required, a rationale must be recorded in the applicable electronic database or tabular system used to track violations.

(3) Escalated enforcement actions must continue to increase in severity, as necessary, to compel compliance as soon as possible.

e. REPORTING OF NON-COMPLIANT SITES

(1) Each Copermittee must notify the San Diego Water Board in writing within 2 working days of issuing escalated enforcement (as defined in the Copermittee's Enforcement Response Plan) to a construction site that poses a significant threat to water quality as a result of violations or other non-compliance with its permits and applicable local ordinances, and the requirements of this Order. Written notification may be provided electronically by email.

(2) Each Copermittee must notify the San Diego Water Board of non-filers under the Industrial General Permit and Construction General Permit by email to Nonfilers_R9@waterboards.ca.gov.

7. Public Education and Participation

Each Copermittee must implement, individually or with other Copermittees, a public education and participation program in accordance with the strategies identified in the Water Quality Improvement Plan to promote and encourage the development of programs, management practices, and behaviors that reduce the discharge of pollutants in storm water to the MEP, prevent controllable non-storm water discharges from entering the MS4, and protect water quality standards in receiving waters.

a. Public Education

The public education program component implemented within the Copermittee's jurisdiction must include, at a minimum, the following:

(1) Educational activities, public information activities, and other appropriate outreach activities intended to reduce pollutants associated with the application of pesticides, herbicides and fertilizer and other pollutants of concern in storm water discharges to and from its MS4 to the MEP, as determined and prioritized by the Copermittee(s) by jurisdiction and/or watershed to address the highest priority water quality conditions identified in the Water Quality Improvement Plan;

(2) Educational activities, public information activities, and other appropriate outreach activities to facilitate the proper management and disposal of used oil and toxic materials; and

(3) Appropriate education and training measures for specific target audiences, such as construction site operators, residents, underserved target audiences and school-aged children, as determined and prioritized by the Copermittee(s) by jurisdiction and/or watershed, based on high risk behaviors and pollutants of concern.

b. Public Participation

The public participation program component implemented within the Copermittee's jurisdiction must include, at a minimum, the following:

(1) A process for members of the public to participate in updating the highest priority water quality conditions, numeric goals, and water quality improvement strategies in the Water Quality Improvement Plan.

(2) Opportunities for members of the public to participate in providing the Copermittee recommendations for improving the effectiveness of the water quality improvement strategies implemented within its jurisdiction.

(3) Opportunities for members of the public to participate in programs and/or activities that can result in the prevention or elimination of non-storm water discharges to the MS4, reduction of pollutants in storm water discharges from the MS4, and/or restoration and protection of the quality of receiving waters.

c. STRATEGIES TO ADDRESS THE HIGHEST PRIORITY WATER QUALITY CONDITIONS

Each Copermittee must describe in its jurisdictional runoff management program document the strategies and/or activities that will be implemented within its jurisdiction, as applicable, to educate the public and encourage public participation to address potential sources of pollutants and/or stressors that contribute to the highest priority water quality conditions in the Watershed Management Area as follows:

(1) The target audiences and/or areas within the Copermittee's jurisdiction where the strategies and/or activities will be implemented;

(2) Provide specific details about how the strategies and/or activities will be implemented (e.g. educational topics, materials and/or activities, public outreach and participation programs and/or opportunities);

(3) Each Copermittee should collaborate and cooperate with other Copermittees and/or entities in the Watershed Management Area to identify and implement regional public education and participation activities, programs and opportunities;

(4) Each Copermittee must incorporate a mechanism for evaluating and assessing educational and other public outreach activities, as needed, to identify progress and incorporate modifications necessary to increase the effectiveness of the public education and participation program.

8. Fiscal Analysis

a. Each Copermittee must secure the resources necessary to meet all the requirements of this Order.

b. Each Copermittee must conduct an annual fiscal analysis of its jurisdictional runoff management program in its entirety. The fiscal analysis must include the following:

(1) Identification of the various categories of expenditures necessary to implement the requirements of this Order, including a description of the specific capital, operation and maintenance, and other expenditure items to be accounted for in each category of expenditures;

(2) The staff resources needed and allocated to meet the requirements of this Order, including any development, implementation, and enforcement activities required;

(3) The estimated expenditures for Provisions E.8.b.(1) and E.8.b.(2) for the current fiscal year; and

(4) The source(s) of funds that are proposed to meet the necessary expenditures described in Provisions E.8.b.(1) and E.8.b.(2), including legal restrictions on the use of such funds, for the current fiscal year and next fiscal year.

c. Each Copermittee must submit a summary of the annual fiscal analysis with each Annual Report required pursuant to Provision F.3.b.

d. Each Copermittee must provide the documentation used to develop the summary of the annual fiscal analysis upon request by the San Diego Water Board.

F. REPORTING

The purpose of this provision is to determine and document compliance with the requirements set forth in this Order. The goal of reporting is to communicate to the San Diego Water Board and the people of the State of California the implementation status of each jurisdictional runoff management program and compliance with the requirements of this Order. This goal is to be accomplished through the submittal of specific deliverables to the San Diego Water Board by the Copermittees.

1. Water Quality Improvement Plans

The Copermittees for each Watershed Management Area must develop and submit the Water Quality Improvement Plan in accordance with the following requirements:

a. Water Quality Improvement Plan Development

Each Water Quality Improvement Plan must be developed in accordance with the following process:

(1) The Copermittees must develop a schedule detailing public participation opportunities during the Water Quality Improvement Plan development. The schedule must indicate dates for public participation required under Provisions F.1.a.(2)(a), (b) and F.1.a.(3)(a). The schedule must be made available on the Regional Clearinghouse within 30 days of Permit adoption.

~~(1)~~(2) Priority Water Quality Conditions and Numeric Goals

(a) The Copermittees must implement a public participation process to solicit data and information to be utilized in the development and identification of the priority water quality conditions for the Watershed Management Area.

(b) The Copermittees ~~are encouraged to~~must involve the public and key stakeholders as early and often as possible during the development of the priority water quality conditions and numeric goals to be included in the Water Quality Improvement Plan.

(c) Within 6 months after the commencement of coverage under this Order, the Copermittees must develop and submit the Water Quality Improvement Plan requirements of Provision B.2 to the San Diego Water Board. The San Diego Water Board will issue a public notice and solicit public comments on the Water Quality Improvement Plan for a minimum of 60 days.

(d) The Copermittees must revise the priority water quality conditions and numeric goals based on comments received and/or recommendations or direction from the San Diego Water Board Executive Officer.

~~(2)~~(3) Water Quality Improvement Strategies and Schedules

(a) The Copermittees ~~are encouraged to~~must involve the public and key stakeholders as early and often as possible during the development of the water quality improvement strategies and schedules to be included in the Water Quality Improvement Plan.

(b) Within 9 months after the commencement of coverage under this Order, the Copermittees must develop and submit the Water Quality Improvement Plan requirements of Provision B.3 to the San Diego Water Board. The San Diego Water Board will issue a public notice and solicit public comments on the Water Quality Improvement Plan for a minimum of 60 days.

(c) The Copermittees must revise the water quality improvement strategies and schedules based on comments received and/or recommendations or direction from the San Diego Water Board Executive Officer.

b. WATER QUALITY IMPROVEMENT PLAN SUBMITTAL

(1) Within 18 months after the commencement of coverage under this Order, the Copermittees for each Watershed Management Area must submit a complete Water Quality Improvement Plan in accordance with the requirements of Provision B to the San Diego Water Board. The San Diego Water Board will issue a public notice and solicit public comments on the Water Quality Improvement Plan for a minimum of ~~30~~60 days.

(2) T~~Based on the comments received, t~~he San Diego Water Board will ~~determine whether to~~ hold a public hearing on the Water Quality Improvement Plan. ~~or to limit public input to submittal of written comments. If no hearing is held the San Diego Water Board will notify the Copermittees within 6 months that the Water Quality Improvement Plan has been accepted as complete following its review and determination that the Water Quality Improvement Plan meets the requirements of this Order.~~

(3) The Copermittees must revise the Water Quality Improvement Plan based on comments received and/or recommendations or direction from the San Diego Water Board Executive Officer.

(4) The Water Quality Improvement Plan must be made available on the Regional Clearinghouse required pursuant to Provision F.4 within 30 days of acceptance by the San Diego Water Board.

2. Updates

a. JURISDICTIONAL RUNOFF MANAGEMENT PROGRAM DOCUMENT UPDATES

Each Copermittee must update its jurisdictional runoff management program document in accordance with the following requirements:

(1) Each Copermittee is encouraged to involve the public and key stakeholders as early and often as possible to solicit recommendations for updates to its jurisdictional runoff management program document.

(2) Each Copermittee must update its jurisdictional runoff management program document to incorporate the requirements of Provision E no later than 18 months after the commencement of coverage under this Order.

(3) Each Copermittee must submit updates to its jurisdictional runoff management program, with a rationale for the modifications, either in the Annual Report required pursuant to Provision F.3.b, or as part of the Report of Waste Discharge required pursuant to Provision F.5.b.

(4) The Copermittee must revise the modifications as directed by the San Diego Water Board Executive Officer.

(5) Updated jurisdictional runoff management program documents must be made available on the Regional Clearinghouse required pursuant to Provision F.4 within 30 days of submitting the Annual Report.

b. BMP DESIGN MANUAL UPDATES

Each Copermittee must update its BMP Design Manual in accordance with the following requirements:

(1) Each Copermittee must update its BMP Design Manual to incorporate the requirements of Provisions E.3.a-d no later than 18 months after the commencement of coverage under this Order.

(2) Subsequent updates must be consistent with the requirements of Provisions E.3.a-d and must be submitted as part of the Annual Reports required pursuant to Provision F.3.b, or as part of the Report of Waste Discharge required pursuant to Provision F.5.b.

(3) Updated BMP Design Manuals must be made available on the Regional Clearinghouse required pursuant to Provision F.4 within 30 days of completing the update.

c. WATER QUALITY IMPROVEMENT PLAN UPDATES

The Water Quality Improvement Plans must be updated in accordance with the following process:

(1) The Copermittees must implement a public participation process to solicit

data and information to be utilized in updating the Water Quality Improvement Plan.

(2) The Copermittees are encouraged to involve the public and key stakeholders as early and often as possible during the updates to the Water Quality Improvement Plan.

(3) The Copermittees for each Watershed Management Area must submit requested updates to the Water Quality Improvement Plan, with the public input received and the rationale for the requested updates, either in the Annual Reports required pursuant to Provision F.3.b, or as part of the Report of Waste Discharge required pursuant to Provision F.5.b. The requested updates are considered accepted by the San Diego Water Board if no response is provided to the Copermittee after 3 months of submitting the request.

(4) The Copermittees must revise the requested updates as directed by the San Diego Water Board Executive Officer.

(5) Updated Water Quality Improvement Plans must be made available on the Regional Clearinghouse required pursuant to Provision F.4 within 30 days of acceptance of the requested updates by the San Diego Water Board.

3. Progress Reporting

a. Progress Report Presentations

The Copermittees for each Watershed Management Area must appear before the San Diego Water Board, as requested by the San Diego Water Board, to provide progress reports on the implementation of the Water Quality Improvement Plan and jurisdictional runoff management programs.

b. Annual Reports

(1) The Copermittees for each Watershed Management Area must submit an Annual Report for each reporting period no later than January 31 of the following year. The annual reporting period consists of two periods: 1) July 1 to June 30 of the following year for the jurisdictional runoff management programs, 2) October 1 to September 30 of the following year for the monitoring and assessment programs. The first Annual Report must be prepared for the reporting period beginning July 1 after commencement of coverage under this Order, and upon San Diego Water Board determination that the Water Quality Improvement Plan meets the requirements of this Order to June 30 in the following year for the jurisdictional runoff management programs, and September 30 in the following year for the monitoring and assessment programs. Annual Reports must be made available on the

Regional Clearinghouse required pursuant to Provision F.4. Each Annual Report must include the following:

(a) The receiving water and MS4 outfall discharge monitoring data collected pursuant to Provisions D.1 and D.2, summarized and presented in tabular and graphical form;

(b) Progress of the special studies required pursuant to Provision D.3, and the results or findings when a special study, or each phase of a special study, is completed;

(c) The findings from the assessments required pursuant to Provision D.4;

(d) The progress of implementing the Water Quality Improvement Plan, including, but not limited to, the following:

(i) The progress toward achieving the interim and final numeric goals for the highest water quality priorities for the Watershed Management Area,

(ii) The water quality improvement strategies that were implemented and/or no longer implemented by each of the Copermittees during the reporting period and previous reporting periods, and are planned to be implemented during the next reporting period,

(iii) Proposed modifications to the water quality improvement strategies, with public input received and rationale for the proposed modifications,

(iv) Previously proposed modifications or updates incorporated into the Water Quality Improvement Plan and/or each Copermittee's jurisdictional runoff management program document and implemented by the Copermittees in the Watershed Management Area, and

(v) Proposed modifications or updates to the Water Quality Improvement Plan and/or each Copermittee's jurisdictional runoff management program document;

(e) A completed Jurisdictional Runoff Management Program Annual Report Form (Attachment D or accepted revision) for each Copermittee in the Watershed Management Area, certified by a Principal Executive Officer, Ranking Elected Official, or Duly Authorized Representative.

(2) Each Copermittee must complete and submit a Jurisdictional Runoff Management Program Annual Report Form (Attachment D or accepted revision) no later than October 31 of each year until the first Annual Report is required to be submitted. Each Copermittee must submit the information on

the Jurisdictional Runoff Management Program Annual Report Form specific to the area within its jurisdiction in each Watershed Management Area.

(3) Each Copermittee must provide any data or documentation utilized in developing the Annual Report upon request by the San Diego Water Board. Any monitoring data utilized in developing the Annual Report must be uploaded to the California Environmental Data Exchange Network (CEDEN).[31] Any monitoring and assessment data utilized in developing the Annual Report must be provided on the Regional Clearinghouse required pursuant to Provision F.4.

c. Regional Monitoring and Assessment Report

(1) The Copermittees must submit a Regional Monitoring and Assessment Report no later than 180 days in advance of the expiration date of this Order. The Regional Monitoring and Assessment Report may be submitted as part of the Report of Waste Discharge required pursuant to Provision F.5.b. The Copermittees must review the receiving water and MS4 outfall discharge monitoring data collected pursuant to Provisions D.1 and D.2, and findings from the assessments required pursuant to Provision D.4, to assess the following:

(a) The beneficial uses of the receiving waters within the San Diego Region that are protected or must be restored;

(b) The progress toward restoring impacted beneficial uses in the receiving waters within the San Diego Region; and

(c) Pollutants or conditions of emerging concern that may impact beneficial uses in the receiving waters within the San Diego Region.

(2) The Regional Monitoring and Assessment Report must include recommendations for improving the implementation and assessment of the Water Quality Improvement Plans and jurisdictional runoff management programs.

(3) Each Copermittee must provide any data or documentation utilized in developing the Regional Monitoring and Assessment Report upon request by the San Diego Water Board. Any monitoring and assessment data utilized in developing the Regional Monitoring and Assessment Report must be provided on the Regional Clearinghouse required pursuant to Provision F.4.

[31] Data must be uploaded to CEDEN Southern California Regional Data Center (http://www.sccwrp.org/Data/DataSubmission/SouthernCaliforniaRegionalDataCenter.aspx) using the templates provided on the CEDEN website.

4. Regional Clearinghouse

The Copermittees must develop, update, and maintain an internet-based Regional Clearinghouse that is made available to the public no later than 18 months after the effective date of this Order.

a. The Copermittees, through the Regional Clearinghouse, must make the following documents and data available, organized by Watershed Management Area, which may be linked to other internet-based data portals and databases where the original documents are stored:

(1) Water Quality Improvement Plan for the Watershed Management Area, and all updated versions with date of update;

(2) Annual Reports for the Watershed Management Area;

(3) Jurisdictional Runoff Management Program document for each Copermittee within the Watershed Management Area, and all updated versions with date of update;

(4) BMP Design Manual for each Copermittee within the Watershed Management Area, and all updated versions with date of update;

(5) Reports from special studies (e.g. source identification, BMP effectiveness assessment) conducted in the Watershed Management Area;

(6) Monitoring data collected pursuant to Provision D for each Watershed Management Area must be uploaded to CEDEN,[32] with links to the uploaded data; and

(7) Available GIS data, layers, and/or shapefiles used to develop the maps generated and maintained by the Copermittees for the Water Quality Improvement Plans, Annual Reports, and jurisdictional runoff management program documents.

b. The Copermittees, through the Regional Clearinghouse, must make the following information and documents available:

(1) Contact information (point of contact, phone number, email address, and mailing address) for each Copermittee;

(2) Public hotline number for reporting non-storm water and illicit discharges for each Copermittee;

[32] Data must be uploaded to CEDEN Southern California Regional Data Center (http://www.sccwrp.org/Data/DataSubmission/SouthernCaliforniaRegionalDataCenter.aspx) using the templates provided on the CEDEN website.

(3) Email address for reporting non-storm water and illicit discharges for each Copermittee;

(4) Link to each Copermittee's website, if available, where the public may find additional information about the Copermittee's storm water management program and for requesting records for the implementation of its program;

(5) Information about opportunities for the public to participate in programs and/or activities that can result in the prevention or elimination of non-storm water discharges to the MS4, reduction of pollutants in storm water discharges from the MS4, and/or restoration and protection of the quality of receiving waters; and

(6) Reports from regional monitoring programs in which the Copermittees participate (e.g. Southern California Monitoring Coalition, Southern California Coastal Water Research Project Bight Monitoring);

(7) Regional Monitoring and Assessment Reports; and

(8) Any other information, data, and documents the Copermittees determine as appropriate for making available to the public.

5. Report of Waste Discharge

a. The Orange County Copermittees and the Riverside County Copermittees are required to submit a complete Report of Waste Discharge pursuant to the requirements of their current Orders. The San Diego Water Board will review and consider the Reports of Waste Discharge to determine whether modification to this Order, pursuant to the requirements of Provision H, will be required prior the Orange County Copermittees and/or Riverside County Copermittees becoming covered under this Order. The current Orders for the Orange County Copermittees and Riverside County Copermittees are rescinded upon notification of coverage under this Order except for enforcement purposes.

b. The Copermittees subject to the requirements of this Order must submit to the San Diego Water Board a complete Report of Waste Discharge as an application for the re-issuance of this Order and NPDES permit. The Report of Waste Discharge must be submitted no later than 180 days in advance of the expiration date of this Order. The Report of Waste Discharge must contain the following minimum information:

(1) Names and addresses of the Copermittees;

(2) Names and titles of the primary contacts of the Copermittees;

(3) Proposed changes to the Copermittees' Water Quality Improvement Plans and the supporting justification;

(4) Proposed changes to the Copermittees' jurisdictional runoff management programs and the supporting justification;

(5) Any other information necessary for the re-issuance of this Order;

(6) Any information to be included as part of the Report of Waste Discharge pursuant to the requirements of this Order; and

(7) Any other information required by federal regulations for NPDES permit reissuance.

6. Application for Early Coverage

a. The Orange County Copermittees, collectively, or Riverside County Copermittees, collectively, may apply for early coverage under this Order by submitting a Report of Waste Discharge Form 200, with a written request for early coverage under this Order.

b. The San Diego Water Board will review the application for early coverage. A notification of coverage under this Order will be issued to the Copermittees in the respective county by the San Diego Water Board upon completion of the early coverage application requirements. The effective coverage date will be specified in the notification of coverage. The Copermittees in the respective county are authorized to have MS4 discharges pursuant to the requirements of this Order starting on the effective coverage date specified in the notification of coverage. The existing Order for the respective county is rescinded upon the effective coverage date specified in the notification of coverage except for enforcement purposes.

7. Reporting Provisions

Each Copermittee must comply with all the reporting and recordkeeping provisions of the Standard Permit Provisions and General Provisions contained in Attachment B to this Order.

G. PRINCIPAL WATERSHED COPERMITTEE RESPONSIBILITIES

1. The Copermittees within each Watershed Management Area must designate a Principal Watershed Copermittee and notify the San Diego Water Board of the name of the Principal Watershed Copermittee. An individual Copermittee should not be designated a Principal Watershed Copermittee for more than two Watershed Management Areas. The notification may be submitted with the Water Quality Improvement Plan required pursuant to Provision F.1 of this Order.

2. The Principal Watershed Copermittee is responsible for, at a minimum, the following:

a. Serving as liaison between the Copermittees in the Watershed Management Area and the San Diego Water Board on general permit issues, and when necessary and appropriate, representing the Copermittees in the Watershed Management Area before the San Diego Water Board.

b. Facilitating the development of the Water Quality Improvement Plan in accordance with the requirements of Provision B of this Order

c. Coordinating the submittal of the deliverables required by Provisions F.1, F.2, F.3.a, and F.3.b of this Order.

d. Coordinating and developing, with the other Principal Watershed Copermittees, the requirements of Provisions F.3.c, F.4, and F.5.b of this Order.

H. MODIFICATION OF PROGRAMS

1. Modifications of the Order may be initiated by the San Diego Water Board or by the Copermittees. Requests by Copermittees must be made to the San Diego Water Board.

2. Minor modifications to the Order may be made by the San Diego Water Board where the proposed modification complies with all the prohibitions and limitations, and other requirements of this Order.

3. Proposed modifications to the Order that are not minor require amendment of this Order in accordance with this Order's rules, policies, and procedures.

4. The San Diego Water Board may re-open and modify this Order at any time prior to its expiration, after opportunity for public comment and a public hearing, if the State Water Board determines that revisions are warranted to those provisions of the Order addressing compliance with water quality standards in the receiving water and/or those provisions of the Order establishing an iterative process for implementation of management practices to assure compliance with water quality standards in the receiving water.

I. STANDARD PERMIT PROVISIONS AND GENERAL PROVISIONS

Each Copermittee must comply with all the Standard Permit Provisions and General Provisions contained in Attachment B to this Order.

ATTACHMENT A

DISCHARGE PROHIBITIONS AND SPECIAL PROTECTIONS

1. Basin Plan Waste Discharge Prohibitions

California Water Code Section 13243 provides that a Regional Water Board, in a water quality control plan, may specify certain conditions or areas where the discharge of waste or certain types of waste is not permitted. The following waste discharge prohibitions in the Water Quality Control Plan for the San Diego Basin (Basin Plan) are applicable to any person, as defined by Section 13050(c) of the California Water Code, who is a citizen, domiciliary, or political agency or entity of California whose activities in California could affect the quality of waters of the state within the boundaries of the San Diego Region.

1. The discharge of waste to waters of the state in a manner causing, or threatening to cause a condition of pollution, contamination or nuisance as defined in California Water Code Section 13050, is prohibited.

2. The discharge of waste to land, except as authorized by waste discharge requirements or the terms described in California Water Code Section 13264 is prohibited.

3. The discharge of pollutants or dredged or fill material to waters of the United States except as authorized by a National Pollutant Discharge Elimination System (NPDES) permit or a dredged or fill material permit (subject to the exemption described in California Water Code Section 13376) is prohibited.

4. Discharges of recycled water to lakes or reservoirs used for municipal water supply or to inland surface water tributaries thereto are prohibited, unless this San Diego Water Board issues a NPDES permit authorizing such a discharge; the proposed discharge has been approved by the State Department of Health Services (DHS) and the operating agency of the impacted reservoir; and the discharger has an approved fail-safe long-term disposal alternative.

5. The discharge of waste to inland surface waters, except in cases where the quality of the discharge complies with applicable receiving water quality objectives, is prohibited. Allowances for dilution may be made at the discretion of the San Diego Water Board. Consideration would include streamflow data, the degree of treatment provided and safety measures to ensure reliability of facility performance. As an example, discharge of secondary effluent would probably be permitted if streamflow provided 100:1 dilution capability.

6. The discharge of waste in a manner causing flow, ponding, or surfacing on lands not owned or under the control of the discharger is prohibited, unless the discharge is authorized by the San Diego Water Board.

7. The dumping, deposition, or discharge of waste directly into waters of the state, or adjacent to such waters in any manner which may permit its being transported into the waters, is prohibited unless authorized by the San Diego Water Board.

8. Any discharge to a storm water conveyance system that is not composed entirely of "*storm water*" is prohibited unless authorized by the San Diego Water Board. [The federal regulations, 40 CFR 122.26(b)(13), define storm water as storm water runoff, snow melt runoff, and surface runoff and drainage. 40 CFR 122.26(b)(2) defines an illicit discharge as any discharge to a storm water conveyance system that is not composed entirely of storm water except discharges pursuant to a NPDES permit and discharges resulting from fire fighting activities.] [§122.26 amended at 56 FR 56553, November 5, 1991; 57 FR 11412, April 2, 1992].

9. The unauthorized discharge of treated or untreated sewage to waters of the state or to a storm water conveyance system is prohibited.

10. The discharge of industrial wastes to conventional septic tank/subsurface disposal systems, except as authorized by the terms described in California Water Code Section 13264, is prohibited.

11. The discharge of radioactive wastes amenable to alternative methods of disposal into the waters of the state is prohibited.

12. The discharge of any radiological, chemical, or biological warfare agent into waters of the state is prohibited.

13. The discharge of waste into a natural or excavated site below historic water levels is prohibited unless the discharge is authorized by the San Diego Water Board.

14. The discharge of sand, silt, clay, or other earthen materials from any activity, including land grading and construction, in quantities which cause deleterious bottom deposits, turbidity or discoloration in waters of the state or which unreasonably affect, or threaten to affect, beneficial uses of such waters is prohibited.

15. The discharge of treated or untreated sewage from vessels to Mission Bay, Oceanside Harbor, Dana Point Harbor, or other small boat harbors is prohibited.

16. The discharge of untreated sewage from vessels to San Diego Bay is prohibited.

17. The discharge of treated sewage from vessels to portions of San Diego Bay that are less than 30 feet deep at mean lower low water (MLLW) is prohibited.

18. The discharge of treated sewage from vessels, which do not have a properly functioning US Coast Guard certified Type I or Type II marine sanitation device, to portions of San Diego Bay that are greater than 30 feet deep at mean lower low water (MLLW) is prohibited.

2. Attachment B to State Water Board Resolution 2012-0012

Special Protections for Areas of Special Biological Significance, Governing Point Source Discharges of Storm Water and Nonpoint Source Waste Discharges

I. PROVISIONS FOR POINT SOURCE DISCHARGES OF STORM WATER AND NONPOINT SOURCE WASTE DISCHARGES

The following terms, prohibitions, and special conditions (hereafter collectively referred to as special conditions) are established as limitations on point source storm water and nonpoint source discharges. These special conditions provide Special Protections for marine aquatic life and natural water quality in Areas of Special Biological Significance (ASBS), as required for State Water Quality Protection Areas pursuant to California Public Resources Code Sections 36700(f) and 36710(f). These Special Protections are adopted by the State Water Board as part of the California Ocean Plan (Ocean Plan) General Exception.

The special conditions are organized by category of discharge. The State Water Resources Control Board (State Water Board) and Regional Water Quality Control Boards (Regional Water Boards) will determine categories and the means of regulation for those categories [e.g., Point Source Storm Water National Pollutant Discharge Elimination System (NPDES) or Nonpoint Source].

A. PERMITTED POINT SOURCE DISCHARGES OF STORM WATER

1. General Provisions for Permitted Point Source Discharges of Storm Water

    a. Existing storm water discharges into an ASBS are allowed only under the following conditions:

        (1) The discharges are authorized by an NPDES permit issued by the State Water Board or Regional Water Board;

        (2) The discharges comply with all of the applicable terms, prohibitions, and special conditions contained in these Special Protections; and

        (3) The discharges:

            (i) Are essential for flood control or slope stability, including roof, landscape, road, and parking lot drainage;

            (ii) Are designed to prevent soil erosion;

            (iii) Occur only during wet weather;

            (iv) Are composed of only storm water runoff.

    b. Discharges composed of storm water runoff shall not alter natural ocean water quality in an ASBS.

    c. The discharge of trash is prohibited.

d. Only discharges from existing storm water outfalls are allowed. Any proposed or new storm water runoff discharge shall be routed to existing storm water discharge outfalls and shall not result in any new contribution of waste to an ASBS (i.e., no additional pollutant loading). "Existing storm water outfalls" are those that were constructed or under construction prior to January 1, 2005. "New contribution of waste" is defined as any addition of waste beyond what would have occurred as of January 1, 2005. A change to an existing storm water outfall, in terms of re-location or alteration, in order to comply with these special conditions, is allowed and does not constitute a new discharge.

e. Non-storm water discharges are prohibited except as provided below:

(1) The term "non-storm water discharges" means any waste discharges from a municipal separate storm sewer system (MS4) or other NPDES permitted storm drain system to an ASBS that are not composed entirely of storm water.

(2) (i) The following non-storm water discharges are allowed, provided that the discharges are essential for emergency response purposes, structural stability, slope stability or occur naturally:

(a) Discharges associated with emergency fire fighting operations.

(b) Foundation and footing drains.

(c) Water from crawl space or basement pumps.

(d) Hillside dewatering.

(e) Naturally occurring groundwater seepage via a storm drain.

(f) Non-anthropogenic flows from a naturally occurring stream via a culvert or storm drain, as long as there are no contributions of anthropogenic runoff.

(ii) An NPDES permitting authority may authorize non-storm water discharges to an MS4 with a direct discharge to an ASBS only to the extent the NPDES permitting authority finds that the discharge does not alter natural ocean water quality in the ASBS.

(3) Authorized non-storm water discharges shall not cause or contribute to a violation of the water quality objectives in Chapter II of the Ocean Plan nor alter natural ocean water quality in an ASBS.

2. Compliance Plans for Inclusion in Storm Water Management Plans (SWMP) and Storm Water Pollution Prevention Plans (SWPPP).

The discharger shall specifically address the prohibition of non-storm water runoff and the requirement to maintain natural water quality for storm water discharges to an ASBS in an ASBS Compliance Plan to be included in its SWMP or a SWPPP, as appropriate to permit type. If a statewide permit includes a SWMP, then the discharger shall prepare a stand-alone compliance plan for ASBS discharges. The ASBS Compliance Plan is subject to approval by the Executive Director of the State Water Board (statewide permits) or Executive Officer of the Regional Water Board (for permits issued by Regional Water Boards).

a. The Compliance Plan shall include a map of surface drainage of storm water runoff, showing areas of sheet runoff, prioritize discharges, and describe any structural Best Management Practices (BMPs) already employed and/or BMPs to be employed in the future. Priority discharges are those that pose the greatest water quality threat and which are identified to require installation of structural BMPs. The map shall also show the storm water conveyances in relation to other features such as service areas, sewage conveyances and treatment facilities, landslides, areas prone to erosion, and waste and hazardous material storage areas, if applicable. The SWMP or SWPPP shall also include a procedure for updating the map and plan when changes are made to the storm water conveyance facilities.

b. The ASBS Compliance Plan shall describe the measures by which all non-authorized non-storm water runoff (e.g., dry weather flows) has been eliminated, how these measures will be maintained over time, and how these measures are monitored and documented.

c. For Municipal Separate Storm Sewer System (MS4s), the ASBS Compliance Plan shall require minimum inspection frequencies as follows:

   (1) The minimum inspection frequency for construction sites shall be weekly during rainy season;

   (2) The minimum inspection frequency for industrial facilities shall be monthly during the rainy season;

   (3) The minimum inspection frequency for commercial facilities (e.g., restaurants) shall be twice during the rainy season; and

   (4) Storm water outfall drains equal to or greater than 18 inches (457 mm) in diameter or width shall be inspected once prior to the beginning of the rainy season and once during the rainy season and maintained to remove trash and other anthropogenic debris.

d. The ASBS Compliance Plan shall address storm water discharges (wet weather flows) and, in particular, describe how pollutant reductions in storm water runoff, that are necessary to comply with these special conditions, will be achieved through BMPs. Structural BMPs need not be installed if the discharger can document to the satisfaction of the State Water Board Executive Director (statewide permits) or Regional Water Board Executive Officer (Regional Water Board permits) that such installation would pose a threat to health or safety. BMPs to control storm water runoff discharges (at the end-of-pipe) during a design storm shall be designed to achieve on average the following target levels:

   (1) Table B Instantaneous Maximum Water Quality Objectives in Chapter II of the Ocean Plan; or

   (2) A 90% reduction in pollutant loading during storm events, for the applicant’s total discharges. The baseline for the reduction is the effective date of the Exception. The baseline for these determinations is the effective date of the Exception, and the

reductions must be achieved and documented within four (4) years of the effective date.

e. The ASBS Compliance Plan shall address erosion control and the prevention of anthropogenic sedimentation in ASBS. The natural habitat conditions in the ASBS shall not be altered as a result of anthropogenic sedimentation.

f. The ASBS Compliance Plan shall describe the non-structural BMPs currently employed and planned in the future (including those for construction activities), and include an implementation schedule. The ASBS Compliance Plan shall include non-structural BMPs that address public education and outreach. Education and outreach efforts must adequately inform the public that direct discharges of pollutants from private property not entering an MS4 are prohibited. The ASBS Compliance Plan shall also describe the structural BMPs, including any low impact development (LID) measures, currently employed and planned for higher threat discharges and include an implementation schedule. To control storm water runoff discharges (at the end-of-pipe) during a design storm, permittees must first consider using LID practices to infiltrate, use, or evapotranspirate storm water runoff on-site.

g. The BMPs and implementation schedule shall be designed to ensure that natural water quality conditions in the receiving water are achieved and maintained by either reducing flows from impervious surfaces or reducing pollutant loading, or some combination thereof.

h. If the results of the receiving water monitoring described in IV.B. of these special conditions indicate that the storm water runoff is causing or contributing to an alteration of natural ocean water quality in the ASBS, the discharger shall submit a report to the State Water Board and Regional Water Board within 30 days of receiving the results.

(1) The report shall identify the constituents in storm water runoff that alter natural ocean water quality and the sources of these constituents.

(2) The report shall describe BMPs that are currently being implemented, BMPs that are identified in the SWMP or SWPPP for future implementation, and any additional BMPs that may be added to the SWMP or SWPPP to address the alteration of natural water quality. The report shall include a new or modified implementation schedule for the BMPs.

(3) Within 30 days of the approval of the report by the State Water Board Executive Director (statewide permits) or Regional Water Board Executive Officer (Regional Water Board permits), the discharger shall revise its ASBS Compliance Plan to incorporate any new or modified BMPs that have been or will be implemented, the implementation schedule, and any additional monitoring required.

(4) As long as the discharger has complied with the procedures described above and is implementing the revised SWMP or SWPPP, the discharger does not have to repeat the same procedure for continuing or recurring exceedances of natural ocean water quality conditions due to the same constituent.

(5) Compliance with this section does not excuse violations of any term, prohibition, or condition contained in these Special Protections.

3. Compliance Schedule

a. On the effective date of the Exception, all non-authorized non-storm water discharges (e.g., dry weather flow) are effectively prohibited.

b. Within one year from the effective date of the Exception, the discharger shall submit a written ASBS Compliance Plan to the State Water Board Executive Director (statewide permits) or Regional Water Board Executive Officer (Regional Water Board permits) that describes its strategy to comply with these special conditions, including the requirement to maintain natural water quality in the affected ASBS. The ASBS Compliance Plan shall include a time schedule to implement appropriate non-structural and structural controls (implementation schedule) to comply with these special conditions for inclusion in the discharger's SWMP or SWPPP, as appropriate to permit type.

c. Within 18 months of the effective date of the Exception, any non-structural controls that are necessary to comply with these special conditions shall be implemented.

d. Within four (4) years of the effective date of the Exception, any structural controls identified in the ASBS Compliance Plan that are necessary to comply with these special conditions shall be operational.

e. Within four (4) years of the effective date of the Exception, all dischargers must comply with the requirement that their discharges into the affected ASBS maintain natural ocean water quality. If the initial results of post-storm receiving water quality testing indicate levels higher than the 85^{th} percentile threshold of reference water quality data and the pre-storm receiving water levels, then the discharger must re-sample the receiving water, pre- and post-storm. If after re-sampling the post-storm levels are still higher than the 85^{th} percentile threshold of reference water quality data, and the pre-storm receiving water levels, for any constituent, then natural ocean water quality is exceeded. See attached Flowchart.

f. The Executive Director of the State Water Board (statewide permits) or Executive Officer of the Regional Water Board (Regional Water Board permits) may only authorize additional time to comply with the special conditions d. and e., above if good cause exists to do so. Good cause means a physical impossibility or lack of funding.

   If a discharger claims physical impossibility, it shall notify the Board in writing within thirty (30) days of the date that the discharger first knew of the event or circumstance that caused or would cause it to fail to meet the deadline in d. or e. The notice shall describe the reason for the noncompliance or anticipated noncompliance and specifically refer to this Section of this Exception. It shall describe the anticipated length of time the delay in compliance may persist, the cause or causes of the delay as well as measures to minimize the impact of the delay on water quality, the measures taken or to be taken by the discharger to prevent or minimize the delay, the schedule by which the measures will be implemented, and the anticipated date of compliance. The discharger shall adopt all reasonable measures to avoid and minimize such delays and their impact on water quality.

   The discharger may request an extension of time for compliance based on lack of funding. The request for an extension shall require:

(1) for municipalities, a demonstration of significant hardship to discharger ratepayers, by showing the relationship of storm water fees to annual household income for residents within the discharger's jurisdictional area, and the discharger has made timely and complete applications for all available bond and grant funding, and either no bond or grant funding is available, or bond and/or grant funding is inadequate; or
(2) for other governmental agencies, a demonstration and documentation of a good faith effort to acquire funding through that agency's budgetary process.

B. NONPOINT SOURCE DISCHARGES

[NOT INCLUDED]
[PROVISIONS FOR NONPOINT SOURCE DISCHARGES NOT APPLICABLE]

II. ADDITIONAL REQUIREMENTS FOR PARKS AND RECREATION FACILITIES

[NOT INCLUDED]
[ADDITIONAL REQUIREMENTS FOR PARKS AND RECREATION FACILITIES NOT APPLICABLE]

III. ADDITIONAL REQUIREMENTS – WATERFRONT AND MARINE OPERATIONS

[NOT INCLUDED]
[ADDITIONAL REQUIREMENTS FOR WATERFRONT AND MARINE OPERATIONS NOT APPLICABLE]

IV. MONITORING REQUIREMENTS

Monitoring is mandatory for all dischargers to assure compliance with the Ocean Plan. Monitoring requirements include both: (A) core discharge monitoring, and (B) ocean receiving water monitoring. The State and Regional Water Boards must approve sampling site locations and any adjustments to the monitoring programs. All ocean receiving water and reference area monitoring must be comparable with the Water Boards' Surface Water Ambient Monitoring Program (SWAMP).

Safety concerns: Sample locations and sampling periods must be determined considering safety issues. Sampling may be postponed upon notification to the State and Regional Water Boards if hazardous conditions prevail.

Analytical Chemistry Methods: All constituents must be analyzed using the lowest minimum detection limits comparable to the Ocean Plan water quality objectives. For metal analysis, all samples, including storm water effluent, reference samples, and ocean receiving water samples, must be analyzed by the approved analytical method with the lowest minimum detection limits (currently Inductively Coupled Plasma/Mass Spectrometry) described in the Ocean Plan.

A. CORE DISCHARGE MONITORING PROGRAM

1. General sampling requirements for timing and storm size:

   Runoff must be collected during a storm event that is greater than 0.1 inch and generates runoff, and at least 72 hours from the previously measurable storm event. Runoff samples shall be collected when post-storm receiving water is sampled, and analyzed for the same constituents as receiving water and reference site samples (see section IV B) as described below.

2. Runoff flow measurements

   a. For municipal/industrial storm water outfalls in existence as of December 31, 2007, 18 inches (457mm) or greater in diameter/width (including multiple outfall pipes in combination having a width of 18 inches, runoff flows must be measured or calculated, using a method acceptable to and approved by the State and Regional Water Boards.
   b. This will be reported annually for each precipitation season to the State and Regional Water Boards.

3. Runoff samples – storm events

   a. For outfalls equal to or greater than 18 inches (0.46m) in diameter or width:

      (1) samples of storm water runoff shall be analyzed during the same storm as receiving water samples for oil and grease, total suspended solids, and, within the range of the southern sea otter indicator bacteria or some other measure of fecal contamination, ; and

      (2) samples of storm water runoff shall be analyzed for critical life stage chronic toxicity (one invertebrate or algal species) at least once during each storm season when receiving water is sampled in the ASBS

      (3) If an applicant has no outfall greater than 36 inches, then storm water runoff from the applicant's largest outfall shall be further analyzed during the same storm as receiving water samples for Ocean Plan Table B metals for protection of marine life, Ocean Plan polynuclear aromatic hydrocarbons (PAHs), current use pesticides (pyrethroids and OP pesticides), and nutrients (ammonia, nitrate and phosphates).

   b. For outfalls equal to or greater than 36 inches (0.91m) in diameter or width:

      (1) samples of storm water runoff shall be analyzed during the same storm as receiving water samples for oil and grease, total suspended solids, and, within the range of the southern sea otter indicator bacteria or some other measure of fecal contamination; and

      (2) samples of storm water runoff shall be further analyzed during the same storm as receiving water samples for Ocean Plan Table B metals for protection of marine life, Ocean Plan polynuclear aromatic hydrocarbons (PAHs), current use pesticides (pyrethroids and OP pesticides), and nutrients (ammonia, nitrate and phosphates) and

(3) samples of storm water runoff shall be analyzed for critical life stage chronic toxicity (one invertebrate or algal species) at least once during each storm season when receiving water is sampled in the ASBS.

c. For an applicant not participating in a regional monitoring program [see below in Section IV (B)] in addition to (a.) and (b.) above, a minimum of the two largest outfalls or 20 percent of the larger outfalls, whichever is greater, shall be sampled (flow weighted composite samples) at least three times annually during wet weather (storm event) and analyzed for all Ocean Plan Table A constituents, Table B constituents for marine aquatic life protection (except for toxicity, only chronic toxicity for three species shall be required), DDT, PCBs, Ocean Plan PAHs, OP pesticides, pyrethroids, nitrates, phosphates, and Ocean Plan indicator bacteria. For parties discharging to ASBS in more than one Regional Water Board region, at a minimum, one (the largest) such discharge shall be sampled annually in each Region.

4. The Executive Director of the State Water Board (statewide permits) or Executive Officer of the Regional Water Board (Regional Water Board permits) may reduce or suspend core monitoring once the storm runoff is fully characterized. This determination may be made at any point after the discharge is fully characterized, but is best made after the monitoring results from the first permit cycle are assessed.

B. OCEAN RECEIVING WATER AND REFERENCE AREA MONITORING PROGRAM

In addition to performing the Core Discharge Monitoring Program in Section II.A above, all applicants having authorized discharges must perform ocean receiving water monitoring. In order to fulfill the requirements for monitoring the physical, chemical, and biological characteristics of the ocean receiving waters within their ASBS, dischargers may choose either (1) an individual monitoring program, or (2) participation in a regional integrated monitoring program.

1. Individual Monitoring Program: The requirements listed below are for those dischargers who elect to perform an individual monitoring program to fulfill the requirements for monitoring the physical, chemical, and biological characteristics of the ocean receiving waters within the affected ASBS. In addition to Core Discharge Monitoring, the following additional monitoring requirements shall be met:

   a. Three times annually, during wet weather (storm events), the receiving water at the point of discharge from the outfalls described in section (IV)(A)(3)(c) above shall be sampled and analyzed for Ocean Plan Table A constituents, Table B constituents for marine aquatic life, DDT, PCBs, Ocean Plan PAHs, OP pesticides, pyrethroids, nitrates, phosphates, salinity, chronic toxicity (three species), and Ocean Plan indicator bacteria.

   The sample location for the ocean receiving water shall be in the surf zone at the point of discharges; this must be at the same location where storm water runoff is sampled. Receiving water shall be sampled at approximately the same time prior to (pre-storm) and during (or immediately after) the same storm (post storm). Reference water quality shall also be sampled and analyzed for the same constituents pre-storm and post-storm, during the same storms when receiving water is sampled. Reference stations will be determined by the State Water Board's Division of Water Quality and the applicable Regional Water Board(s).

b. Sediment sampling shall occur at least three times during every five (5) year period. The subtidal sediment (sand or finer, if present) at the discharge shall be sampled and analyzed for Ocean Plan Table B constituents for marine aquatic life, DDT, PCBs, PAHs, pyrethroids, and OP pesticides. For sediment toxicity testing, only an acute toxicity test using the amphipod Eohaustorius estuarius must be performed.

c. A quantitative survey of intertidal benthic marine life shall be performed at the discharge and at a reference site. The survey shall be performed at least once every five (5) year period. The survey design is subject to approval by the Regional Water Board and the State Water Board's Division of Water Quality. The results of the survey shall be completed and submitted to the State Water Board and Regional Water Board at least six months prior to the end of the permit cycle.

d. Once during each five (5) year period, a bioaccumulation study shall be conducted to determine the concentrations of metals and synthetic organic pollutants at representative discharge sites and at representative reference sites. The study design is subject to approval by the Regional Water Board and the State Water Board's Division of Water Quality. The bioaccumulation study may include California mussels (Mytilus californianus) and/or sand crabs (Emerita analoga or Blepharipoda occidentalis). Based on the study results, the Regional Water Board and the State Water Board's Division of Water Quality, may adjust the study design in subsequent permits, or add or modify additional test organisms (such as shore crabs or fish), or modify the study design appropriate for the area and best available sensitive measures of contaminant exposure.

e. Marine Debris: Representative quantitative observations for trash by type and source shall be performed along the coast of the ASBS within the influence of the discharger's outfalls. The design, including locations and frequency, of the marine debris observations is subject to approval by the Regional Water Board and State Water Board's Division of Water Quality.

f. The monitoring requirements of the Individual Monitoring Program in this section are minimum requirements. After a minimum of one (1) year of continuous water quality monitoring of the discharges and ocean receiving waters, the Executive Director of the State Water Board (statewide permits) or Executive officer of the Regional Water Board (Regional Water Board permits) may require additional monitoring, or adjust, reduce or suspend receiving water and reference station monitoring. This determination may be made at any point after the discharge and receiving water is fully characterized, but is best made after the monitoring results from the first permit cycle are assessed.

2. Regional Integrated Monitoring Program: Dischargers may elect to participate in a regional integrated monitoring program, in lieu of an individual monitoring program, to fulfill the requirements for monitoring the physical, chemical, and biological characteristics of the ocean receiving waters within their ASBS. This regional approach shall characterize natural water quality, pre- and post-storm, in ocean reference areas near the mouths of identified open space watersheds and the effects of the discharges on natural water quality (physical, chemical, and toxicity) in the ASBS receiving waters, and should include benthic marine aquatic life and bioaccumulation components. The design of the ASBS stratum of a regional integrated monitoring program may deviate from the otherwise prescribed individual monitoring approach (in Section IV.B.1) if approved by the State Water Board's Division of Water Quality and the Regional Water Boards.

a. Ocean reference areas shall be located at the drainages of flowing watersheds with minimal development (in no instance more than 10% development), and shall not be located in CWA Section 303(d) listed waterbodies or have tributaries that are 303(d) listed. Reference areas shall be free of wastewater discharges and anthropogenic non-storm water runoff. A minimum of low threat storm runoff discharges (e.g. stream highway overpasses and campgrounds) may be allowed on a case-by-case basis. Reference areas shall be located in the same region as the ASBS receiving water monitoring occurs. The reference areas for each Region are subject to approval by the participants in the regional monitoring program and the State Water Board's Division of Water Quality and the applicable Regional Water Board(s). A minimum of three ocean reference water samples must be collected from each station, each from a separate storm. A minimum of one reference location shall be sampled for each ASBS receiving water site sampled per responsible party. For parties discharging to ASBS in more than one Regional Water Board region, at a minimum, one reference station and one receiving water station shall be sampled in each region.

b. ASBS ocean receiving water must be sampled in the surf zone at the location where the runoff makes contact with ocean water (i.e. at "point zero"). Ocean receiving water stations must be representative of worst-case discharge conditions (i.e. co-located at a large drain greater than 36 inches, or if drains greater than 36 inches are not present in the ASBS then the largest drain greater than18 inches.) Ocean receiving water stations are subject to approval by the participants in the regional monitoring program and the State Water Board's Division of Water Quality and the applicable Regional Water Board(s). A minimum of three ocean receiving water samples must be collected during each storm season from each station, each from a separate storm. A minimum of one receiving water location shall be sampled in each ASBS per responsible party in that ASBS. For parties discharging to ASBS in more than one Regional Water Board region, at a minimum, one reference station and one receiving water station shall be sampled in each region.

c. Reference and receiving water sampling shall commence during the first full storm season following the adoption of these special conditions, and post-storm samples shall be collected when annual storm water runoff is sampled. Sampling shall occur in a minimum of two storm seasons. For those ASBS dischargers that have already participated in the Southern California Bight 2008 ASBS regional monitoring effort, sampling may be limited to only one storm season.

d. Receiving water and reference samples shall be analyzed for the same constituents as storm water runoff samples. At a minimum, constituents to be sampled and analyzed in reference and discharge receiving waters must include oil and grease, total suspended solids, Ocean Plan Table B metals for protection of marine life, Ocean Plan PAHs, pyrethroids, OP pesticides, ammonia, nitrate, phosphates, and critical life stage chronic toxicity for three species. In addition, within the range of the southern sea otter, indicator bacteria or some other measure of fecal contamination shall be analyzed.

3. Waterfront and Marine Operations: In addition to the above requirements for ocean receiving water monitoring, additional monitoring must be performed for marinas and boat launch and pier facilities:

a. For all marina or mooring field operators, in mooring fields with 10 or more occupied moorings, the ocean receiving water must be sampled for Ocean Plan indicator bacteria, residual chlorine, copper, zinc, grease and oil, methylene blue active substances (MBAS), and ammonia nitrogen.

(1) For mooring field operators opting for an individual monitoring program (Section IV.B.1 above), this sampling must occur weekly (on the weekend) from May through October.

(2) For mooring field operators opting to participate in a regional integrated monitoring program (Section IV.B.2 above), this sampling must occur monthly from May through October on a high use weekend in each month. The Water Boards may allow a reduction in the frequency of sampling, through the regional monitoring program, after the first year of monitoring.

b. For all mooring field operators, the subtidal sediment (sand or finer, if present) within mooring fields and below piers shall be sampled and analyzed for Ocean Plan Table B metals (for marine aquatic life beneficial use), acute toxicity, PAHs, and tributyltin. For sediment toxicity testing, only an acute toxicity test using the amphipod Eohaustorius estuarius must be performed. This sampling shall occur at least three times during a five (5) year period. For mooring field operators opting to participate in a regional integrated monitoring program, the Water Boards may allow a reduction in the frequency of sampling after the first sampling effort's results are assessed.

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ATTACHMENT B

STANDARD PERMIT PROVISIONS AND GENERAL PROVISIONS

1. Standard Permit Provisions

Code of Federal Regulations Title 40 Section 122.41 (40 CFR 122.41) includes conditions, or provisions, that apply to all National Pollutant Discharge Elimination System (NPDES) permits. Additional provisions applicable to NPDES permits are in 40 CFR 122.42. All applicable provisions in 40 CFR 122.41 and 40 CFR 122.42 must be incorporated into this Order and NPDES permit. The applicable 40 CFR 122.41 and 40 CFR 122.42 provisions are as follows:

a. DUTY TO COMPLY [40 CFR 122.41(a)]

The Copermittee must comply with all of the provisions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act (CWA) and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

(1) The Copermittee must comply with effluent standards or prohibitions established under Section 307(a) of the CWA for toxic pollutants and with standards for sewage sludge use or disposal established under Section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions or standards for sewage sludge use or disposal, even if the permit has not yet been modified to incorporate the requirement. [40 CFR 122.41(a)(1)]

(2) The CWA provides that any person who violates Section 301, 302, 306, 307, 308, 318 or 405 of the CWA, or any permit condition or limitation implementing any such sections in a permit issued under Section 402, or any requirement imposed in a pretreatment program approved under Section 402(a)(3) or 402(b)(8) of the CWA, is subject to a civil penalty not to exceed $25,000 per day for each violation. The CWA provides that any person who *negligently* violates Section 301, 302, 306, 307, 308, 318, or 405 of the CWA, or any condition or limitation implementing any of such sections in a permit issued under Section 402 of the CWA, or any requirement imposed in a pretreatment program approved under Section 402(a)(3) or 402(b)(8) of the CWA, is subject to criminal penalties of $2,500 to $25,000 per day of violation, or imprisonment of not more than 1 year, or both. In the case of a second or subsequent conviction for a negligent violation, a person shall be subject to criminal penalties of not more than $50,000 per day of violation, or by imprisonment of not more than 2 years, or both. Any person who *knowingly* violates such sections, or such conditions or limitations is subject to criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment for not more than 3 years, or both. In the case of a second or subsequent conviction for a knowing violation, a person shall be subject to criminal penalties of not more than $100,000 per day of violation, or imprisonment of not more than 6 years, or both. Any person who knowingly violates Section 301, 302, 303, 306, 307, 308, 318 or 405 of the CWA, or any permit condition or limitation implementing any of such sections in a permit issued under Section 402 of the CWA, and who knows at that time that he thereby places another person in imminent danger of death or serious bodily injury, shall, upon conviction, be subject to a fine of

not more than $250,000 or imprisonment of not more than 15 years, or both. In the case of a second or subsequent conviction for a knowing endangerment violation, a person shall be subject to a fine of not more than $500,000 or by imprisonment of not more than 30 years, or both. An organization, as defined in Section 309(c)(3)(B)(iii) of the CWA, shall, upon conviction of violating the imminent danger provision, be subject to a fine of not more than $1,000,000 and can be fined up to $2,000,000 for second or subsequent convictions.
[40 CFR 122.41(a)(2)]

(3) Any person may be assessed an administrative penalty by the San Diego Regional Water Quality Control Board (San Diego Water Board), State Water Resources Control Board (State Water Board), or United States Environmental Protection Agency (USEPA) for violating Section 301, 302, 306, 307, 308, 318 or 405 of the CWA, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of this Act. Administrative penalties for Class I violations are not to exceed $10,000 per violation, with the maximum amount of any Class I penalty assessed not to exceed $25,000. Penalties for Class II violations are not to exceed $10,000 per day for each day during which the violation continues, with the maximum amount of any Class II penalty not to exceed $125,000.
[40 CFR 122.41(a)(3)]

b. DUTY TO REAPPLY [40 CFR 122.41(b)]

If a Copermittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the Copermittee must apply for and obtain a new permit.

c. NEED TO HALT OR REDUCE ACTIVITY NOT A DEFENSE [40 CFR 122.41(c)]

It shall not be a defense for a Copermittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

d. DUTY TO MITIGATE [40 CFR 122.41(d)]

The Copermittee must take all reasonable steps to minimize or prevent any discharge or prevent any discharge or sludge use or disposal in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

e. PROPER OPERATION AND MAINTENANCE [40 CFR 122.41(e)]

The Copermittee must at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Copermittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems that are installed by a Copermittee only when the operation is necessary to achieve compliance with the conditions of this permit.

f. PERMIT ACTIONS [40 CFR 122.41(f)]

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Copermittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

g. PROPERTY RIGHTS [40 CFR 122.41(g)]

This permit does not convey any property rights of any sort, or any exclusive privilege.

h. DUTY TO PROVIDE INFORMATION [40 CFR 122.41(h)]

The Copermittee must furnish to the San Diego Water Board, State Water Board, or USEPA within a reasonable time, any information which the San Diego Water Board, State Water Board, or USPEA may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The Copermittee must also furnish to the San Diego Water Board, State Water Board, or USPEA upon request, copies of records required to be kept by this permit.

i. INSPECTION AND ENTRY [40 CFR 122.41(i)]

The Copermittee must allow the San Diego Water Board, State Water Board, USEPA, and/or their authorized representative (including an authorized contractor acting as their representative), upon presentation of credentials and other documents as may be required by law, to:

(1) Enter upon the Copermittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit; [40 CFR 122.41(i)(1)]

(2) Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit; [40 CFR 122.41(i)(2)]

(3) Inspect and photograph at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; [40 CFR 122.41(i)(3)] and

(4) Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the CWA, any substances or parameters at any location. [40 CFR 122.41(i)(4)]

j. MONITORING AND RECORDS [40 CFR 122.41(j)]

(1) Samples and measurements taken for the purpose of monitoring must be representative of the monitored activity. [40 CFR 122.41(j)(1)]

(2) Except for records of monitoring information required by this permit related to the Copermittee's sewage sludge use and disposal activities, which shall be retained for a period of at least five (5) years (or longer as required by 40 CFR Part 503), the

Copermittee must retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three (3) years from the date of the sample, measurement, report or application. This period may be extended by request of the San Diego Water Board at any time. [40 CFR 122.41(j)(2)]

(3) Records for monitoring information must include: [40 CFR 122.41(j)(3)]

(a) The date, exact place, and time of sampling or measurements; [40 CFR 122.41(j)(3)(i)]
(b) The individual(s) who performed the sampling or measurements; [40 CFR 122.41(j)(3)(ii)]
(c) The date(s) analyses were performed; [40 CFR 122.41(j)(3)(iii)]
(d) The individual(s) who performed the analyses; [40 CFR 122.41(j)(3)(iv)]
(e) The analytical techniques or methods used; [40 CFR 122.41(j)(3)(v)] and
(f) The results of such analyses. [40 CFR 122.41(j)(3)(vi)]

(4) Monitoring must be conducted according to test procedures under 40 CFR Part 136 unless another method is required under 40 CFR Subchapters N or O. [40 CFR 122.41(j)(4)]

In the case of pollutants for which there are no approved methods under 40 CFR Part 136 or otherwise required under 40 CFR Subchapters N and O, monitoring must be conducted according to a test procedure specified in the permit for such pollutants. [40 CFR 122.44(i)(1)(iv)]

(5) The CWA provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or both. [40 CFR 122.41(j)(5)]

k. SIGNATORY REQUIREMENT [40 CFR 122.41(k)]

(1) All applications, reports, or information submitted to the San Diego Water Board, State Water Board, or USEPA must be signed and certified. (See 40 CFR 122.22) [40 CFR 122.41(k)(1)]

(a) *For a municipality, State, Federal, or other public agency.* [All applications must be signed] [b]y either a principal executive officer or ranking elected official. [40 CFR 122.22(a)(3)]

(b) All reports required by permits, and other information requested by the San Diego Water Board, State Water Board, or USEPA must be signed by a person described in paragraph (a) of this section, or by a duly authorized representative of that person. A person is a duly authorized representative only if: [40 CFR 122.22(b)]

(i) The authorization is made in writing by a person described in paragraph (a) of this section; [40 CFR 122.22(b)(1)]

(ii) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company, (A duly authorized representative may thus be either a named individual or any individual occupying a named position.) [40 CFR 122.22(b)(2)] and,

(iii) The written authorization is submitted to the San Diego Water Board and State Water Board. [40 CFR 122.22(b)(3)]

(c) *Changes to authorization.* If an authorization under paragraph (b) of this section is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph (b) of this section must be submitted to the San Diego Water Board prior to or together with any reports, information, or applications to be signed by an authorized representative. [40 CFR 122.22(c)]

(d) *Certification.* Any person signing a document under paragraph (a) or (b) of this section shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations." [40 CFR 122.22(d)]

(2) The CWA provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or non-compliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both. [40 CFR 122.41(k)(2)]

I. REPORTING REQUIREMENTS [40 CFR 122.41(l)]

(1) *Planned changes.* The Copermittee must give notice to the San Diego Water Board as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when: [40 CFR 122.41(l)(1)]

(a) The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR 122.29(b); [40 CFR 122.41(l)(1)(i)] or

(b) The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which

are subject neither to effluent limitations in the permit, nor to notification requirements under 40 CFR 122.42(a)(1).
[40 CFR 122.41(l)(1)(ii)]

(c) The alteration or addition results in a significant change in the Copermittee's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan. [40 CFR 122.41(l)(1)(iii)]

(2) *Anticipated noncompliance*. The Copermittee must give advance notice to the San Diego Water Board or State Water Board of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.
[40 CFR 122.41(l)(2)]

(3) *Transfers*. This permit is not transferable to any person except after notice to the San Diego Water Board. The San Diego Water Board may require modification or revocation and reissuance of the permit to change the name of the Copermittee and incorporate such other requirements as may be necessary under the CWA.
[40 CFR 122.41(l)(3)]

(4) *Monitoring reports.* Monitoring results must be reported at the intervals specified elsewhere in this permit. [40 CFR 122.41(l)(4)]

(a) Monitoring results must be reported on a Discharge Monitoring Report (DMR) form or forms provided or specified by the San Diego Water Board or State Water Board for reporting results of monitoring of sludge use or disposal practices. [40 CFR 122.41(l)(4)(i)]

(b) If the Copermittee monitors any pollutant more frequently than required by the permit using test procedures approved under 40 CFR Part 136 or another method required for an industry-specific waste stream under 40 CFR Subchapters N or O, the results of this monitoring must be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the San Diego Water Board or State Water Board.
[40 CFR 122.41(l)(4)(ii)]

(c) Calculations for all limitations which require averaging of measurements must utilize an arithmetic mean unless otherwise specified in the permit.
[40 CFR 122.41(l)(4)(iii)]

(5) *Compliance schedules*. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit must be submitted no later than 14 days following each schedule date. [40 CFR 122.41(l)(5)]

(6) *Twenty-four hour reporting.*

(a) The Copermittee must report any noncompliance that may endanger health or the environment. Any information must be provided orally within 24 hours from the time the Copermittee becomes aware of the circumstances. A written submission must also be provided within five (5) days of the time the Copermittee becomes aware of the circumstances. The written submission must contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. [40 CFR 122.41(l)(6)(i)]

(b) The following must be included as information which must be reported within 24 hours under this paragraph: [40 CFR 122.41(l)(6)(ii)]

(i) Any unanticipated bypass that exceeds any effluent limitation in the permit (See 40 CFR 122.41(g)). [40 CFR 122.41(l)(6)(ii)(A)]
(ii) Any upset which exceeds any effluent limitation in the permit. [40 CFR 122.41(l)(6)(ii)(B)] and,
(iii) Violation of a maximum daily discharge limitation for any of the pollutants listed by the San Diego Water Board in the permit to be reported within 24 hours. (See 40 CFR 122.44(g)) [40 CFR 122.41(l)(6)(ii)(C)]

(c) The San Diego Water Board may waive the above-required written report on a case-by-case basis if the oral report has been received within 24 hours. [40 CFR 122.41(l)(6)(iii)]

(7) *Other noncompliance.* The Copermittee must report all instances of noncompliance not reported in accordance with the standard provisions required under 40 CFR 122.41(l)(4), (5), and (6), at the time monitoring reports are submitted. The reports must contain the information listed in the standard provisions required under 40 CFR 122.41(l)(6). [40 CFR 122.41(l)(7))]

(8) *Other information.* When the Copermittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the San Diego Water Board, State Water Board, or USEPA, the Copermittee must promptly submit such facts or information. [40 CFR 122.41(l)(8)]

m. BYPASS [40 CFR 122.41(m)]

(1) *Definitions.*

(a) "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility. [40 CFR 122.41(m)(1)(i)] or

(b) "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be

expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.
[40 CFR 122.41(m)(1)(ii)]

(2) *Bypass not exceeding limitations*. The Copermittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the standard provisions required under 40 CFR 122.41(m)(3) and (4).
[40 CFR 122.41(m)(2)]

(3) *Notice.*

(a) *Anticipated bypass*. If the Copermittee knows in advance of the need for a bypass, it must submit a notice, if possible at least ten days before the date of the bypass. [40 CFR 122.41(m)(3)(i)] or

(b) *Unanticipated bypass*. The Copermittee must submit notice of an unanticipated bypass in accordance with the standard provisions required under 40 CFR 122.41(l)(6) (24-hour notice).
[40 CFR 122.41(m)(3)(ii)]

(4) *Prohibition of Bypass.*

(a) Bypass is prohibited, and the San Diego Water Board may take enforcement action against a Copermittee for bypass, unless:
[40 CFR 122.41(m)(4)(i)]

(i) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage; [40 CFR 122.41(m)(4)(i)(A)]
(ii) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance;
[40 CFR 122.41(m)(4)(i)(B)] and,
(iii) The Copermittee submitted notice in accordance with the standard provisions required under 40 CFR 122.41(m)(3).
[40 CFR 122.41(m)(4)(i)(C)]

(b) The San Diego Water Board may approve an anticipated bypass, after considering its adverse effects, if the San Diego Water Board determines that it will meet the three conditions listed above.
[40 CFR 122.41(m)(4)(ii)]

n. UPSET [40 CFR 122.41(n)]

(1) *Definition.* “Upset” means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the Copermittee. An upset does not

include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation. [40 CFR 122.41(n)(1)]

(2) *Effect of an upset*. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the standard provisions required under 40 CFR 122.41(n)(3) are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review. [40 CFR 122.41(n)(2)]

(3) *Conditions necessary for a demonstration of upset*. A Copermittee who wishes to establish the affirmative defense of upset must demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that: [40 CFR 122.41(n)(3)]

(a) An upset occurred and that the Copermittee can identify the cause(s) of the upset; [40 CFR 122.41(n)(3)(i)]
(b) The permitted facility was at the time being properly operated; [40 CFR 122.41(n)(3)(ii)] and
(c) The Copermittee submitted notice of the upset in accordance with the standard provisions required under 40 CFR 122.41(l)(6)(ii)(B) (24-hour notice). [40 CFR 122.41(n)(3)(iii)]
(d) The Copermittee complied with any remedial measures pursuant to the standard provisions required under 40 CFR 122.41(d). [40 CFR 122.41(n)(3)(iii)]

(4) *Burden of proof*. In any enforcement proceeding, the Copermittee seeking to establish the occurrence of an upset has the burden of proof. [40 CFR 122.41(n)(4)]

o. STANDARD PERMIT PROVISIONS FOR MUNICIPAL SEPARATE STORM SEWER SYSTEMS [40 CFR 122.42(c)]

The operator of a large or medium municipal separate storm sewer system or a municipal separate storm sewer that has been designated by the San Diego Water Board or State Water Board under 40 CFR 122.26(a)(1)(v) must submit an annual report by the anniversary of the date of the issuance of the permit for such system. The report must include:

(1) The status of implementing the components of the storm water management program that are established as permit conditions; [40 CFR 122.42(c)(1)]

(2) Proposed changes to the storm water management programs that are established as permit conditions. Such proposed changes must be consistent with 40 CFR 122.26(d)(2)(iii); [40 CFR 122.42(c)(2)] and

(3) Revisions, if necessary, to the assessment of controls and the fiscal analysis reported in the permit application under 40 CFR 122.26(d)(2)(iv) and (v); [40 CFR 122.42(c)(3)]

(4) A summary of data, including monitoring data, that is accumulated throughout the reporting year; [40 CFR 122.42(c)(4)]

(5) Annual expenditures and budget for year following each annual report; [40 CFR 122.42(c)(5)]

(6) A summary describing the number and nature of enforcement actions, inspections, and public education programs; [40 CFR 122.42(c)(6)]

(7) Identification of water quality improvements or degradation. [40 CFR 122.42(c)(7)]

p. STANDARD PERMIT PROVISIONS FOR STORM WATER DISCHARGES [40 CFR 122.42(d)]

The initial permits for discharges composed entirely of storm water issued pursuant to 40 CFR 122.26(e)(7) must require compliance with the conditions of the permit as expeditiously as practicable, but in no event later than three years after the date of issuance of the permit.

2. General Provisions

In addition to the standard provisions required to be incorporated into the Order and NPDES permit pursuant to 40 CFR 122.41 and 40 CFR 122.42, several other general provisions apply to this Order. The general provisions applicable to this Order and NPDES permit are as follows:

a. DISCHARGE OF WASTE IS A PRIVILEGE

No discharge of waste into the waters of the State, whether or not such discharge is made pursuant to waste discharge requirements, shall create a vested right to continue such discharge. All discharges of waste into waters of the State are privileges, not rights. [CWC Section 13263(g)]

b. DURATION OF ORDER AND NPDES PERMIT

(1) *Effective date*. This Order and NPDES permit becomes effective on the 50th day after its adoption provided the USEPA has no objection. If the USEPA objects to its issuance, this Order shall not become effective until such objection is withdrawn. This Order supersedes Order No. R9-2007-0001 upon the effective date of this Order, and supersedes Order Nos. R9-2009-0002 and R9-2010-0016 upon their expiration or earlier notice of coverage.

(2) *Expiration*. This Order and NPDES permit expires five years after its effective date. [40 CFR 122.46(a)]

(3) *Continuation of expired order*. After this Order and NPDES permit expires, the terms and conditions of this Order and NPDES permit are automatically continued pending issuance of a new permit if all requirements of the federal NPDES regulations on the continuation of expired permits (40 CFR 122.6) are complied with.

c. AVAILABILITY

A copy of this Order must be kept at a readily accessible location and must be available to on-site personnel at all times.

d. CONFIDENTIALITY OF INFORMATION

Except as provided for in 40 CFR 122.7, no information or documents submitted in accordance with or in application for this Order will be considered confidential, and all such information and documents shall be available for review by the public at the San Diego Water Board office.

Claims of confidentiality for the following information will be denied:
[40 CFR 122.7(b)]

(1) The name and address of any permit applicant or Copermittee;
[40 CFR 122.7(b)(1)] and

(2) Permit applications and attachments, permits, and effluent data.
[40 CFR 122.7(b)(2)]

e. EFFLUENT LIMITATIONS

(1) *Interim effluent limitations*. The Copermittee must comply with any interim effluent limitations as established by addendum, enforcement action, or revised waste discharge requirements which have been, or may be, adopted by the San Diego Water Board.

(2) *Other effluent limitations and standards*. If any applicable toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is promulgated under Section 307(a) of the CWA for a toxic pollutant and that standard or prohibition is more stringent than any limitation on the pollutant in the permit, the San Diego Water Board shall institute proceedings under these regulations to modify or revoke and reissue the permit to conform to the toxic effluent standard or prohibition. [40 CFR 122.44(b)(1)]

f. DUTY TO MINIMIZE OR CORRECT ADVERSE IMPACTS

The Copermittee must take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with this Order, including such accelerated or additional monitoring as may be necessary to determine the nature and impact of the noncompliance.

g. PERMIT ACTIONS

The filing of a request by the Copermittee for modification, revocation and reissuance, or termination of this Order, or a notification of planned change in or anticipated noncompliance with this Order does not stay any condition of this Order. (See 40 CFR 122.41(f)) In addition, the following provisions apply to this Order:

(1) Upon application by any affected person, or on its own motion, the San Diego Water Board may review and revise the requirements in this Order. All requirements must be reviewed periodically. [CWC Section 13263(e)]

(2) This Order may be terminated or modified for cause, including, but not limited to, all of the following: [CWC Section 13381]

   (a) Violation of any condition contained in the requirements of this Order. [CWC Section 13381(a)]

   (b) Obtaining the requirements in this Order by misrepresentation, or failure to disclose fully all relevant facts. [CWC Section 13381(b)]

   (c) A change in any condition that requires either a temporary or permanent reduction or elimination of the permitted discharge. [CWC Section 13381(c)]

(3) When this Order is transferred to a new owner or operator, such requirements as may be necessary under the CWC may be incorporated into this Order.

h. NPDES PERMITTED NON-STORM WATER DISCHARGES

The San Diego Water Board has, in prior years, issued a limited number of individual NPDES permits for non-storm water discharges to MS4s. The San Diego Water Board or State Water Board may in the future, upon prior notice to the Copermittee(s), issue an NPDES permit for any non-storm water discharge (or class of non-storm water discharges) to an MS4.

i. MONITORING

In addition to the standard provisions required under 40 CFR 122.41(j) and (l)(4), the following general monitoring provisions apply to this Order:

(1) Where procedures are not otherwise specified in Order, sampling, analysis and quality assurance/quality control must be conducted in accordance with the Quality Assurance Management Plan (QAMP) for the State of California's Surface Water Ambient Monitoring Program (SWAMP), adopted by the State Water Resources Control Board (State Water Board).

(2) Pursuant to 40 CFR 122.41(j)(2) and CWC Section 13383(a), each Copermittee must retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least five (5) years from the date of the sample, measurement, report or application. This period may be extended by request of the San Diego Water Board at any time.

(3) All chemical, bacteriological, and toxicity analyses must be conducted at a laboratory certified for such analyses by the California Department of Public Health or a laboratory approved by the San Diego Water Board.

(4) For priority toxic pollutants that are identified in the California Toxics Rule (CTR) (65 Fed. Reg. 31682), the Copermittees must instruct their laboratories to establish calibration standards that are equivalent to or lower than the Minimum Levels (MLs) published in Appendix 4 of the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SIP). If a Copermittee can demonstrate that a particular ML is not attainable, in accordance with procedures set forth in 40 CFR Part 136, the lowest quantifiable concentration of the lowest calibration standard analyzed by a specific analytical procedure (assuming that all the method specified sample weights, volumes, and processing steps have been followed) may be used instead of the ML listed in Appendix 4 of the SIP. The Copermittee must submit documentation from the laboratory to the San Diego Water Board for approval prior to raising the ML for any priority toxic pollutant.

j. ENFORCEMENT

(1) The San Diego Water Board is authorized to enforce the terms of this Order under several provisions of the CWC, including, but not limited to, CWC Sections 13385, 13386, and 13387.

(2) Nothing in this Order shall be construed to protect the Copermittee from its liabilities under federal, state, or local laws.

(3) The CWC provides for civil and criminal penalties comparable to, and in some cases greater than, those provided for under the CWA.

(4) Except as provided in the standard conditions required under 40 CFR 122.41(m) and (n), nothing in this Order shall be construed to relieve the Copermittee from civil or criminal penalties for noncompliance.

(5) Nothing in this Order shall be construed to preclude the institution of any legal action or relieve the Copermittee from any responsibilities, liabilities, or penalties to which the Copermittee is or may be subject to under Section 311 of the CWA.

(6) Nothing in this Order shall be construed to preclude institution of any legal action or relieve the Copermittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authoring preserved by Section 510 of the CWA.

k. SEVERABILITY

The provisions of this Order are severable, and if any provision of this Order, or the application of any provisions of this Order to any circumstance, is held invalid, the application of such provision to other circumstances and the remainder of this Order shall not be affected thereby.

l. APPLICATIONS

Any application submitted by a Copermittee for reissuance or modification of this Order must satisfy all applicable requirements specified in federal regulations as well as any additional requirements for submittal of a Report of Waste Discharge specified in the CWC and the California Code of Regulations.

m. IMPLEMENTATION

All plans, reports and subsequent amendments submitted in compliance with this Order must be implemented immediately (or as otherwise specified). All submittals by Copermittees must be adequate to implement the requirements of this Order.

n. REPORT SUBMITTALS

(1) All report submittals must include an executive summary, introduction, conclusion, recommendations, and signed certified statement.

(2) Each Copermittee must submit a signed certified statement covering its responsibilities for each applicable submittal.

(3) The Principal Watershed Copermittee(s) must submit a signed certified statement covering its responsibilities for each applicable submittal and the sections of the submittals for which it is responsible.

(4) Unless otherwise directed, the Copermittees must submit one hard copy and one electronic copy of each report required under this Order to the San Diego Water Board, and one electronic copy to the USEPA.

(5) The Copermittees must submit reports and provide notifications as required by this Order to the following:

EXECUTIVE OFFICER
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION
9174 SKY PARK COURT, SUITE 100
SAN DIEGO CA 92123-4340
Telephone: (858) 467-2952 Fax: (858) 571-6972

EUGENE BROMLEY
US ENVIRONMENTAL PROTECTION AGENCY
REGION IX
PERMITS ISSUANCE SECTION (W-5-1)
75 HAWTHORNE STREET
SAN FRANCISCO CA 94105

ATTACHMENT C

ACRONYMS AND ABBREVIATIONS

AMAL	Average Monthly Action Level
ASBS	Area(s) of Special Biological Significance
BMP	Best Management Practice
Basin Plan	Water Quality Control Plan for the San Diego Basin
CEQA	California Environmental Quality Act
CCR	California Code of Regulations
CFR	Code of Federal Regulations
CWA	Clean Water Act
CWC	California Water Code
CZARA	Coastal Zone Act Reauthorization Amendments of 1990
ESAs	Environmentally Sensitive Areas
GIS	Geographic Information System
IBI	Index of Biological Integrity
LID	Low Impact Development
MDAL	Maximum Daily Action Level
MEP	Maximum Extent Practicable
MS4	Municipal Separate Storm Sewer System
NAL	Non-Storm Water Action Level
NAICS	North American Industry Classification System
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
ROWD	Report of Waste Discharge (application for NPDES reissuance)
SAL	Storm Water Action Level
San Diego Water Board	California Regional Water Quality Control Board, San Diego Region
SIC	Standard Industrial Classification Code
State Water Board	State Water Resources Control Board
TMDL	Total Maximum Daily Load
USEPA	United States Environmental Protection Agency
WDID	Waste Discharge Identification Number
WLA	Waste Load Allocation
WQBEL	Water Quality Based Effluent Limitation

DEFINITIONS

Active/Passive Sediment Treatment - Using mechanical, electrical or chemical means to flocculate or coagulate suspended sediment for removal from runoff from construction sites prior to discharge.

Anthropogenic Litter – Trash generated from human activities, not including sediment.

Average Monthly Action Level – The highest allowable average of daily discharges over a calendar month.

Beneficial Uses - The uses of water necessary for the survival or wellbeing of man, plants, and wildlife. These uses of water serve to promote tangible and intangible economic, social, and environmental goals. "Beneficial Uses" of the waters of the State that may be protected include, but are not limited to, domestic, municipal, agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves. Existing beneficial uses are uses that were attained in the surface or ground water on or after November 28, 1975; and potential beneficial uses are uses that would probably develop in future years through the implementation of various control measures. "Beneficial Uses" are equivalent to "Designated Uses" under federal law. [California Water Code Section 13050(f)].

Best Management Practices (BMPs) - Defined in 40 CFR 122.2 as schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs also include treatment requirements, operating procedures and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Bioassessment - The use of biological community information to evaluate the biological integrity of a water body and its watershed. With respect to aquatic ecosystems, bioassessment is the collection and analysis of samples of the benthic macroinvertebrate community together with physical/habitat quality measurements associated with the sampling site and the watershed to evaluate the biological condition (i.e. biotic integrity) of a water body.

Biofiltration - Practices that use vegetation and amended soils to detain and treat runoff from impervious areas. Treatment is through filtration, infiltration, adsorption, ion exchange, and biological uptake of pollutants.

Biological Integrity - Defined in Karr J.R. and D.R. Dudley. 1981. Ecological perspective on water quality goals. *Environmental Management* 5:55-68 as: "A balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of natural habitat of the region." Also referred to as ecosystem health.

BMP Design Manual – A plan developed to eliminate, reduce, or mitigate the impacts of runoff from development projects, including Priority Development Projects.

Clean Water Act Section 303(d) Water Body - An impaired water body in which water quality does not meet applicable water quality standards and/or is not expected to meet water quality standards, even after the application of technology based pollution controls required by the

CWA. The discharge of runoff to these water bodies by the Copermittees is significant because these discharges can cause or contribute to violations of applicable water quality standards.

Construction Site – Any project, including projects requiring coverage under the Construction General Permit, that involves soil disturbing activities including, but not limited to, clearing, grading, disturbances to ground such as stockpiling, and excavation.

Contamination - As defined in the Porter-Cologne Water Quality Control Act, contamination is "an impairment of the quality of waters of the State by waste to a degree which creates a hazard to the public health through poisoning or through the spread of disease. 'Contamination' includes any equivalent effect resulting from the disposal of waste whether or not waters of the State are affected."

Copermittee – An incorporated city within the County of Orange, County of Riverside, or County of San Diego in the San Diego Region, the County of Orange, the County of Riverside, the County of San Diego, the Orange County Flood Control District, the Riverside County Water Conservation and Flood Control District, the San Diego Regional Airport Authority, or the San Diego Unified Port District.

Copermittees – All of the individual Copermittees, collectively.

Critical Channel Flow (Qc) – The channel flow that produces the critical shear stress that initiates bed movement or that erodes the toe of channel banks. When measuring Qc, it should be based on the weakest boundary material – either bed or bank.

Daily Discharge – Defined as either: (1) the total mass of the constituent discharged over the calendar day or any 24 hour period that reasonably represents a calendar day for purposes of sampling (as specified in the permit), for a constituent with limitations expressed in units of mass or; (2) the unweighted arithmetic mean measurement of the constituent over the day for a constituent with limitations expressed in other units of measurement (e.g. concentration.)

The Daily Discharge may be determined by the analytical results of a composite sample taken over the course of one day (a calendar day, or other 24 hour period other than a day), or by the arithmetic mean of analytical results from one or more grab samples taken over the course of a day.

Development Projects - Construction, rehabilitation, redevelopment, or reconstruction of any public or private residential project, industrial, commercial, or any other projects.

Dry Season –May 1 to September 30.

Dry Weather – Weather is considered dry if the preceding 72 hours has been without measurable precipitation (>0.1 inch).

Enclosed Bays – Enclosed bays are indentations along the coast that enclose an area of oceanic water within distinct headlands or harbor works. Enclosed bays include all bays where the narrowest distance between the headlands or outermost bay works is less than 75 percent of the greatest dimension of the enclosed portion of the bay. Enclosed bays do not include inland surface waters or ocean waters.

Erosion – When land is diminished or worn away due to wind, water, or glacial ice. Often the eroded debris (silt or sediment) becomes a pollutant via storm water runoff. Erosion occurs naturally but can be intensified by land clearing activities such as farming, development, road building, and timber harvesting.

Environmentally Sensitive Areas (ESAs) - Areas that include but are not limited to all Clean Water Act Section 303(d) impaired water bodies; areas designated as Areas of Special Biological Significance by the State Water Board and San Diego Water Board; State Water Quality Protected Areas; water bodies designated with the RARE beneficial use by the State Water Board and San Diego Water Board; areas designated as preserves or their equivalent under the Natural Communities Conservation Program within the Cities and County of Orange; and any other equivalent environmentally sensitive areas which have been identified by the Copermittees.

Estuaries – Waters, including coastal lagoons, located at the mouth of streams that serve as areas of mixing fresh and ocean waters. Coastal lagoons and mouths of streams that are temporarily separated from the ocean by sandbars shall be considered estuaries. Estuarine waters shall be considered to extend from a bay or the open ocean to a point upstream where there is no significant mixing of fresh water and ocean water. Estuaries do not include inland surface waters or ocean waters.

Existing Development – Any area that has been developed and exists for municipal, commercial, industrial, or residential purposes, uses, or activities. May include areas that are not actively used for its originally developed purpose, but may be re-purposed or redeveloped for another use or activity.

Flow Duration – The long-term period of time that flows occur above a threshold that causes significant sediment transport and may cause excessive erosion damage to creeks and streams (not a single storm event duration). The simplest way to visualize this is to consider a histogram of pre- and post-project flows using long-term records of hourly data. To maintain pre-development flow duration means that the total number of hours (counts) within each range of flows in a flow-duration histogram cannot increase between the pre- and post-development condition. Flow duration within the range of geomorphologically significant flows is important for managing erosion.

Grading - The cutting and/or filling of the land surface to a desired slope or elevation.

Hazardous Material – Any substance that poses a threat to human health or the environment due to its toxicity, corrosiveness, ignitability, explosive nature or chemical reactivity. These also include materials named by the USEPA in 40 CFR 116 to be reported if a designated quantity of the material is spilled into the waters of the U.S. or emitted into the environment.

Hazardous Waste - Hazardous waste is defined as “any waste which, under Section 600 of Title 22 of this code, is required to be managed according to Chapter 30 of Division 4.5 of Title 22 of this code” [CCR Title 22, Division 4.5, Chapter 11, Article 1].

Household Hazardous Waste – Paints, cleaning products, and other wastes generated during home improvement or maintenance activities.

Hydromodification – The change in the natural watershed hydrologic processes and runoff characteristics (i.e., interception, infiltration, overland flow, and groundwater flow) caused by urbanization or other land use changes that result in increased stream flows and sediment transport. In addition, alteration of stream and river channels, such as stream channelization, concrete lining, installation of dams and water impoundments, and excessive streambank and shoreline erosion are also considered hydromodification, due to their disruption of natural watershed hydrologic processes.

Illicit Connection – Any connection to the MS4 that conveys an illicit discharge.

Illicit Discharge - Any discharge to the MS4 that is not composed entirely of storm water except discharges pursuant to a NPDES permit and discharges resulting from fire fighting activities [40 CFR 122.26(b)(2)].

Inactive Areas – Areas of construction activity that are not active and those that have been active and are not scheduled to be re-disturbed for at least 14 days.

Infiltration – Water other than wastewater that enters a sewer system (including sewer service connections and foundation drains) from the ground through such means as defective pipes, pipe joints, connections, or manholes. Infiltration does not include, and is distinguished from, inflow [40 CFR 35.2005(20)].

Inland Surface Waters – Includes all surface waters of the State that do not include the ocean, enclosed bays, or estuaries.

Jurisdictional Runoff Management Program Document – A written description of the specific jurisdictional runoff management measures and programs that each Copermittee will implement to comply with this Order and ensure that storm water pollutant discharges in runoff are reduced to the MEP and do not cause or contribute to a violation of water quality standards.

Low Impact Development (LID) – A storm water management and land development strategy that emphasizes conservation and the use of on-site natural features integrated with engineered, small-scale hydrologic controls to more closely reflect pre-development hydrologic functions.

Low Impact Development Best Management Practices (LID BMPs) – LID BMPs include schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States through storm water management and land development strategies that emphasize conservation sand the use of on-site natural features integrated with engineered, small-scale hydrologic controls to more closely reflect pre-development hydrologic functions. LID BMPs include retention practices that do not allow runoff, such as infiltration, rain water harvesting and reuse, and evapotranspiration. LID BMPs also include flow-through practices such as biofiltration that may have some discharge of storm water following pollutant reduction.

Major Outfall – As defined in the Code of Federal Regulations, a major outfall is a MS4 outfall that discharges from a single pipe with an inside diameter of 36 inches or more or its equivalent (i.e. discharge from a single conveyance other than a circular pipe which is associated with a drainage are of more than 50 acres); or, for MS4s that receive storm water from lands zoned for industrial activity (based on comprehensive zoning plans or equivalent), a MS4 outfall that discharges from a single pipe with an inside diameter of 12 inches or more or from its equivalent (i.e. discharge from other than a circular pipe associated with a drainage area of 2 acres or more).

Maximum Daily Action Level (MDAL) –The highest allowable daily discharge of a pollutant, over a calendar day (or 24 hour period). For pollutants with action levels expressed in units of mass, the daily discharge is calculated as the total mass of the pollutant discharged over the day. For pollutants with action levels expressed in other units of measurement, the daily discharge is calculated as the arithmetic mean measurement of the pollutant over the day.

Maximum Extent Practicable (MEP) – The technology-based standard established by Congress in CWA section 402(p)(3)(B)(iii) for storm water that operators of MS4s must meet. Technology-based standards establish the level of pollutant reductions that dischargers must achieve, typically by treatment or by a combination of source control and treatment control BMPs. MEP generally emphasizes pollution prevention and source control BMPs primarily (as the first line of defense) in combination with treatment methods serving as a backup (additional line of defense). MEP considers economics and is generally, but not necessarily, less stringent than BAT. A definition for MEP is not provided either in the statute or in the regulations. Instead the definition of MEP is dynamic and will be defined by the following process over time: municipalities propose their definition of MEP by way of their runoff management programs. Their total collective and individual activities conducted pursuant to the runoff management programs becomes their proposal for MEP as it applies both to their overall effort, as well as to specific activities (e.g., MEP for street sweeping, or MEP for MS4 maintenance). In the absence of a proposal acceptable to the San Diego Water Board, the San Diego Water Board defines MEP.

In a memo dated February 11, 1993, entitled "Definition of Maximum Extent Practicable," Elizabeth Jennings, Senior Staff Counsel, SWRCB addressed the achievement of the MEP standard as follows:

> "*To achieve the MEP standard, municipalities must employ whatever Best Management Practices (BMPs) are technically feasible (i.e., are likely to be effective) and are not cost prohibitive. The major emphasis is on technical feasibility. Reducing pollutants to the MEP means choosing effective BMPs, and rejecting applicable BMPs only where other effective BMPs will serve the same purpose, or the BMPs would not be technically feasible, or the cost would be prohibitive. In selecting BMPs to achieve the MEP standard, the following factors may be useful to consider:*
>
> *a. Effectiveness: Will the BMPs address a pollutant (or pollutant source) of concern?*
> *b. Regulatory Compliance: Is the BMP in compliance with storm water regulations as well as other environmental regulations?*
> *c. Public Acceptance: Does the BMP have public support?*
> *d. Cost: Will the cost of implementing the BMP have a reasonable relationship to the pollution control benefits to be achieved?*
> *e. Technical Feasibility: Is the BMP technically feasible considering soils, geography, water resources, etc.?*
>
> *The final determination regarding whether a municipality has reduced pollutants to the maximum extent practicable can only be made by the Regional or State Water Boards, and not by the municipal discharger. If a municipality reviews a lengthy menu of BMPs and chooses to select only a few of the least expensive, it is likely that MEP has not been met. On the other hand, if a municipal discharger employs all applicable BMPs except those where it can show that they are not technically feasible in the locality, or whose cost would*

exceed any benefit derived, it would have met the standard. Where a choice may be made between two BMPs that should provide generally comparable effectiveness, the discharger may choose the least expensive alternative and exclude the more expensive BMP. However, it would not be acceptable either to reject all BMPs that would address a pollutant source, or to pick a BMP based solely on cost, which would be clearly less effective. In selecting BMPs the municipality must make a serious attempt to comply and practical solutions may not be lightly rejected. In any case, the burden would be on the municipal discharger to show compliance with its permit. After selecting a menu of BMPs, it is the responsibility of the discharger to ensure that all BMPs are implemented."

Monitoring Year – October 1 to September 30

Municipal Separate Storm Sewer System (MS4) – A conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains): (i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or designated and approved management agency under section 208 of the CWA that discharges to waters of the United States; (ii) Designated or used for collecting or conveying storm water; (iii) Which is not a combined sewer; (iv) Which is not part of the Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.26.

National Pollutant Discharge Elimination System (NPDES) - The national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under Sections 307, 318, 402, and 405 of the CWA.

Non-Storm Water - All discharges to and from a MS4 that do not originate from precipitation events (i.e., all discharges from a MS4 other than storm water). Non-storm water includes illicit discharges and NPDES permitted discharges.

Nuisance - As defined in the Porter-Cologne Water Quality Control Act, a nuisance is "anything which meets all of the following requirements: 1) Is injurious to health, or is indecent, or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property. 2) Affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal. 3) Occurs during, or as a result of, the treatment or disposal of wastes."

Ocean Waters – the territorial marine waters of the State as defined by California law to the extent these waters are outside of enclosed bays, estuaries, and coastal lagoons. Discharges to ocean waters are regulated in accordance with the State Board's California Ocean Plan.

Order – Unless otherwise specified, refers to this Order, Order No. R9-2013-0001 (NPDES No. CAS0109266)

Persistent Flow - Persistent flow is defined as the presence of flowing, pooled, or ponded water more than 72 hours after a measureable rainfall event of 0.1 inch or greater during three consecutive monitoring and/or inspection events. All other flowing, pooled, or ponded water is considered transient.

Person - A person is defined as an individual, association, partnership, corporation, municipality, State or Federal agency, or an agent or employee thereof [40 CFR 122.2].

Point Source - Any discernible, confined, and discrete conveyance, including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operations, landfill leachate collection systems, vessel, or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.

Pollutant - Any agent that may cause or contribute to the degradation of water quality such that a condition of pollution or contamination is created or aggravated.

Pollution - As defined in the Porter-Cologne Water Quality Control Act, pollution is “the alteration of the quality of the waters of the State by waste, to a degree that unreasonably affects the either of the following: 1) The waters for beneficial uses; or 2) Facilities that serve these beneficial uses.” Pollution may include contamination.

Pollution Prevention - Pollution prevention is defined as practices and processes that reduce or eliminate the generation of pollutants, in contrast to source control BMPs, treatment control BMPs, or disposal.

Pre-Development Runoff Conditions – Runoff conditions that existed onsite before the existing development was constructed, or exists onsite before planned development activities occur.

Priority Development Projects - New development and redevelopment projects defined under Provision E.3.b of Order No. R9-2012-0011.

Rainy Season (aka Wet Season) –October 1 to April 30

Receiving Waters – Waters of the United States.

Receiving Water Limitations - Waste discharge requirements issued by the San Diego Water Board typically include both: (1) “Effluent Limitations” (or “Discharge Limitations”) that specify the technology-based or water-quality-based effluent limitations; and (2) “Receiving Water Limitations” that specify the water quality objectives in the Basin Plan as well as any other limitations necessary to attain those objectives. In summary, the “Receiving Water Limitations” provision is the provision used to implement the requirements of CWA section 402(p)(3)(B).

Redevelopment - The creation, addition, and or replacement of impervious surface on an already developed site. Examples include the expansion of a building footprint, road widening, the addition to or replacement of a structure, and creation or addition of impervious surfaces. Replacement of impervious surfaces includes any activity that is not part of a routine maintenance activity where impervious material(s) are removed, exposing underlying soil during construction. Redevelopment does not include trenching and resurfacing associated with utility work; resurfacing existing roadways; new sidewalk construction, pedestrian ramps, or bike lane on existing roads; and routine replacement of damaged pavement, such as pothole repair.

Reporting Period – The period of information that is reported in the Annual Report. The reporting period consists of two components: 1) July 1 to June 30, consistent with the fiscal year, for the implementation of the jurisdictional runoff management programs, and 2) October 1 to September 30, consistent with the monitoring year for the monitoring and assessment programs. Together, these two time periods constitute the reporting year for the Annual Report due January 31 following the end of the monitoring year.

Retain –Keep or hold in a particular place, condition, or position without discharge to surface waters.

Retrofitting – Storm water management practice put into place after development has occurred in watersheds where the practices previously did not exist. Retrofitting of developed areas is intended to improve water quality, protect downstream channels, reduce flooding, or meet other specific objectives. Retrofitting developed areas may include, but is not limited to replacing roofs with green roofs, disconnecting downspouts or impervious surfaces to drain to pervious surfaces, replacing impervious surfaces with pervious surfaces, installing rain barrels, installing rain gardens, and trash area enclosures.

Runoff - All flows in a storm water conveyance system that consists of the following components: (1) storm water (wet weather flows) and (2) non-storm water including dry weather flows.

San Diego Water Board – As used in this document the term "San Diego Water Board" is synonymous with the term "Regional Board" as defined in Water Code section 13050(b) and is intended to refer to the California Regional Water Quality Control Board for the San Diego Region as specified in Water Code Section 13200.

Sediment - Soil, sand, and minerals washed from land into water. Sediment resulting from anthropogenic sources (i.e. human induced land disturbance activities) is considered a pollutant. This Order regulates only the discharges of sediment from anthropogenic sources and does not regulate naturally occurring sources of sediment. Sediment can destroy fish-nesting areas, clog animal habitats, and cloud waters so that sunlight does not reach aquatic plants.

Source Control BMP – Land use or site planning practices, or structural or nonstructural measures that aim to prevent runoff pollution by reducing the potential for contamination at the source of pollution. Source control BMPs minimize the contact between pollutants and runoff.

Storm Water – Per 40 CFR 122.26(b)(13), means storm water runoff, snowmelt runoff and surface runoff and drainage. Surface runoff and drainage pertains to runoff and drainage resulting from precipitation events.

Stream, Channel, or Habitat Rehabilitation – Measures or activities for the purpose of improving or restoring the environmental health (i.e. physical, chemical and biological integrity) of streams, channels, or river systems. Rehabilitation techniques may include, but are not limited to, riparian zone restoration, constructed wetlands, bank stabilization, channel reconfiguration, and daylighting drainage systems.

Structural BMPs - A subset of BMPs which detains, retains, filters, removes, or prevents the release of pollutants to surface waters from development projects in perpetuity, after construction of a project is completed.

Total Maximum Daily Load (TMDL) - The maximum amount of a pollutant that can be discharged into a water body from all sources (point and non-point) and still maintain water quality standards. Under CWA section 303(d), TMDLs must be developed for all water bodies that do not meet water quality standards after application of technology-based controls.

Toxicity - Adverse responses of organisms to chemicals or physical agents ranging from mortality to physiological responses such as impaired reproduction or growth anomalies). The water quality objectives for toxicity provided in the Basin Plan, state in part…"All waters shall be free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life….The survival of aquatic life in surface waters subjected to a waste discharge or other controllable water quality factors, shall not be less than that for the same water body in areas unaffected by the waste discharge".

Treatment Control BMP – Any engineered system designed to remove pollutants by simple gravity settling of particulate pollutants, filtration, biological uptake, media absorption or any other physical, biological, or chemical process.

Unpaved Road – Any long, narrow stretch without pavement used for traveling by motor passenger vehicles between two or more points. Unpaved roads are generally constructed of dirt, gravel, aggregate or macadam and may be improved or unimproved.

Waste - As defined in CWC Section 13050(d), "waste includes sewage and any and all other waste substances, liquid, solid, gaseous, or radioactive, associated with human habitation, or of human or animal origin, or from any producing, manufacturing, or processing operation, including waste placed within containers of whatever nature prior to, and for purposes of, disposal."

Article 2 of CCR Title 23, Chapter 15 (Chapter 15) contains a waste classification system that applies to solid and semi-solid waste, which cannot be discharged directly or indirectly to water of the state and which therefore must be discharged to land for treatment, storage, or disposal in accordance with Chapter 15. There are four classifications of waste (listed in order of highest to lowest threat to water quality): hazardous waste, designated waste, non-hazardous solid waste, and inert waste.

Water Quality Objective - Numerical or narrative limits on constituents or characteristics of water designated to protect designated beneficial uses of the water. [California Water Code Section 13050 (h)]. California's water quality objectives are established by the State and Regional Water Boards in the Water Quality Control Plans. Numeric or narrative limits for pollutants or characteristics of water designed to protect the beneficial uses of the water. In other words, a water quality objective is the maximum concentration of a pollutant that can exist in a receiving water and still generally ensure that the beneficial uses of the receiving water remain protected (i.e., not impaired). Since water quality objectives are designed specifically to protect the beneficial uses, when the objectives are violated the beneficial uses are, by definition, no longer protected and become impaired. This is a fundamental concept under the Porter Cologne Act. Equally fundamental is Porter Cologne's definition of pollution. A condition of pollution exists when the water quality needed to support designated beneficial uses has become unreasonably affected or impaired; in other words, when the water quality objectives have been violated. These underlying definitions (regarding beneficial use protection) are the reason why all waste discharge requirements implementing the federal NPDES regulations require compliance with water quality objectives. (Water quality objectives are also called water quality criteria in the CWA.)

Water Quality Standards - Water quality standards, as defined in Clean Water Act section 303(c) consist of the beneficial uses (e.g., swimming, fishing, municipal drinking water supply, etc.,) of a water body and criteria (referred to as water quality objectives in the California Water Code) necessary to protect those uses. Under the Water Code, the water boards establish beneficial uses and water quality objectives in water quality control or basin plans. Together with an anti-degradation policy, these beneficial uses and water quality objectives serve as water quality standards under the Clean Water Act. In Clean Water Act parlance, state beneficial uses are called “designated uses” and state water quality objectives are called “criteria.” Throughout this Order, the relevant term is used depending on the statutory scheme.

Waters of the State - Any water, surface or underground, including saline waters within the boundaries of the State [CWC section 13050 (e)]. The definition of the Waters of the State is broader than that for the Waters of the United States in that all water in the State is considered to be a Waters of the State regardless of circumstances or condition.

Waters of the United States - As defined in the 40 CFR 122.2, the Waters of the U.S. are defined as: “(a) All waters, which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; (b) All interstate waters, including interstate “wetlands;” (c) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, “wetlands,” sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation or destruction of which would affect or could affect interstate or foreign commerce including any such waters: (1) Which are or could be used by interstate or foreign travelers for recreational or other purposes; (2) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or (3) Which are used or could be used for industrial purposes by industries in interstate commerce; (d) All impoundments of waters otherwise defined as waters of the United States under this definition: (e) Tributaries of waters identified in paragraphs (a) through (d) of this definition; (f) The territorial seas; and (g) “Wetlands” adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) through (f) of this definition. Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area’s status as prior converted cropland by any other federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with the EPA.”

Watershed - That geographical area which drains to a specified point on a water course, usually a confluence of streams or rivers (also known as drainage area, catchment, or river basin).

Wet Season (aka Rainy Season) –October 1 to April 30

Wet Weather – Weather is considered wet if there is a storm event of 0.1 inches and greater and the following 72 hours, unless otherwise defined by another regulatory mechanism.

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ATTACHMENT D

**JURISDICTIONAL RUNOFF MANAGEMENT PROGRAM
ANNUAL REPORT FORM**

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JURISDICTIONAL RUNOFF MANAGEMENT PROGRAM
ANNUAL REPORT FORM
FY _________________

I. COPERMITTEE INFORMATION		
Copermittee Name:		
Copermittee Primary Contact Name:		
Copermittee Primary Contact Information: Address: City: County: State: Zip: Telephone: Fax: Email:		
II. LEGAL AUTHORITY		
Has the Copermittee established adequate legal authority within its jurisdiction to control pollutant discharges into and from its MS4 that complies with Order No. R9-2013-0001?	**YES** **NO**	☐ ☐
A Principal Executive Officer, Ranking Elected Official, or Duly Authorized Representative has certified that the Copermittee obtained and maintains adequate legal authority?	**YES** **NO**	☐ ☐
III. JURISDICTIONAL RUNOFF MANAGEMENT PROGRAM DOCUMENT UPDATE		
Was an update of the jurisdictional runoff management program document required or recommended by the San Diego Water Board?	**YES** **NO**	☐ ☐
If YES to the question above, did the Copermittee update its jurisdictional runoff management program document and make it available on the Regional Clearinghouse?	**YES** **NO**	☐ ☐
IV. ILLICIT DISCHARGE DETECTION AND ELIMINATION PROGRAM		
Has the Copermittee implemented a program to actively detect and eliminate illicit discharges and connections to its MS4 that complies with Order No. R9-2013-0001?	**YES** **NO**	☐ ☐
Number of non-storm water discharges reported by the public		
Number of non-storm water discharges detected by Copermittee staff or contractors		
Number of non-storm water discharges investigated by the Copermittee		
Number of sources of non-storm water discharges identified		
Number of non-storm water discharges eliminated		
Number of sources of illicit discharges or connections identified		
Number of illicit discharges or connections eliminated		
Number of enforcement actions issued		
Number of escalated enforcement actions issued		
V. DEVELOPMENT PLANNING PROGRAM		
Has the Copermittee implemented a development planning program that complies with Order No. R9-2013-0001?	**YES** **NO**	☐ ☐
Was an update to the BMP Design Manual required or recommended by the San Diego Water Board?	**YES** **NO**	☐ ☐
If YES to the question above, did the Copermittee update its BMP Design Manual and make it available on the Regional Clearinghouse?	**YES** **NO**	☐ ☐
Number of proposed development projects in review		
Number of Priority Development Projects in review		
Number of Priority Development Projects approved		
Number of approved Priority Development Projects exempt from any BMP requirements		
Number of approved Priority Development Projects allowed alternative compliance		
Number of Priority Development Projects granted occupancy		
Number of completed Priority Development Projects in inventory		
Number of high priority Priority Development Project structural BMP inspections		
Number of Priority Development Project structural BMP violations		
Number of enforcement actions issued		
Number of escalated enforcement actions issued		

JURISDICTIONAL RUNOFF MANAGEMENT PROGRAM
ANNUAL REPORT FORM
FY ________________

VI. CONSTRUCTION MANAGEMENT PROGRAM	
Has the Copermittee implemented a construction management program that complies with Order No. R9-2013-0001?	**YES** ☐ **NO** ☐
Number of construction sites in inventory	
Number of active construction sites in inventory	
Number of inactive construction sites in inventory	
Number of construction sites closed/completed during reporting period	
Number of construction site inspections	
Number of construction site violations	
Number of enforcement actions issued	
Number of escalated enforcement actions issued	

VII. EXISTING DEVELOPMENT MANAGEMENT PROGRAM				
Has the Copermittee implemented an existing development management program that complies with Order No. R9-2013-0001?				**YES** ☐ **NO** ☐
	Municipal	**Commercial**	**Industrial**	**Residential**
Number of facilities or areas in inventory				
Number of existing development inspections				
Number of follow-up inspections				
Number of violations				
Number of enforcement actions issued				
Number of escalated enforcement actions issued				

VIII. PUBLIC EDUCATION AND PARTICIPATION	
Has the Copermittee implemented a public education program component that complies with Order No. R9-2013-0001?	**YES** ☐ **NO** ☐
Has the Copermittee implemented a public participation program component that complies with Order No. R9-2013-0001?	**YES** ☐ **NO** ☐
IX. FISCAL ANALYSIS	
Has the Copermittee attached to this form a summary of its fiscal analysis that complies with Order No. R9-2013-0001?	**YES** ☐ **NO** ☐

X. CERTIFICATION

I [☐ Principal Executive Officer ☐ Ranking Elected Official ☐ Duly Authorized Representative] certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

______________________ Signature	______________________ Date
______________________ Print Name	______________________ Title
______________________ Telephone Number	______________________ Email

ATTACHMENT E

SPECIFIC PROVISIONS FOR TOTAL MAXIMUM DAILY LOADS APPLICABLE TO ORDER NO. R9-2013-0001

These provisions implement Total Maximum Daily Loads (TMDLs), adopted by the San Diego Water Board and approved by USEPA under Clean Water Act section 303(c), which are applicable to discharges regulated under this Order. The provisions and schedules for implementation of the TMDLs described below must be incorporated into the Water Quality Improvement Plans, required pursuant to Provision B of this Order, for the specified Watershed Management Areas.

1. Total Maximum Daily Load for Diazinon in Chollas Creek Watershed
2. Total Maximum Daily Loads for Dissolved Copper in Shelter Island Yacht Basin
3. Total Maximum Daily Loads for Total Nitrogen and Total Phosphorus in Rainbow Creek Watershed
4. Total Maximum Daily Loads for Dissolved Copper, Lead, and Zinc in Chollas Creek
5. Total Maximum Daily Loads for Indicator Bacteria, Baby Beach in Dana Point Harbor and Shelter Island Shoreline Park in San Diego Bay
6. Revised Total Maximum Daily Loads for Indicator Bacteria, Project I – Twenty Beaches and Creeks in the San Diego Region (Including Tecolote Creek)

1. Total Maximum Daily Load for Diazinon in Chollas Creek Watershed

a. APPLICABILITY

(1) TMDL Basin Plan Amendment: Resolution No. R9-2002-0123

(2) TMDL Adoption and Approval Dates:

San Diego Water Board Adoption Date:	August 14, 2002
State Water Board Approval Date:	July 16, 2003
Office of Administrative Law Approval Date:	September 11, 2003
US EPA Approval Date:	November 3, 2003

(3) TMDL Effective Date: September 11, 2003

(4) Watershed Management Area: San Diego Bay

(5) Water Body: Chollas Creek

(6) Responsible Copermittees: City of La Mesa, City of Lemon Grove, City of San Diego, County of San Diego, San Diego Unified Port District

b. WATER QUALITY BASED EFFLUENT LIMITATIONS

The WQBELs for Chollas Creek consist of the following:

(1) Receiving Water Limitations

Discharges from the MS4s must not cause or contribute to the violation of the following receiving water limitations by the end of the compliance schedule under Specific Provision 1.c:

Table 1.1
Receiving Water Limitations as Concentrations in Chollas Creek

Constituent	Exposure Duration	Receiving Water Limitation	Averaging Period
Diazinon	Acute	0.08 µg/L	1 hour
	Chronic	0.05 µg/L	4 days

(2) Effluent Limitations

Discharges from the MS4s must not contain concentrations that exceed the following effluent limitations by the end of the compliance schedule under Specific Provision 1.c:

Table 1.2
Effluent Limitations as Concentrations in MS4 Discharges to Chollas Creek

Constituent	Exposure Duration	Effluent Limitation	Averaging Period
Diazinon	Acute	0.072 µg/L	1 hour
	Chronic	0.045 µg/L	4 days

(3) Best Management Practices

The following BMPs for Chollas Creek must be incorporated into the Water Quality Improvement Plan for the San Diego Bay Watershed Management Area and implemented by the Responsible Copermittees:

(a) The Responsible Copermittees must implement BMPs to support the achievement of the WQBELs under Specific Provision 1.b for Chollas Creek.

(b) The Responsible Copermittees must implement the Diazinon Toxicity Control Plan and Diazinon Public Outreach/Education Program as described in the report titled, *Technical Report for Total Maximum Daily Load for Diazinon in Chollas Creek Watershed, San Diego County*, dated August 14, 2002, including subsequent modifications, in order to achieve the WQBELs under Specific Provision 1.b.

(c) The Responsible Copermittees should coordinate any BMPs implemented to address this TMDL with Caltrans as possible.

c. COMPLIANCE SCHEDULE

The Responsible Copermittees are required to achieve their respective WLAs by December 31, 2010. The Responsible Copermittees must be in compliance with the WQBELs under Specific Provision 1.b.

d. SPECIFIC MONITORING AND ASSESSMENT REQUIREMENTS

(1) The Responsible Copermittees must implement the monitoring and assessment requirements issued under Investigation Order No. R9-2004-0277, *California Department of Transportation and San Diego Municipal Separate Storm Sewer System Copermittees Responsible for the Discharge of Diazinon into the Chollas Creek Watershed*. The monitoring reports required under Investigation Order No. R9-2004-0277 must be submitted as part of the Annual Reports required under Provision F.3.b of this Order.

(2) The Responsible Copermittees must monitor the effluent of the MS4 outfalls for diazinon within the Chollas Creek watershed, and calculate or estimate the annual diazinon loads, in accordance with the requirements of Provisions D.2, D.4.b.(1), and D.4.b.(2) of this Order. The monitoring and assessment results must be submitted as part of the Annual Reports required under Provision F.3.b of this Order.

e. Compliance Determination

Compliance with WQBELs of Specific Provision 1.b may be demonstrated via one of the following methods:

(1) There is no direct or indirect discharge from the Responsible Copermittees' MS4s to the receiving water;

(2) There are no exceedances of the applicable receiving water limitations under Specific Provision 1.b.(1) in the receiving water at, or downstream of the Responsible Copermittees' MS4 outfalls; OR

(3) There are no violations of the applicable effluent limitations under Specific Provision 1.b.(2) at the Responsible Copermittees' MS4 outfalls.

2. Total Maximum Daily Loads for Dissolved Copper in Shelter Island Yacht Basin

a. APPLICABILITY

(1) TMDL Basin Plan Amendment: Resolution No. R9-2005-0019

(2) TMDL Adoption and Approval Dates:

San Diego Water Board Adoption Date:	February 9, 2005
State Water Board Approval Date:	September 22, 2005
Office of Administrative Law Approval Date:	December 2, 2005
US EPA Approval Date:	February 8, 2006

(3) TMDL Effective Date: December 2, 2005

(4) Watershed Management Area: San Diego Bay

(5) Water Body: Shelter Island Yacht Basin

(6) Responsible Copermittee: City of San Diegot

b. WATER QUALITY BASED EFFLUENT LIMITATIONS

The WQBELs for Shelter Island Yacht Basin consist of the following:

(1) Receiving Water Limitations

Discharges from the MS4s must not cause or contribute to the violation of the following receiving water limitations by the end of the compliance schedule under Specific Provision 2.c:

Table 2.1
Receiving Water Limitations as Concentrations in Shelter Island Yacht Basin

Constituent	Exposure Duration	Receiving Water Limitation	Averaging Period
Dissolved Copper	Acute	4.8 µg/L	1 hour
	Chronic	3.1 µg/L	4 days

(2) Effluent Limitations

Discharges from the MS4s must not contain pollutant loads that exceed the following effluent limitations by the end of the compliance schedule under Specific Provision 2.c:

Table 2.2
Effluent Limitations as Annual Loads in MS4 Discharges to Shelter Island Yacht Basin

Constituent	Effluent Limitation
Dissolved Copper	30 kg/yr

(3) Best Management Practices

The Responsible Copermittee must implement BMPs to support the achievement of the WQBELs under Specific Provision 2.b for Shelter Island Yacht Basin

c. COMPLIANCE SCHEDULE

The Responsible Copermittee is required to achieve the MS4 WLA by December 2, 2005. The Responsible Copermittee must be in compliance with the WQBELs under Specific Provision 2.b.

d. SPECIFIC MONITORING AND ASSESSMENT REQUIREMENTS

The Responsible Copermittee must monitor the effluent of its MS4 outfalls for dissolved copper, and calculate or estimate the monthly and annual dissolved copper loads, in accordance with the requirements of Provisions D.2, D.4.b.(1), and D.4.(b)(2)of this Order. The monitoring and assessment results must be submitted as part of the Annual Reports required under Provision F.3.b of this Order.

e. COMPLIANCE DETERMINATION

Compliance with WQBELs of Specific Provision 2.b may be demonstrated via one of the following methods:

(1) There is no direct or indirect discharge from the Responsible Copermittee's MS4s to the receiving water;

(2) There are no exceedances of the applicable receiving water limitations under Specific Provision 2.b.(1) in the receiving water at, or downstream of the Responsible Copermittee's MS4 outfalls; OR

(3) There are no violations of the applicable effluent limitations under Specific Provision 2.b.(2) at the Responsible Copermittee's MS4 outfalls.

3. Total Maximum Daily Loads for Total Nitrogen and Total Phosphorus in Rainbow Creek Watershed

a. APPLICABILITY

(1) TMDL Basin Plan Amendment: Resolution No. R9-2005-0036

(2) TMDL Adoption and Approval Dates:

San Diego Water Board Adoption Date:	February 9, 2005
State Water Board Approval Date:	November 16, 2005
Office of Administrative Law Approval Date:	February 1, 2006
US EPA Approval Date:	March 22, 2006

(3) TMDL Effective Date: February 1, 2006

(4) Watershed Management Area: Santa Margarita River

(5) Water Body: Rainbow Creek

(6) Responsible Copermittee: County of San Diego

b. WATER QUALITY BASED EFFLUENT LIMITATIONS

The WQBELs for Rainbow Creek consist of the following

(1) Receiving Water Limitations

Discharges from the MS4s must not cause or contribute to the violation of the following receiving water limitations by the end of the compliance schedule under Specific Provision 3.c.(1):

Table 3.1
Receiving Water Limitations as Concentrations in Rainbow Creek

Constituent	Receiving Water Limitation
Nitrate (as N)	10 mg/L
Total Nitrogen	1 mg/L
Total Phosphorus	0.1 mg/L

(2) Effluent Limitations

(a) Discharges from the MS4s must not contain concentrations that exceed the following effluent limitations by the end of the compliance schedule under Specific Provision 3.c.(1):

Table 3.2
Effluent Limitations as Concentrations in MS4 Discharges to Rainbow Creek

Constituent	Effluent Limitation
Nitrate (as N)	10 mg/L
Total Nitrogen	1 mg/L
Total Phosphorus	0.1 mg/L

(b) Pollutant loads from given land uses discharging to and from the MS4s must not exceed the following effluent limitations by the end of the compliance schedule under Specific Provision 3.c.(1):

Table 3.3
Effluent Limitations as Annual Loads in MS4 Discharges to Rainbow Creek

Land Use	Total N	Total P
Commercial nurseries	116 kg/yr	3 kg/yr
Park	3 kg/yr	0.1 kg/yr
Residential areas	149 kg/yr	12 kg/yr
Urban areas	27 kg/yr	6 kg/yr

Interim effluent limitations expressed as pollutant loads are given in the compliance schedule under Specific Provision 3.0.

(3) Best Management Practices

(a) The Responsible Copermittee must implement BMPs to support the achievement of the WQBELs under Specific Provision 3.b for Rainbow Creek.

(b) The Responsible Copermittee should coordinate any BMPs implemented to address this TMDL with Caltrans and other sources as possible.

c. Compliance Schedule

(1) Compliance Date

The Responsible Copermittee must be in compliance with the WQBELs under Specific Provision 3.b, by December 31, 2021.

(2) Interim Compliance Requirements

Table 3.4
Interim Effluent Limitations as Annual Loads in MS4 Discharges from Specific Land Uses to Rainbow Creek

	Total N Interim Effluent Limitations (kg/yr)			Total P Interim Effluent Limitations (kg/yr)		
	Interim Compliance Date			Interim Compliance Date		
Land Use	**2009**	**2013**	**2017**	**2009**	**2013**	**2017**
Commercial nurseries	390	299	196	20	16	10
Park	5	3	3	0.15	0.10	0.10
Residential areas	507	390	260	99	74	47
Urban areas	40	27	27	9	6	6

d. Specific Monitoring and Assessment Requirements

The Responsible Copermittee must implement the Sampling and Analysis Plan for Rainbow Creek Nutrient Reduction TMDL Implementation Water Quality Monitoring, dated January 2010. The results of any monitoring conducted during the reporting period, and assessment of whether the interim and final WQBELs have been achieved must be submitted as part of the Annual Reports required under Provision F.3.b of this Order.

e. Compliance Determination

(1) Compliance with interim compliance requirements of Specific Provision 3.c.(2) may be demonstrated via one of the following methods:

(a) There is no direct or indirect discharge from the Responsible Copermittee's MS4s to the receiving water;

(b) There are no exceedances of the applicable receiving water limitations under Specific Provision 3.b.(1) in the receiving water at, or downstream of the Responsible Copermittee's MS4 outfalls;

(c) There are no violations of the applicable effluent limitations under Specific Provision 3.b.(2)(a) at the Responsible Copermittee's MS4 outfalls;

(d) The pollutant loads from given land uses discharging to and from the MS4s do not exceed the applicable effluent limitations under Specific Provision 3.b.(2)(b); OR

(e) The Responsible Copermittee has submitted and is fully implementing a Water Quality Improvement Plan, accepted by the San Diego Water Board, which provides reasonable assurance that the interim compliance requirements will be achieved by the interim compliance dates.

(2) Compliance with WQBELs of Specific Provision 3.b may be demonstrated via one of the following methods:

(a) There is no direct or indirect discharge from the Responsible Copermittee's MS4s to the receiving water;

(b) There are no exceedances of the applicable receiving water limitations under Specific Provision 3.b.(1) in the receiving water at, or downstream of the Responsible Copermittee's MS4 outfalls;

(c) There are no violations of the applicable effluent limitations under Specific Provision 3.b.(2)(a) at the Responsible Copermittee's MS4 outfalls; OR

(d) The pollutant loads from given land uses discharging to and from the MS4s do not exceed the applicable effluent limitations under Specific Provision 3.b.(2)(b).

4. Total Maximum Daily Loads for Dissolved Copper, Lead, and Zinc in Chollas Creek

a. APPLICABILITY

(1) TMDL Basin Plan Amendment: Resolution No. R9-2007-0043

(2) TMDL Adoption and Approval Dates:

San Diego Water Board Adoption Date:	June 13, 2007
State Water Board Approval Date:	July 15, 2008
Office of Administrative Law Approval Date:	October 22, 2008
US EPA Approval Date:	December 18, 2008

(3) TMDL Effective Date: October 22, 2008

(4) Watershed Management Area: San Diego Bay

(5) Water Body: Chollas Creek

(6) Responsible Copermittees: City of La Mesa, City of Lemon Grove, City of San Diego, County of San Diego, San Diego Unified Port District

b. WATER QUALITY BASED EFFLUENT LIMITATIONS

The WQBELs for Chollas Creek consist of the following:

(1) Receiving Water Limitations

Discharges from the MS4s must not cause or contribute to the violation of the following receiving water limitations by the end of the compliance schedule under Specific Provision 4.c.(1):

Table 4.1
Receiving Water Limitations as Concentrations in Chollas Creek

Constituent	Exposure Duration	Receiving Water Limitation (µg/L)	Averaging Period
Dissolved Copper	Acute	$(0.96) \times e^{[0.9422 \times \ln(\text{hardness}) - 1.700]} \times \text{WER*}$	1 hour
	Chronic	$(0.96) \times e^{[0.8545 \times \ln(\text{hardness}) - 1.702]} \times \text{WER*}$	4 days
Dissolved Lead	Acute	$[1.46203 - 0.145712 \times \ln(\text{hardness})] \times e^{[1.273 \times \ln(\text{hardness}) - 1.460]} \times \text{WER*}$	1 hour
	Chronic	$[1.46203 - 0.145712 \times \ln(\text{hardness})] \times e^{[1.273 \times \ln(\text{hardness}) - 4.705]} \times \text{WER*}$	4 days
Dissolved Zinc	Acute	$(0.978) \times e^{[0.8473 \times \ln(\text{hardness}) + 0.884]} \times \text{WER*}$	1 hour
	Chronic	$(0.986) \times e^{[0.8473 \times \ln (\text{hardness}) + 0.884]} \times \text{WER*}$	4 days

Notes:
* The Water Effect Ratio (WER) is assumed to be 1.0 unless there is a site-specific and chemical-specific WER.

(2) Effluent Limitations

Discharges from the MS4s must not contain pollutant loads that exceed the following effluent limitations by the end of the compliance schedule under Specific Provision 4.c.(1):

Table 4.2
Effluent Limitations as Concentrations in MS4 Discharges to Chollas Creek

Constituent	Exposure Duration	Effluent Limitation (µg/L)	Averaging Period
Dissolved Copper	Acute	90% x (0.96) x $e^{[0.9422 \times \ln(\text{hardness}) - 1.700]}$ x WER*	1 hour
	Chronic	90% x (0.96) x $e^{[0.8545 \times \ln(\text{hardness}) - 1.702]}$ x WER*	4 days
Dissolved Lead	Acute	90% x [1.46203 – 0.145712 x ln(hardness)] x $e^{[1.273 \times \ln(\text{hardness}) - 1.460]}$ x WER*	1 hour
	Chronic	90% x [1.46203 – 0.145712 x ln(hardness)] x $e^{[1.273 \times \ln(\text{hardness}) - 4.705]}$ x WER*	4 days
Dissolved Zinc	Acute	90% x (0.978) x $e^{[0.8473 \times \ln(\text{hardness}) + 0.884]}$ x WER*	1 hour
	Chronic	90% x (0.986) x $e^{[0.8473 \times \ln(\text{hardness}) + 0.884]}$ x WER*	4 days

Notes:
* The Water Effect Ratio (WER) is assumed to be 1.0 unless there is a site-specific and chemical-specific WER.

(3) Best Management Practices

(a) The Responsible Copermittees must implement BMPs to support the achievement of the WQBELs under Specific Provision 4.b for Chollas Creek.

(b) The Responsible Copermittees should coordinate any BMPs implemented to address this TMDL with Caltrans and the U.S. Navy as possible.

c. COMPLIANCE SCHEDULE

(1) WLA Compliance Date

The Responsible Copermittees are required to achieve the WLA, thus must be in compliance with the WQBELs under Specific Provision 4.b, by October 22, 2028.

(2) Interim Compliance Requirements

The Responsible Copermittee must comply with the following interim WQBELs by the interim compliance date:

Table 4.3
Interim Effluent Limitations as Concentrations in MS4 Discharges to Chollas Creek

Interim Compliance Date	Constituent	Exposure Duration	Effluent Limitation (µg/L)	Averaging Period
October 22, 2018	Dissolved Copper	Acute	$1.2 \times 90\% \times (0.96) \times e^{[0.9422 \times \ln(\text{hardness}) - 1.700]} \times \text{WER*}$	1 hour
		Chronic	$1.2 \times 90\% \times (0.96) \times e^{[0.8545 \times \ln(\text{hardness}) - 1.702]} \times \text{WER*}$	4 days
	Dissolved Lead	Acute	$1.2 \times 90\% \times [1.46203 - 0.145712 \times \ln(\text{hardness})] \times e^{[1.273 \times \ln(\text{hardness}) - 1.460]} \times \text{WER*}$	1 hour
		Chronic	$1.2 \times 90\% \times [1.46203 - 0.145712 \times \ln(\text{hardness})] \times e^{[1.273 \times \ln(\text{hardness}) - 4.705]} \times \text{WER*}$	4 days
	Dissolved Zinc	Acute	$1.2 \times 90\% \times (0.978) \times e^{[0.8473 \times \ln(\text{hardness}) + 0.884]} \times \text{WER*}$	1 hour
		Chronic	$1.2 \times 90\% \times (0.986) \times e^{[0.8473 \times \ln(\text{hardness}) + 0.884]} \times \text{WER*}$	4 days

Notes:
* The Water Effect Ratio (WER) is assumed to be 1.0 unless there is a site-specific and chemical-specific WER.

d. Specific Monitoring and Assessment Requirements

(1) The Responsible Copermittees must implement the monitoring and assessment requirements issued under Investigation Order No. R9-2004-0277, *California Department of Transportation and San Diego Municipal Separate Storm Sewer System Copermittees Responsible for the Discharge of Diazinon into the Chollas Creek Watershed*, when it is amended to include monitoring requirements for the Total Maximum Daily Loads for Dissolved Copper, Lead, and Zinc in Chollas Creek. The monitoring reports required under Investigation Order No. R9-2004-0277 must be submitted as part of the Annual Reports required under Provision F.3.b of this Order.

(2) The Responsible Copermittees must monitor the effluent of the MS4 outfalls discharging to Chollas Creek for dissolved copper, lead, and zinc, and calculate or estimate the monthly and annual dissolved copper, lead, and zinc loads, in accordance with the requirements of Provisions D.2, D.4.b.(1), and D.4.b.(2)of this Order. The monitoring and assessment results must be submitted as part of the Annual Reports required under Provision F.3.b of this Order.

e. COMPLIANCE DETERMINATION

(1) Compliance with interim compliance requirements of Specific Provision 4.c.(2) may be demonstrated via one of the following methods:

(a) There is no direct or indirect discharge from the Responsible Copermittees' MS4s to the receiving water;

(b) There are no exceedances of the applicable receiving water limitations under Specific Provision 4.b.(1) in the receiving water at, or downstream of the Responsible Copermittees' MS4 outfalls;

(c) There are no violations of the applicable effluent limitations under Specific Provision 4.b.(2) at the Responsible Copermittees' MS4 outfalls; OR

(d) The Responsible Copermittees have submitted and is fully implementing a Water Quality Improvement Plan, accepted by the San Diego Water Board, which provides reasonable assurance that the interim compliance requirements will be achieved by the interim compliance dates.

(2) Compliance with WQBELs of Specific Provision 4.b may be demonstrated via one of the following methods:

(a) There is no direct or indirect discharge from the Responsible Copermittees' MS4s to the receiving water;

(b) There are no exceedances of the applicable receiving water limitations under Specific Provision 4.b.(1) in the receiving water at, or downstream of the Responsible Copermittees' MS4 outfalls; OR

(c) There are no violations of the applicable effluent limitations under Specific Provision 4.b.(2) at the Responsible Copermittees' MS4 outfalls.

5. Total Maximum Daily Loads for Indicator Bacteria, Baby Beach in Dana Point Harbor and Shelter Island Shoreline Park in San Diego Bay

a. APPLICABILITY

(1) TMDL Basin Plan Amendment: Resolution No. R9-2008-0027

(2) TMDL Adoption and Approval Dates:

San Diego Water Board Adoption Date:	June 11, 2008
State Water Board Approval Date:	June 16, 2009
Office of Administrative Law Approval Date:	September 15, 2009
US EPA Approval Date:	October 26, 2009

(3) TMDL Effective Date: September 15, 2009

(4) Watershed Management Areas: See Table 5.0

(5) Water Bodies: See Table 5.0

(6) Responsible Copermittees: See Table 5.0

Table 5.0
Applicability of Total Maximum Daily Loads for Indicator Bacteria
Baby Beach in Dana Point Harbor and Shelter Island Shoreline Park in San Diego Bay

Watershed Management Area	Water Body	Segment or Area	Responsible Copermittees
South Orange County	Dana Point Harbor	Baby Beach	-City of Dana Point -County of Orange
San Diego Bay	San Diego Bay	Shelter Island Shoreline Park	- San Diego Unified Port District

b. WATER QUALITY BASED EFFLUENT LIMITATIONS

The WQBELs for segments or areas of the water bodies listed in Table 5.0 consist of the following:

(1) Receiving Water Limitations

(a) Discharges from the MS4s must not cause or contribute to the violation of the following receiving water limitations by the end of the compliance schedules under Specific Provisions 5.c.(1)(a) and 5.c.(2):

Table 5.1
Receiving Water Limitations as Bacteria Densities in the Water Body

	Receiving Water Limitations	
Constituent	**Single Sample Maximum[1,2]**	**30-Day Geometric Mean[2]**
Total Coliform	10,000 MPN/100mL	1,000 MPN/100mL
Fecal Coliform	400 MPN/100mL	200 MPN/100mL
Enterococcus	104 MPN/100mL	35 MPN/100mL

Notes:
1. During wet weather days, only the single sample maximum receiving water limitations are required to be achieved.
2. During dry weather days, the single sample maximum and 30-day geometric mean receiving water limitations are required to be achieved.

(b) If the above receiving water limitations are not met in the receiving water, the Responsible Copermittees must demonstrate that the discharges from the MS4s are not causing or contributing to the exceedance of receiving water limitations.

(2) Effluent Limitations

Discharges from the MS4s must not contain densities that exceed the following effluent limitations by the end of the compliance schedules under Specific Provisions 5.c.(1)(a) and 5.c.(2) to demonstrate the discharge is not causing or contributing to a violation of receiving water quality standards:

Table 5.2
Effluent Limitations as Bacteria Densities in MS4 Discharges to the Water Body

	Effluent Limitations	
Constituent	**Single Sample Maximum[1,2]**	**30-Day Geometric Mean[2]**
Total Coliform	10,000 MPN/100mL	1,000 MPN/100mL
Fecal Coliform	400 MPN/100mL	200 MPN/100mL
Enterococcus	104 MPN/100mL	35 MPN/100mL

Notes:
1. During wet weather days, only the single sample maximum effluent limitations are required to be achieved.
2. During dry weather days, the single sample maximum and 30-day geometric mean effluent limitations are required to be achieved.

Interim effluent limitations expressed as pollutant loads are given in the compliance schedule under Specific Provision 5.c.

(3) Best Management Practices

(a) The Water Quality Improvement Plans for the applicable Watershed Management Areas in Table 5.0 must incorporate the Bacteria Load Reduction Plan (BLRP) required to be developed pursuant to Resolution No. R9-2008-0027.

(b) The Responsible Copermittee must implement BMPs to support the achievement of the WQBELs under Specific Provision 5.0 for the segments or areas of the water bodies listed in Table 5.0

c. Compliance Schedule

(1) Baby Beach in Dana Point Harbor

(a) WLA Compliance Dates

The Responsible Copermittees for MS4 discharges to Baby Beach are required to achieve the WLA, thus must be in compliance with the WQBELs under Specific Provision 5.0, according to the following compliance schedule:

Table 5.3
Compliance Schedule Dates to Achieve Baby Beach WLAs

Constituent	Dry Weather WLA Compliance Date	Wet Weather WLA Compliance Date
Total Coliform	September 15, 2014	September 15, 2009
Fecal Coliform		September 15, 2009
Enterococcus		September 15, 2019

(b) Interim Compliance Requirements

The Responsible Copermittees for MS4 discharges to Baby Beach must comply with the following interim WQBELs by the interim compliance date:

Table 5.4
Interim Effluent Limitations as Loads in MS4 Discharges to Baby Beach

Constituent	Interim Compliance Date	Dry Weather Interim Effluent Limitation	Wet Weather Interim Effluent Limitation
Total Coliform	September 15, 2012	4.93×10^9 MPN/day	NA*
Fecal Coliform	September 15, 2012	0.59×10^9 MPN/day	NA*
Enterococcus	September 15, 2012	0.42×10^9 MPN/day	NA**
	September 15, 2016	NA*	207×10^9 MPN/30days

Notes:
* The WQBELs under Specific Provision 5.b must already be achieved by the given interim compliance date.
** There is no corresponding interim WQBEL for the given interim compliance date.

(2) Shelter Island Shoreline Park in San Diego Bay

The Responsible Copermittee for MS4 discharges to Shelter Island Shoreline Park is required to achieve the WLA, thus must be in compliance with the WQBELs under Specific Provision 5.0, by December 31, 2012.

d. SPECIFIC MONITORING AND ASSESSMENT REQUIREMENTS

(1) Monitoring Stations

Monitoring locations should consist of, at a minimum, the same locations used to collect data required pursuant to Order Nos. R9-2007-0001 and R9-2009-0002, and beach monitoring for Health and Safety Code section 115880.[33] If exceedances of the applicable interim or final receiving water limitations are observed in the monitoring data, additional monitoring locations and/or other source identification methods must be implemented to identify the sources causing the exceedances. The additional monitoring locations must also be used to demonstrate that the bacteria loads from the identified anthropogenic sources have been addressed and are no longer causing exceedances in the receiving waters.

(2) Monitoring Procedures

(a) The Responsible Copermittees must collect dry weather monitoring samples from the receiving water monitoring stations at least monthly. Dry weather samples collected from additional monitoring stations established to identify sources must be collected at an appropriate frequency to demonstrate bacteria loads from the identified anthropogenic sources have been addressed and are no longer causing exceedances in the receiving waters.

(b) The Responsible Copermittees must collect wet weather monitoring samples within the first 24 hours of the first storm event[34] of the rainy season (i.e. October 1 through April 30). Wet weather samples collected from receiving water stations and any additional monitoring stations established to identify sources must be collected at an appropriate frequency to demonstrate bacteria loads from the identified sources have been addressed and are no longer causing exceedances in the receiving waters.

(c) Samples must be analyzed for total coliform, fecal coliform, and *Enterococcus* indicator bacteria.

(3) Assessment and Reporting Requirements

(a) The Responsible Copermittees must analyze the dry weather and wet weather monitoring data to assess whether the interim and final WQBELs have been achieved.

[33] Commonly referred to as AB 411 monitoring
[34] Wet weather days are defined by the TMDL as storm events of 0.2 inches or greater and the following 72 hours. The Responsible Copermittees may choose to limit their wet weather sampling requirements to storm events of 0.2 inches or greater, or also include storm events of 0.1 inches or greater as defined by the federal regulations [40CFR122.26(d)(2)(iii)(A)(2)].

(b) The monitoring and assessment results must be submitted as part of the Annual Reports required under Provision F.3.b of this Order.

e. COMPLIANCE DETERMINATION

(1) Compliance with interim compliance requirements of Specific Provision 5.c.(1)(b) may be demonstrated via one of the following methods:

(a) There is no direct or indirect discharge from the Responsible Copermittees' MS4s to the receiving water;

(b) There are no exceedances of the applicable receiving water limitations under Specific Provision 5.b.(1)(a) in the receiving water at, or downstream of the Responsible Copermittees' MS4 outfalls;

(c) There are no violations of the applicable effluent limitations under Specific Provision 5.b.(2) at the Responsible Copermittees' MS4 outfalls;

(d) The pollutant loads discharging from the Responsible Copermittees' MS4 outfalls do not exceed the applicable effluent limitations under Specific Provision 5.c.(1)(b);

(e) The Responsible Copermittees can demonstrate that exceedances of the applicable receiving water limitations under Specific Provision 5.b.(1)(a) in the receiving water are due to loads from natural sources, AND pollutant loads from the Copermittees' MS4 are not causing or contributing to the exceedances; OR

(f) The Responsible Copermittees have submitted and are fully implementing a Water Quality Improvement Plan, accepted by the San Diego Water Board, which provides reasonable assurance that the interim compliance requirements will be achieved by the interim compliance dates.

(2) Compliance with WQBELs of Specific Provision 5.b may be demonstrated via one of the following methods:

(a) There is no direct or indirect discharge from the Responsible Copermittees' MS4s to the receiving water;

(b) There are no exceedances of the applicable receiving water limitations under Specific Provision 5.b.(1)(a) in the receiving water at, or downstream of the Responsible Copermittees' MS4 outfalls;

(c) There are no violations of the applicable effluent limitations under Specific Provision 5.b.(2) at the Responsible Copermittees' MS4 outfalls;

(d) The pollutant loads discharging from the Responsible Copermittees' MS4 outfalls do not exceed the applicable effluent limitations under Specific Provision 5.c.(1)(b); OR

(e) The Responsible Copermittees can demonstrate that exceedances of the applicable receiving water limitations under Specific Provision 5.b.(1)(a) in the receiving water are due to loads from natural sources, AND pollutant loads from the Copermittees' MS4 are not causing or contributing to the exceedances.

6. Revised Total Maximum Daily Loads for Indicator Bacteria, Project I – Twenty Beaches and Creeks in the San Diego Region (Including Tecolote Creek)

a. APPLICABILITY

(1) TMDL Basin Plan Amendment: Resolution No. R9-2010-0001

(2) TMDL Adoption and Approval Dates:

San Diego Water Board Adoption Date: February 10, 2010
State Water Board Approval Date: December 14, 2010
Office of Administrative Law Approval Date: April 4, 2011
US EPA Approval Date: June 22, 2011

(3) TMDL Effective Date: April 4, 2011

(4) Watershed Management Areas: See Table 6.0

(5) Water Bodies: See Table 6.0

(6) Responsible Copermittees: See Table 6.0

Table 6.0
Applicability of Total Maximum Daily Loads for Indicator Bacteria
Project I - Twenty Beaches and Creeks in the San Diego Region (including Tecolote Creek)

Watershed Management Area	Water Body	Segment or Area	Responsible Copermittees
South Orange County	Pacific Ocean Shoreline	Cameo Cove at Irvine Cove Drive – Riviera Way	-City of Laguna Beach -County of Orange -Orange County Flood Control District
		at Heisler Park - North	
	Pacific Ocean Shoreline	at Main Laguna Beach	-City of Aliso Viejo -City of Laguna Beach -City of Laguna Woods -County of Orange -Orange County Flood Control District
		Laguna Beach at Ocean Avenue	
		Laguna Beach at Cleo Street	
		Arch Cove at Bluebird Canyon Road	
		Laguna Beach at Dumond Drive	
	Pacific Ocean Shoreline	Laguna Beach at Lagunita Place / Blue Lagoon Place at Aliso Beach	-City of Aliso Viejo -City of Laguna Beach -City of Laguna Hills -City of Laguna Niguel -City of Laguna Woods -City of Lake Forest -City of Mission Viejo -County of Orange -Orange County Flood Control District
	Aliso Creek	Entire reach (7.2 miles) and associated tributaries: - Aliso Hills Channel - English Canyon Creek - Dairy Fork Creek - Sulfur Creek - Wood Canyon Creek	
	Aliso Creek Mouth	at mouth	

Table 6.0 (Cont'd)
Applicability of Total Maximum Daily Loads for Indicator Bacteria
Project I - Twenty Beaches and Creeks in the San Diego Region (including Tecolote Creek)

Watershed Management Area	Water Body	Segment or Area	Responsible Copermittees
South Orange County (cont'd)	Pacific Ocean Shoreline	Aliso Beach at West Street	-City of Dana Point -City of Laguna Beach -City of Laguna Niguel -County of Orange -Orange County Flood Control District
		Aliso Beach at Table Rock Drive	
		100 Steps Beach at Pacific Coast Hwy at hospital (9th Avenue)	
		at Salt Creek (large outlet)	
		Salt Creek Beach at Salt Creek service road	
		Salt Creek Beach at Strand Road	
	Pacific Ocean Shoreline	at San Juan Creek	-City of Dana Point -City of Laguna Hills -City of Laguna Niguel -City of Mission Viejo -City of Rancho Santa Margarita -City of San Juan Capistrano -County of Orange -Orange County Flood Control District
	San Juan Creek	lower 1 mile	
	San Juan Creek Mouth	at mouth	
	Pacific Ocean Shoreline	at Poche Beach	-City of Dana Point -City of San Clemente -County of Orange -Orange County Flood Control District
		Ole Hanson Beach Club Beach at Pico Drain	
		San Clemente City Beach at El Portal Street Stairs	
		San Clemente City Beach at Mariposa Street	
		San Clemente City Beach at Linda Lane	
		San Clemente City Beach at South Linda Lane	
		San Clemente City Beach at Lifeguard Headquarters	
		under San Clemente Municipal Pier	
		San Clemente City Beach at Trafalgar Canyon (Trafalgar Lane)	
		San Clemente State Beach at Riviera Beach	
		Can Clemente State Beach at Cypress Shores	
San Luis Rey River	Pacific Ocean Shoreline	at San Luis Rey River mouth	-City of Oceanside -City of Vista -County of San Diego

Table 6.0 (Cont'd)
Applicability of Total Maximum Daily Loads for Indicator Bacteria
Project I - Twenty Beaches and Creeks in the San Diego Region (including Tecolote Creek)

Watershed Management Area	Water Body	Segment or Area	Responsible Copermittees
Carlsbad	Pacific Ocean Shoreline	at Moonlight State Beach	-City of Carlsbad -City of Encinitas -City of Escondido -City of San Marcos -County of San Diego
San Dieguito River	Pacific Ocean Shoreline	at San Dieguito Lagoon mouth	-City of Del Mar -City of Escondido -City of Poway -City of San Diego -City of Solana Beach -County of San Diego
Penasquitos	Pacific Ocean Shoreline	Torrey Pines State Beach at Del Mar (Anderson Canyon)	-City of Del Mar -City of Poway -City of San Diego -County of San Diego
Mission Bay	Pacific Ocean Shoreline	La Jolla Shores Beach at El Paseo Grande	-City of San Diego
		La Jolla Shores Beach at Caminito del Oro	
		La Jolla Shores Beach at Vallecitos	
		La Jolla Shores Beach at Avenida de la Playa	
		at Casa Beach, Children's Pool	
		South Casa Beach at Coast Boulevard	
		Whispering Sands Beach at Ravina Street	
		Windansea Beach at Vista de la Playa	
		Windansea Beach at Bonair Street	
		Windansea Beach at Playa del Norte	
		Windansea Beach at Palomar Avenue	
		at Tourmaline Surf Park	
		Pacific Beach at Grand Avenue	
	Tecolote Creek	Entire reach and tributaries	

Table 6.0 (Cont'd)
Applicability of Total Maximum Daily Loads for Indicator Bacteria
Project I- Twenty Beaches and Creeks in the San Diego Region (including Tecolote Creek)

Watershed Management Area	Water Body	Segment or Area	Responsible Copermittees
San Diego River	Forrester Creek	lower 1 mile	-City of El Cajon -City of Santee -County of San Diego
	San Diego River	lower 6 miles	-City of El Cajon -City of La Mesa -City of San Diego -City of Santee -County of San Diego
	Pacific Ocean Shoreline	at San Diego River mouth at Dog Beach	
San Diego Bay	Chollas Creek	lower 1.2 miles	-City of La Mesa -City of Lemon Grove -City of San Diego -County of San Diego - San Diego Unified Port District

b. Water Quality Based Effluent Limitations

The WQBELs for segments or areas of the water bodies listed in Table 6.0 consist of the following:

(1) Receiving Water Limitations

(a) Discharges from the MS4s must not cause or contribute to the violation of the following receiving water limitations by the end of the compliance schedules under Specific Provision 6.c.(1):

Table 6.1
Receiving Water Limitations as Bacteria Densities and Allowable Exceedance Frequencies in the Water Body

	Receiving Water Limitations			
Constituent	Single Sample Maximum[1,2] (MPN/100mL)	Single Sample Maximum Allowable Exceedance Frequency[3]	30-Day Geometric Mean[2] (MPN/100mL)	30-Day Geometric Mean Allowable Exceedance Frequency
Total Coliform	10,000	22% / 0%	1,000	0%
Fecal Coliform	400	22% / 0%	200	0%
Enterococcus	104[4] / 61[5]	22% / 0%	35[4] / 33[5]	0%

Notes:
1. During wet weather days, only the single sample maximum receiving water limitations are required to be achieved.
2. During dry weather days, the single sample maximum and 30-day geometric mean receiving water limitations are required to be achieved.
3. The 22% single sample maximum allowable exceedance frequency only applies to wet weather days. The 0% single sample maximum allowable exceedance frequency applies to dry weather days.
4. This *Enterococcus* receiving water limitation applies to segments of areas of Pacific Ocean Shoreline listed in Table 6.0.
5. This *Enterococcus* receiving water limitations applies to segments or areas of creeks or creek mouths listed in Table 6.0.

Interim receiving water limitations expressed as allowable exceedance frequencies are given in the compliance schedule under Specific Provision 6.c.

(b) If the above receiving water limitations are not met in the receiving water, the Responsible Copermittees must demonstrate that the discharges from the MS4s are not causing or contributing to the violation of receiving water limitations. The Copermittee must provide data that demonstrate the discharges from the MS4s are meeting the effluent limitations under Specific Provision 6.b.(2).

(2) Effluent Limitations

Discharges from the MS4s must not contain densities that exceed the following effluent limitations by the end of the compliance schedules under Specific Provision 6.c.(1) to demonstrate the discharge is not causing or contributing to a violation of receiving water quality standards:

Table 6.2
Effluent Limitations as Bacteria Densities and Allowable Exceedance Frequencies in MS4 Discharges to the Water Body

	Effluent Limitations			
Constituent	Single Sample Maximum[1,2] (MPN/100mL)	Single Sample Maximum Allowable Exceedance Frequency[3]	30-Day Geometric Mean[2] (MPN/100mL)	30-Day Geometric Mean Allowable Exceedance Frequency
Total Coliform	10,000	22% / 0%	1,000	0%
Fecal Coliform	400	22% / 0%	200	0%
Enterococcus	104[4] / 61[5]	22% / 0%	35[4] / 33[5]	0%

Notes:
1. During wet weather days, only the single sample maximum effluent limitations are required to be achieved.
2. During dry weather days, the single sample maximum and 30-day geometric mean effluent limitations are required to be achieved.
3. The 22% single sample maximum allowable exceedance frequency only applies to wet weather days. The 0% single sample maximum allowable exceedance frequency applies to dry weather days
4. This *Enterococcus* effluent limitation applies to MS4 discharges to segments of areas of Pacific Ocean Shoreline listed in Table 6.0.
5. This *Enterococcus* effluent limitation applies to MS4 discharges to segments or areas of creeks or creek mouths listed in Table 6.0.

Interim effluent limitations expressed as allowable exceedance frequencies are given in the compliance schedule under Specific Provision 6.c.

(3) Best Management Practices

(a) The Water Quality Improvement Plans for the applicable Watershed Management Areas in Table 6.0 must incorporate the Comprehensive Load Reduction Plans (CLRPs) required to be developed pursuant to Resolution No. R9-2010-0001. For segments or areas in Table 6.0 that have been delisted from the Clean Water Act Section 303(d) List of Water Quality Limited Segments, a CLRP is not required.

(b) The Responsible Copermittee must implement BMPs to support the achievement of the WQBELs under Specific Provision 6.b for the segments or areas of the water bodies listed in Table 6.0.

(c) The Responsible Copermittees should coordinate any BMPs implemented to address this TMDL with Caltrans and owners/operators of small MS4s as possible.

c. Compliance Schedule

(1) WLA Compliance Dates

The Responsible Copermittees for MS4 discharges to a segment or area of the water bodies listed in Table 6.0 are required to achieve the WLA, thus must be in compliance with the WQBELs under Specific Provision 6.b, according to the following compliance schedule:

Table 6.3
Compliance Schedule Dates to Achieve Indicator Bacteria WLAs

Constituent	Dry Weather WLA Compliance Date	Wet Weather WLA Compliance Date
Total Coliform*	April 4, 2021	April 4, 2031
Fecal Coliform		
Enterococcus		

* Total coliform receiving water limitations only apply to segments or areas of Pacific Ocean Shoreline listed in Table 6.0.

(2) Interim Compliance Requirements

The Responsible Copermittees must comply with the following interim WQBELs by the interim compliance dates:

(a) Interim Dry Weather Receiving Water Limitations

The Responsible Copermittee must calculate the “existing” exceedance frequencies of the 30-day geometric mean water quality objectives for each of the indicator bacteria by analyzing the available monitoring data collected between January 1, 1996 and December 31, 2002. “Existing” exceedance frequencies may be calculated by segment or area of a water body, or by water body, and/or by Watershed Management Area listed in Table 6.0. Separate “existing” exceedance frequencies must be calculated for beaches and creeks/creek mouths.

The Responsible Copermittees must achieve a 50 percent reduction in the “existing” exceedance frequency of the 30-day geometric mean WQBELs for the segments or areas of the water bodies listed in Table 6.0 by the interim compliance dates for achieving the interim dry weather WQBELs given in Table 6.5. A 50 percent reduction in the “existing” exceedance frequency is equivalent to half of the “existing” exceedance frequency of the 30-day geometric mean WQBELs.

The “existing” exceedance frequencies and the interim dry weather allowable exceedance frequencies (i.e. interim dry weather WQBELs) calculated by the Responsible Copermittees must be included in the Water Quality Improvement Plans for the applicable Watershed Management Areas.

(b) Interim Wet Weather Receiving Water Limitations

The Responsible Copermittees must achieve the interim wet weather receiving water limitations in Table 6.4, expressed as interim allowable exceedance frequencies, by the interim compliance dates for achieving the interim wet weather WQBELs given in Table 6.5.

Table 6.4
Interim Wet Weather Receiving Water Limitations Expressed as Interim Wet Weather Allowable Exceedance Frequencies

Watershed Management Area	Water Body	Segment or Area	Interim Wet Weather Allowable Exceedance Frequencies		
			Total Coliform	Fecal Coliform	*Enterococcus*
South Orange County	Pacific Ocean Shoreline	Cameo Cove at Irvine Cove Drive – Riviera Way	38%	37%	39%
		at Heisler Park - North			
	Pacific Ocean Shoreline	at Main Laguna Beach			
		Laguna Beach at Ocean Avenue			
		Laguna Beach at Cleo Street			
		Arch Cove at Bluebird Canyon Road			
		Laguna Beach at Dumond Drive			
	Pacific Ocean Shoreline	Laguna Beach at Lagunita Place / Blue Lagoon Place at Aliso Beach	41%	41%	42%
	Aliso Creek	Entire reach (7.2 miles) and associated tributaries: - Aliso Hills Channel - English Canyon Creek - Dairy Fork Creek - Sulfur Creek - Wood Canyon Creek	41%	41%	42%
	Aliso Creek Mouth	at mouth	41%	41%	42%
	Pacific Ocean Shoreline	Aliso Beach at West Street	36%	36%	36%
		Aliso Beach at Table Rock Drive			
		100 Steps Beach at Pacific Coast Hwy at hospital (9th Avenue)			
		at Salt Creek (large outlet)			
		Salt Creek Beach at Salt Creek service road			
		Salt Creek Beach at Strand Road			

Table 6.4 (Cont'd)
Interim Wet Weather Receiving Water Limitations Expressed as
Interim Wet Weather Allowable Exceedance Frequencies

Watershed Management Area	Water Body	Segment or Area	Interim Wet Weather Allowable Exceedance Frequencies		
			Total Coliform	Fecal Coliform	*Entero-coccus*
South Orange County (cont'd)	Pacific Ocean Shoreline	at San Juan Creek	44%	44%	48%
	San Juan Creek	lower 1 mile	44%	44%	47%
	San Juan Creek Mouth	at mouth	44%	44%	47%
	Pacific Ocean Shoreline	at Poche Beach	35%	35%	36%
		Ole Hanson Beach Club Beach at Pico Drain			
		San Clemente City Beach at El Portal Street Stairs			
		San Clemente City Beach at Mariposa Street			
		San Clemente City Beach at Linda Lane			
		San Clemente City Beach at South Linda Lane			
		San Clemente City Beach at Lifeguard Headquarters			
		under San Clemente Municipal Pier			
		San Clemente City Beach at Trafalgar Canyon (Trafalgar Lane)			
		San Clemente State Beach at Riviera Beach			
		Can Clemente State Beach at Cypress Shores			
San Luis Rey River	Pacific Ocean Shoreline	at San Luis Rey River mouth	45%	44%	47%
Carlsbad	Pacific Ocean Shoreline	at Moonlight State Beach	40%	40%	41%
San Dieguito River	Pacific Ocean Shoreline	at San Dieguito Lagoon mouth	33%	33%	36%

Table 6.4 (Cont'd)
Interim Wet Weather Receiving Water Limitations Expressed as Interim Wet Weather Allowable Exceedance Frequencies

Watershed Management Area	Water Body	Segment or Area	Interim Wet Weather Allowable Exceedance Frequencies		
			Total Coliform	Fecal Coliform	*Entero-coccus*
Penasquitos	Pacific Ocean Shoreline	Torrey Pines State Beach at Del Mar (Anderson Canyon)	26%	26%	26%
Mission Bay	Pacific Ocean Shoreline	La Jolla Shores Beach at El Paseo Grande	37%	37%	37%
		La Jolla Shores Beach at Caminito del Oro			
		La Jolla Shores Beach at Vallecitos			
		La Jolla Shores Beach at Avenida de la Playa			
		at Casa Beach, Children's Pool			
		South Casa Beach at Coast Boulevard			
		Whispering Sands Beach at Ravina Street			
		Windansea Beach at Vista de la Playa			
		Windansea Beach at Bonair Street			
		Windansea Beach at Playa del Norte			
		Windansea Beach at Palomar Avenue			
		at Tourmaline Surf Park			
		Pacific Beach at Grand Avenue			
	Tecolote Creek	Entire reach and tributaries	49%	49%	51%
San Diego River	Forrester Creek	lower 1 mile	46%	43%	49%
	San Diego River	lower 6 miles	46%	43%	49%
	Pacific Ocean Shoreline	at San Diego River mouth at Dog Beach	46%	43%	51%
San Diego Bay	Chollas Creek	lower 1.2 miles	41%	41%	43%

(c) Interim Compliance Dates

The Responsible Copermittees must achieve the interim receiving water limitations under Specific Provisions 6.c.(2)(a) and 6.c.(2)(b) by the interim compliance dates given in Table 6.5.

Table 6.5
Interim Compliance Dates to Achieve Interim WQBELs

Watershed Management Area	Water Body	Segment or Area	Interim Compliance Dates: Interim Dry Weather WQBELs	Interim Compliance Dates: Interim Wet Weather WQBELs
South Orange County	Pacific Ocean Shoreline	Cameo Cove at Irvine Cove Drive – Riviera Way	April 4, 2016	April 4, 2021
		at Heisler Park - North		
	Pacific Ocean Shoreline	at Main Laguna Beach	April 4, 2016	April 4, 2021
		Laguna Beach at Ocean Avenue		
		Laguna Beach at Cleo Street		
		Arch Cove at Bluebird Canyon Road		
		Laguna Beach at Dumond Drive		
	Pacific Ocean Shoreline	Laguna Beach at Lagunita Place / Blue Lagoon Place at Aliso Beach	April 4, 2016	April 4, 2021
	Aliso Creek	Entire reach (7.2 miles) and associated tributaries: - Aliso Hills Channel - English Canyon Creek - Dairy Fork Creek - Sulfur Creek - Wood Canyon Creek	April 4, 2018	April 4, 2021
	Aliso Creek Mouth	at mouth	April 4, 2018	April 4, 2021
	Pacific Ocean Shoreline	Aliso Beach at West Street	April 4, 2016	April 4, 2021
		Aliso Beach at Table Rock Drive		
		100 Steps Beach at Pacific Coast Hwy at hospital (9th Avenue)		
		at Salt Creek (large outlet)		
		Salt Creek Beach at Salt Creek service road	April 4, 2017	April 4, 2021
		Salt Creek Beach at Strand Road	April 4, 2017	April 4, 2021

Table 6.5 (Cont'd)
Interim Compliance Dates to Achieve Interim WQBELs

Watershed Management Area	Water Body	Segment or Area	Interim Compliance Dates: Interim Dry Weather WQBELs	Interim Wet Weather WQBELs
South Orange County (cont'd)	Pacific Ocean Shoreline	at San Juan Creek	April 4, 2016	April 4, 2021
	San Juan Creek	lower 1 mile	April 4, 2018	April 4, 2021
	San Juan Creek Mouth	at mouth	April 4, 2016	April 4, 2021
	Pacific Ocean Shoreline	at Poche Beach	April 4, 2016	April 4, 2021
		Ole Hanson Beach Club Beach at Pico Drain	April 4, 2016	April 4, 2021
		San Clemente City Beach at El Portal Street Stairs	April 4, 2017	April 4, 2021
		San Clemente City Beach at Mariposa Street		
		San Clemente City Beach at Linda Lane	April 4, 2016	April 4, 2021
		San Clemente City Beach at South Linda Lane	April 4, 2018	April 4, 2021
		San Clemente City Beach at Lifeguard Headquarters	April 4, 2017	April 4, 2021
		under San Clemente Municipal Pier		
		San Clemente City Beach at Trafalgar Canyon (Trafalgar Lane)	April 4, 2018	April 4, 2021
		San Clemente State Beach at Riviera Beach	April 4, 2016	April 4, 2021
		Can Clemente State Beach at Cypress Shores	April 4, 2017	April 4, 2021
San Luis Rey River	Pacific Ocean Shoreline	at San Luis Rey River mouth	April 4, 2017	April 4, 2021
Carlsbad	Pacific Ocean Shoreline	at Moonlight State Beach	April 4, 2016	April 4, 2021
San Dieguito River	Pacific Ocean Shoreline	at San Dieguito Lagoon mouth	April 4, 2016	April 4, 2021

Table 6.5 (Cont'd)
Interim Compliance Dates to Achieve Interim WQBELs

Watershed Management Area	Water Body	Segment or Area	Interim Compliance Dates: Interim Dry Weather WQBELs	Interim Compliance Dates: Interim Wet Weather WQBELs
Penasquitos	Pacific Ocean Shoreline	Torrey Pines State Beach at Del Mar (Anderson Canyon)	April 4, 2016	April 4, 2021
Mission Bay	Pacific Ocean Shoreline	La Jolla Shores Beach at El Paseo Grande	April 4, 2016	April 4, 2021
		La Jolla Shores Beach at Caminito del Oro		
		La Jolla Shores Beach at Vallecitos		
		La Jolla Shores Beach at Avenida de la Playa		
		at Casa Beach, Children's Pool		
		South Casa Beach at Coast Boulevard		
		Whispering Sands Beach at Ravina Street		
		Windansea Beach at Vista de la Playa		
		Windansea Beach at Bonair Street		
		Windansea Beach at Playa del Norte		
		Windansea Beach at Palomar Avenue		
		at Tourmaline Surf Park		
		Pacific Beach at Grand Avenue		
	Tecolote Creek	Entire reach and tributaries		
San Diego River	Forrester Creek	lower 1 mile	April 4, 2018	April 4, 2021
	San Diego River	lower 6 miles		
	Pacific Ocean Shoreline	at San Diego River mouth at Dog Beach		
San Diego Bay	Chollas Creek	lower 1.2 miles	April 4, 2018	April 4, 2021

d. Specific Monitoring and Assessment Requirements

(1) Monitoring and Assessment Requirements for Beaches

(a) Monitoring Stations

For beaches addressed by the TMDL, monitoring locations should consist of, at a minimum, the same locations used to collect data required pursuant to Order Nos. R9-2007-0001 and R9-2009-0002, and beach monitoring for Health and Safety Code section 115880.[35] If exceedances

[35] Commonly referred to as AB 411 monitoring

of the applicable interim or final receiving water limitations are observed in the monitoring data, additional monitoring locations and/or other source identification methods must be implemented to identify the sources causing the exceedances. The additional monitoring locations must also be used to demonstrate that the bacteria loads from the identified anthropogenic sources have been addressed and are no longer causing exceedances in the receiving waters.

(b) Monitoring Procedures

(i) The Responsible Copermittees must collect dry weather monitoring samples from the receiving water monitoring stations at least monthly. Dry weather samples collected from additional monitoring stations established to identify sources must be collected at an appropriate frequency to demonstrate bacteria loads from the identified sources have been addressed and are no longer causing exceedances in the receiving waters.

(ii) The Responsible Copermittees must collect wet weather monitoring samples from the receiving water monitoring stations at least once within the first 24 hours of the first storm event[36] of the rainy season (i.e. October 1 through April 30). Wet weather samples collected from receiving water stations and any additional monitoring stations established to identify sources must be collected at an appropriate frequency to demonstrate bacteria loads from the identified sources have been addressed and are no longer in exceedance of the allowable exceedance frequencies in the receiving waters.

(iii) Samples must be analyzed for total coliform, fecal coliform, and *Enterococcus* indicator bacteria.

(c) Assessment and Reporting Requirements

(i) The Responsible Copermittees must analyze the dry weather and wet weather monitoring data to assess whether the interim and final WQBELs for the Pacific Ocean Shoreline segments or areas listed in Table 6.0 have been achieved.

(ii) The monitoring and assessment results must be submitted as part of the Annual Reports required under Provision F.3.b of this Order.

[36] Wet weather days are defined by the TMDL as storm events of 0.2 inches or greater and the following 72 hours. The Responsible Copermittees may choose to limit their wet weather sampling requirements to storm events of 0.2 inches or greater, or also include storm events of 0.1 inches or greater as defined by the federal regulations [40CFR122.26(d)(2)(iii)(A)(2)].

(2) Monitoring and Assessment Requirements for Creeks and Creek Mouths

(a) Monitoring Stations

For creeks addressed by the TMDL, monitoring locations should consist of, at a minimum, a location at or near the mouth of the creek (e.g. Mass Loading Station or Mass Emission Station) and one or more locations upstream of the mouth (e.g. Watershed Assessment Station). If exceedances of the applicable interim or final receiving water limitations are observed in the monitoring data, additional monitoring locations and/or other source identification methods must be implemented to identify the sources causing the exceedances. The additional monitoring locations must also be used to demonstrate that the bacteria loads from the identified sources have been addressed and are no longer causing exceedances in the receiving waters.

(b) Monitoring Procedures

(i) The Responsible Copermittees must collect dry weather monitoring samples from the receiving water monitoring stations in accordance with the requirements of Provision D.

(ii) The Responsible Copermittees must collect wet weather monitoring samples from the receiving water monitoring stations within the first 24 hours of the first storm event[37] of the rainy season (i.e. October 1 through April 30).

(iii) Samples collected from receiving water monitoring stations must be analyzed for fecal coliform and *Enterococcus* indicator bacteria.

(c) Assessment and Reporting Requirements

(i) The Responsible Copermittees must analyze the receiving water monitoring data to assess whether the interim and final receiving water WQBELs for the creeks and creek mouths listed in Table 6.0 have been achieved.

(ii) The Responsible Copermittee must identify and incorporate additional MS4 outfall and receiving water monitoring stations and/or adjust monitoring frequencies to identify sources causing exceedances of the receiving water WQBELs.

(iii) The monitoring and assessment results must be submitted as part of the Annual Reports required under Provision F.3.b of this Order.

[37] Wet weather days are defined by the TMDL as storm events of 0.2 inches or greater and the following 72 hours. The Responsible Copermittees may choose to limit their wet weather sampling requirements to storm events of 0.2 inches or greater, or also include storm events of 0.1 inches or greater as defined by the federal regulations [40CFR122.26(d)(2)(iii)(A)(2)].

e. COMPLIANCE DETERMINATION

(1) Compliance with interim compliance requirements of Specific Provision 6.c.(2) may be demonstrated via one of the following methods:

(a) There is no direct or indirect discharge from the Responsible Copermittees' MS4s to the receiving water;

(b) There are no exceedances of the applicable receiving water limitations under Specific Provision 6.b.(1) in the receiving water at, or downstream of the Responsible Copermittees' MS4 outfalls;

(c) There are no violations of the applicable effluent limitations under Specific Provision 6.b.(2) at the Responsible Copermittees' MS4 outfalls;

(d) There are no exceedances of the applicable interim receiving water limitations under Specific Provision 6.c.(2) in the receiving water at, or downstream of the Responsible Copermittees' MS4 outfalls;

(e) The Responsible Copermittees can demonstrate that exceedances of the applicable interim or final receiving water limitations under Specific Provision 6.b.(1)(a) or 6.c.(2) in the receiving water are due to loads from natural sources, AND pollutant loads from the Copermittees' MS4 are not causing or contributing to the exceedances; OR

(f) The Responsible Copermittees have submitted and are fully implementing a Water Quality Improvement Plan, accepted by the San Diego Water Board, which provides reasonable assurance that the interim compliance requirements will be achieved by the interim compliance dates.

(2) Compliance with WQBELs of Specific Provision 6.b may be demonstrated via one of the following methods:

(a) There is no direct or indirect discharge from the Responsible Copermittees' MS4s to the receiving water;

(b) There are no exceedances of the applicable receiving water limitations under Specific Provision 6.b.(1) in the receiving water at, or downstream of the Responsible Copermittees' MS4 outfalls;

(c) There are no violations of the applicable effluent limitations under Specific Provision 6.b.(2) at the Responsible Copermittees' MS4 outfalls; OR

(d) The Responsible Copermittees can demonstrate that exceedances of the applicable final receiving water limitations under Specific Provision 6.b.(1)(a) in the receiving water are due to loads from natural sources, AND pollutant loads from the Copermittees' MS4 are not causing or contributing to the exceedances.

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January 11th, 2013

Via e-mail to
wchiu@waterboards.ca.gov
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

The Escondido Creek Conservancy

P.O. Box 460791
Escondido, CA 92046-0791
www.escondidocreek.org
information@escondidocreek.org
760.471.9354

RE: Comments on Tentative Order Number: R9-2013-0001

Dear Mr. Chiu:

The Escondido Creek Conservancy (TECC) respectfully submits the following comments on the draft San Diego Regional Municipal Separate Storm Sewer System Permit, Tentative Order No. R9-2013-0001.

Urban runoff is not only one of the San Diego area's most urgent pollution problem, it is also one of the most challenging. In a region known for its beaches and strong tourism economy, polluted runoff makes our beaches and waterways unsafe for surfing, swimming, fishing, and other recreation for at least 72 hours after a rain event. Even in dry weather, runoff due to residential, municipal, and industrial irrigation for urban and suburban landscape can be a major pollution source.

Despite this challenge, we are confident that this public health problem can be successfully mitigated by working collaboratively as a community. The Water Quality Improvement Plans proposed in the draft permit have the potential to become powerful tools to help us improve water quality within our watersheds. However, the Copermittees cannot be tasked with creating these plans alone.

Specifically:
•The Permit should require formation of a stakeholder advisory group for each watershed, and these groups should include representatives of environmental and other public interest organizations with knowledge of the respective watersheds.
•The stakeholder advisory groups should work closely with the Copermittees and a Regional Board staff member during the development phase of Water Quality Improvement Plans to ensure these Plans target significant water quality goals that are both significant and quantifiable.
•The stakeholder advisory process should include accountability and measureable milestones to ensure the goals of the Permit are being met, as defined in the Water Quality Improvement Plans.

By taking advantage of the knowledge and resources of diverse stakeholders like municipalities, businesses, and residents, the San Diego area can be a pioneer in controlling urban runoff, creating healthier communities and watersheds, and improving our local beaches. Not only will the steps listed above help to accomplish these goals, but also bolster the local economy by firmly establishing San Diego as the country's finest coastal destination. However, all of these benefits can only be achieved if the diverse voices of the watershed stakeholders are influencing the planning process in a meaningful way.

TECC recognizes the challenge urban runoff presents to our region and is committed being a part of the solution. Consequently, TECC is interested in participating in a Water Quality Improvement Plan development process for the Carlsbad Hydrologic Unit watershed.

In summary, TECC urges the Regional Board to enhance the stakeholder participation opportunities as Water Quality Improvement Plans are developed and subsequently approve the permit.

Respectfully submitted,

Kevin Barnard

Kevin Barnard
President
The Escondido Creek Conservancy

January 11, 2013

Via e-mail to wchiu@waterboards.ca.gov
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

RE: Comments on Tentative Order Number: R9-2013-0001

Dear Mr. Chiu:

Friends of Rose Canyon, Friends of Rose Creek, and the Rose Creek Watershed Alliance respectfully submit the following comments on the draft San Diego Regional Municipal Separate Storm Sewer System permit.

We have been working together to implement some aspects of the Rose Creek Watershed Opportunities Assessment, a plan whose goal is to enhance and preserve the Rose Creek Watershed (www.rosecreekwatershed.org). Urban runoff is the San Diego region's most urgent pollution problem and was identified in the Assessment for action. Arguably, it is the most difficult to solve. In a region known for its beaches and strong tourism economy, polluted runoff makes our beaches and waterways unsafe for swimming, fishing and other recreation for at least 72 hours after a rain event. Even in dry weather, our "urban drool" from residents and businesses overwatering lawns becomes a major pollution source.

The good news is that by working together as a community, we can solve this challenging public health problem. The Water Quality Improvement Plans proposed in the draft permit have the potential to become powerful tools to help us improve water quality within our watersheds. However, the Copermittees cannot be tasked with creating these plans alone. Specifically:

- The Permit should require formation of a stakeholder advisory group for each watershed that includes representatives of environmental and community groups with knowledge of the watershed.
- These stakeholder advisory groups should work closely with the Copermittees and a regional board staff member while the Water Quality Improvement Plans are being developed to ensure that these plans aggressively pursue water quality gains.
- The stakeholder advisory process should include accountability and measureable milestones to ensure the goals of the Permit are being met.

By taking advantage of the knowledge and resources of diverse stakeholders like municipalities, businesses and residents, our region can be on the cutting-edge of addressing urban runoff and creating healthier communities and watersheds.

Friends of Rose Canyon, Friends of Rose Creek, and the Rose Creek Watershed Alliance recognize the challenge urban runoff presents to our region. We look forward to participating in a Water Quality Improvement Plan development process for the Rose Creek watershed in the city of San Diego.

We urge the Regional Board to enhance the stakeholder participation opportunities during Water Quality Improvement Plan development.

Respectfully submitted,

Deborah Knight
Executive Director, Friends of Rose Canyon
www.rosecanyon.org

Karin Zirk
Friends of Rose Creek
www.saverosecreek.org

Ann Van Leer
Rose Creek Watershed Alliance
www.rosecreekwatershed.org

April 10 and 11, 2013
Item No. 8
Supporting Document No. 5

From:	Tom Gable
To:	Chiu, Wayne@Waterboards
Subject:	Public Participation in Water Quality Control Regulation Development, Measurement, Accountability
Date:	Friday, January 11, 2013 4:49:54 PM
Attachments:	~~29A587CE-9A0[redacted]29930[61].png~~

Mr. Gary Strawn

Vice Chairman

San Diego Regional Water Quality Control Board

9174 Sky Park Court, Suite 100

San Diego, CA 92123-4340

Re: Comment—Tentative Order No. R9-2013-001, Regional MS4 Permit,

Place ID: 786088Wchiu

Dear Vice Chair Strawn:

As a native San Diegan and businessman, I am concerned that implementing the permit outlined in Board's Tentative Order R9-2012-0011 ("Permit") dated October 31, 2012, we be detrimental to the clients of our public relations firm in the life science, biotech, clean tech and technology industries.

We all want clean, safe water to the region. But in participating in several committee meetings and reviewing documents related to the permit, indicators are the costs will be debilitating to many, particularly in those industries which have significant water usage requirements.

To echo concerns raised by others, the three primary areas of concern include: 1) the strict liability for exceeding water quality objectives; 2) the preemption of WQIPs by new and changing regulatory requirements prior to allowing the WQIPs to be developed and implemented; and 3) the lack of reliable funding sources to implement these regulatory changes.

It is necessary to hold individuals, businesses and governments accountable. But what are the accountability measures that would be practical and have a demonstrable, positive effects on water quality?

Because of these concerns, I respectfully request that the Permit focus on the timely development of effective and enforceable WQIPs, and that each of the WQIPs be developed through a process that ensures public participation. I ask also that the designation of appropriate Best Management Practices in each watershed be determined through the WQIP process rather than the one size fits all strategy currently being proposed in the Permit. I ask further that until the Board adopts a WQIP for a watershed that the provisions of the existing Permit remain in place for that watershed. Finally, in order to avoid unnecessary litigation I request that the Board adopt the WQIPs as Orders implementing the proposed Permit.

I urge you to adopt final permit language that is evidence-based and both environmentally and economically sustainable.

Thank you for your consideration.

Sincerely,

Tom Gable

CEO

---

gablepr

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Twitter: http://www.twitter.com/tomgable
LinkedIn: http://www.linkedin.com/in/tomgable

From: Ed Muna
To: Chiu, Wayne@Waterboards
Subject: Comment—Tentative Order No. R9-2013-001, Regional MS4 Permit
Date: Friday, January 11, 2013 5:16:28 PM

Mr. Gary Strawn

Vice Chairman

San Diego Regional Water Quality Control Board

9174 Sky Park Court, Suite 100

San Diego, CA 92123-4340

Re: Comment—Tentative Order No. R9-2013-001, Regional MS4 Permit,

Place ID: 786088Wchiu

Dear Vice Chair Strawn:

I am responding to the San Diego Regional Water Quality Control Board's Tentative Order R9-2012-0011 ("Permit") dated October 31, 2012. After reviewing the proposed Permit, I am concerned it will impose expensive, onerous, and untested regulations on local governments, businesses, and residents.

Everyone understands the importance of clean, safe water to the region. As a member of the business community, I too am interested in improving San Diego's water. It is important, however, that we use our limited resources wisely, and ensure that our efforts produce the desired outcome of improving water quality.

I applaud the Board's inclusion of Water Quality Improvement Plans (WQIP) as a first step in developing a cost-effective approach to improving our water. Analysis remains a critical component of a successful strategy, and I am glad to see that the Board is committed to finding the best possible solution to water quality improvement.

I am concerned, however, that the costs associated with enforcing and implementing the permit will have a negative impact on my business and San Diego's economy. The three primary areas of concern include: 1) the strict liability for exceeding water quality objectives; 2) the preemption of WQIPs by new and changing regulatory requirements prior to allowing the WQIPs to be developed and implemented; and 3) the lack of reliable funding sources to implement these regulatory changes.

It is necessary to hold individuals, businesses and governments accountable, but it is critical that accountability measures are practical with demonstrable, positive effects on water quality. Because of these concerns, I respectfully request that the Permit focus on the timely development of effective and enforceable WQIPs, and that each of the WQIPs be developed through a process that ensures public participation. I ask also that the designation of appropriate Best Management Practices in each watershed be determined through the WQIP process rather than the one size fits all strategy currently being proposed in the Permit. I ask further that until the Board adopts a WQIP for a watershed that the provisions of the existing Permit remain in place for that watershed. Finally, in order to avoid unnecessary litigation I request that the Board adopt the WQIPs as Orders implementing the proposed Permit.

I urge you to adopt final permit language that is evidence-based and both environmentally and economically sustainable. Thank you for your consideration. Please contact XXXXX if you have any questions.

Sincerely,

Ed Muna

Senior Vice President
Hughes Marino, Inc.
Direct: (619) 630-2750 | Mobile: (619) 200-2712
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INDUSTRIAL
ENVIRONMENTAL
ASSOCIATION

January 11, 2013

Mr. Wayne Chiu
California Regional Water Quality Control Board, San Diego Region
9174 Sky Park Court, Suite 100
San Diego, California, 92123-4340

Sent Via Email to: wchiu@waterboards.ca.gov

Re: Comment – Tentative Order No. R9-2013-0001, NPDES No. CAS0109266
Regional MS4 Permit

Dear Mr. Chiu:

Please find attached comments prepared and submitted by the Industrial Environmental Association (IEA) regarding the San Diego Region MS4 Permit Reissuance.

The Industrial Environmental Association (IEA) was formed in 1983 to promote responsible, cost-effective environmental laws and regulations, facilitate environmental compliance among member companies and provide related education activities for the community at large. IEA actively insists on strong environmental compliance efforts among member companies as a matter of written policy. Further, IEA urges reliance on scientific, analytical data to evaluate the regulations necessary to protect the public and the environment.

After many hours of review and consideration, we appreciate the opportunity to submit these suggestions which we believe will help meet the goals of the Regional Board in a manner that avoids excessive cost and regulatory burden for our members.

We appreciate the opportunity to work with the Board and Staff throughout what has been a very open process, and we look forward to the opportunity to discuss these issues more comprehensively in the weeks ahead. .

Sincerely,

Jack Monger
Executive Director

Industrial Environmental Association (IEA) Comments

Tentative

Order No. R9-2013-0001

NPDES No. CAS0109266

National Pollutant Discharge Elimination System (NPDES) Permit and Waste Discharge Requirements for Discharges from the Municipal Separate Storm Sewer Systems (MS4s) Draining the Watersheds within the San Diego Region

1. **Overall Methodology**- In general, IEA supports a Regional MS4 Permit promoting an adaptive planning and management process that allows implementation of appropriate strategies, control measures, and best management practices (BMPs) to protect and preserve water quality and suitable beneficial uses of waters of the state.

2. **Water Quality Improvement Plan Approach-** IEA recognizes the general intent of the Water Quality Improvement Plans (Provision B) is for Copermittees to develop focused watershed-based plans to identify water quality conditions and issues, develop priorities, establish strategies and schedules, and implement adaptive processes to carry out prioritized actions to improve water quality. IEA welcomes the opportunity to participate in the Water Quality Improvement Plan development process and collaborate with Copermittees to develop targeted and cost-efficient strategies and assessment metrics aimed at water quality improvement.

3. **Monitoring and Assessment**- IEA recognizes a key goal of an effective Monitoring and Assessment framework (Provision D) is the collection of precise and useful data to inform stakeholders about water quality conditions in discharges and receiving waters. It is presumed that this data will allow for focused implementation actions and water quality improvement strategies. IEA supports a monitoring framework that provides cost-effective informed data to guide future actions. Accordingly, IEA supports coordination of Regional Water Quality Control Board (RWQCB) staff and Copermittee stakeholders in identifying an iterative, strategic, cost-effective, question-driven monitoring approach. The approach should incorporate short-, medium-, and long-term goals and outline procedures to collect comparable data across watersheds/jurisdictions that allows for future statistical assessments. Short-term goals can include discharge and receiving water characterization to understand current conditions and track progress. Medium-term goals can include planning for Clean Water Act Section 303(d) listings/delistings and best available science-based TMDL development in accordance with the Clean Water Act. Long-term goals can include collecting data appropriate for development of site-specific water quality objectives and potential revisions to Basin Plan objectives.

4. **Non-Storm Water Discharges**- There is still confusion in the Regional MS4 Permit regarding which non-storm water discharges are effectively prohibited and must be eliminated and those that are authorized. The Regional MS4 Permit both states that it authorizes and prohibits non-storm water discharges but it is not always clear which are authorized and which are prohibited. In multiple locations (e.g. Finding 15), the Regional MS4 Permit states that non-stormwater discharges into the MS4s must be

"effectively prohibited" or eliminated. This language conflicts with other provisions (Provision II.A.1.b., for example), which state, consistent with EPA's regulations, that non-stormwater discharges authorized by a NPDES permit are authorized to be discharged to the MS4 system. One change that would help to clarify this issue would be to revise Finding 15 as follows:

> **Non-Storm Water and Storm Water Discharges.** Non-storm water discharges from the MS4s are not considered storm water discharges and therefore are not subject to the MEP standard of CWA section 402(p)(3)(B)(iii), which is explicitly for "Municipal … *Stormwater Discharges* (emphasis added)" from the MS4s. Pursuant to CWA 402(p)(3)(B)(ii), non-storm water discharges into the MS4s must be effectively prohibited. *However, consistent with EPA's regulations, the draft Permit authorizes discharges of non-storm water to MS4s that are either authorized by a separate NPDES permit, or the discharge is a category of non-storm water discharges or flows that must be addressed pursuant to Provisions E.2.a.(1)-(5) of this Order.*

IEA recognizes the Regional MS4 Permit intent to reduce transport of pollutants through elimination of non-storm water discharges (Provision E. 2). However, this intent can also be achieved through implementation of appropriate BMPs if, and when, the listed sources of non-storm water are found to be sources of pollutants to the receiving water. This is the approach used in previous MS4 permits and is consistent with EPA storm water regulations.

A good example of this is non-emergency firefighting flows from fire suppression equipment maintenance activities that can and have been treated with BMPs. IEA recognizes that the RWQCB has identified fire suppression equipment maintenance discharges "contain waste"1 and thus need to be prohibited by the Copermittees as illicit discharges through ordinance, order, or similar means. IEA recommends the Regional MS4 Permit be modified to allow the Water Quality Improvement Plan process to incorporate the use of BMPs for fire suppression equipment maintenance activity discharges.

IEA recommends the following amendment of Provision E.2.a.6:

> If the Copermittee or San Diego Water Board identifies any category of non-storm water discharges listed under Provisions E.2.a.(1)-(4) as a source of pollutants to receiving waters, the category must be prohibited through ordinance, order, or similar means and addressed as an illicit discharge. *Alternately, the Copermittee can designate different and/ or additional BMPs to be implemented as opposed to prohibiting the category of non-stormwater.*

[1] Order R9-2010-0016 Waste Discharge Requirements for Discharges from the Municipal Separate Storm Sewer Systems (MS4s) Draining the County of Riverside, the Incorporated Cities of Riverside County, and the Riverside County Flood Control and Water Conservation District within the San Diego Region. NPDES No. CAS0108766. November 10, 2010.

Further, the Regional MS4 Permit currently specifies that air conditioner condensation [Provision E.2.a.(4).(a)] is a non-storm water discharge that must be directed to landscaped areas or other pervious surfaces *where feasible* (emphasis added). IEA members have previously independently evaluated this potential action and have identified potentially significant costs for compliance. A case study in the Los Penasquitos watershed estimated that due to current system configuration, re-routing the condensation line at one building facility would require ~$12,000 investment. For these reasons, it is suggested that these requirements be limited to new development and the actual footprint of any re-development, unless otherwise required by the Water Quality Improvement Plans.

5. **Development Planning**- IEA supports the implementation of cost-effective methods to reduce the discharge of pollutants in storm water to the maximum extent practicable (MEP) and effectively prohibit non-storm water discharges to provide the reasonable protection, preservation, enhancement, and restoration of water quality and designated beneficial uses of waters of the state. IEA supports the business and development community in requesting the Development Planning (Provision E.3) criteria for priority development project structural BMP requirements and alternative compliance be carefully examined. Given the poor soil infiltration rates in much of San Diego County, many development projects will likely demonstrate technical infeasibility in implementing cost-effective Low Impact Development (LID) and hydromodification controls. The process currently identified in the Regional MS4 Permit does not provide sufficient detail for consistency among Copermittees in evaluating technical infeasibility conditions and implementation of feasible mitigation alternatives. IEA supports development of a stakeholder-lead Technical Advisory Committee to assist in the revision of Provision E.3 to meet multiple objectives for both improved water quality and consideration of site-specific conditions and economic constraints.

6. **Existing Development Management-Inspections-** In general, IEA recognizes the importance of Copermittee inspection activities at inventoried existing development to ensure compliance with applicable local ordinances and permits and the Regional MS4 Permit. However, Provision E.5.c currently contains language that provides for "volunteer monitoring or patrol programs" to conduct visual and verification inspections for Copermittees. IEA strongly opposes authorization of volunteer monitoring and/or patrol programs for third party inspections of industrial or commercial facilities through the Regional MS4 Permit. This type of action has potentially serious safety, procedural, and liability issues for the volunteer program responsible party, Copermittees and inspected facility owner. IEA recognizes there may be some amount of water quality, collaboration, and cost-efficiency value in engaging properly-trained and insured volunteer programs for certain types of visual observation activities on public right-of-way property. However, Provision E.5.c.(1). (a) (i) is not the appropriate permit provision to reference this type of collaboration in the Regional MS4 Permit.

IEA recommends Provision E. 5.c..(1).(a) (i) be revised to delete provision [c] that states: "Inspections by volunteer monitoring or patrol programs trained by the Copermittee". As an alternative, IEA recommends the "volunteer monitoring or patrol programs trained by the Copermittee" language be added to Provision E. 5.c.(1). (a) (i) [a] such that the whole section would as indicated below. Further IEA recommends a footnote be added to the word "program" to clearly identify that volunteer program staff shall conduct visual observations in the public right-of-way only as indicated below.

..(1) Inspection Frequency

(a) Each Copermittee must establish appropriate inspection frequencies for inventoried existing development in accordance with the following requirements:

(i) At a minimum, inventoried existing development must be inspected once every five years utilizing one or more of the following methods:

[a] Drive-by inspections by Copermittee municipal or contract staff, or volunteer monitoring or patrol program[1] staff trained by the Copermittee, and

[b] Onsite inspections by Copermittee municipal and contract staff;

[1] *Volunteer monitoring or patrol program staff shall be limited to only inspection activities performed in the public right-of-way, when conducted at the direction of a copermittee.*

In order to further clarify this issue, IEA recommends Provision E.5.c.(2). (a) be revised to delete the words "by the Copermittee or volunteer monitoring or patrol programs". Provision E. 5.c.(2).(a) would then read:

..(2) Inspection Content

(a) Inspections of existing development must include, at a minimum:

Finally, IEA recommends the Regional MS4 Permit language and/or Attachment F - Fact Sheet/Technical Report include language that requires participating volunteer monitoring or patrol programs to demonstrate appropriate training, equipment calibration records, and proof of professional liability insurance to Copermittee or other responsible party(s) prior to engagement in visual or other monitoring activities under the Regional MS4 Permit. This requirement will work to both protect the interests of Copermittee and other interested organizations as well as provide reasonable assurance that data collected by volunteer monitoring or patrol programs is consistent and of high quality.

January 11, 2013

San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

Subject: Tentative Draft Order Number: R9-2013-0001

The Laguna Bluebelt Coalition is dedicated to marine life protection through cooperative efforts in education, enforcement, water quality improvements, habitat restoration and networking among diverse stakeholders, agencies and elected officials. We support efforts by many local and regional environmental groups and organizations to address urban runoff pollution in the Aliso Watershed as a model for other impaired creek and coastal receiving waters. The following comments on the draft San Diego Regional Municipal Separate Storm Sewer System permit are intended to educate and motivate sustainable solutions to creek and ocean pollution..

Urban runoff is the San Diego region's most urgent pollution problem. Laguna Beach and the regional economy depend upon a healthy ecology. In a region known for its beaches and strong tourism economy, polluted runoff makes our beaches and waterways unsafe for swimming, fishing and other recreation for at least 72 hours after a rain event. Even in dry weather, contaminated urban runoff from known from residential and commercial overwatering becomes a major regional pollution source.

Today modern techniques, tactics and technologies can re-purpose polluted water as a "new water" resource. By working together as a community, we can solve this challenging public health problem affecting our economy and healthy ecology. The Water Quality Improvement Plans proposed in the draft permit have the potential to become powerful tools to help us improve water quality within our watersheds. However, the Copermittees cannot be tasked with creating these plans alone.

Specifically:

- The Permit should require formation of a stakeholder advisory group for each watershed that includes representatives of environmental groups with knowledge of the watershed.
- This stakeholder advisory group should work closely with the Copermittees and a regional board staff member while the Water Quality Improvement Plans are being developed to ensure these plans aggressively pursue water quality gains.
- The stakeholder advisory process should include accountability and measureable milestones to ensure the goals of the Permit are being met.

By taking advantage of the knowledge and resources of diverse stakeholders like municipalities, businesses and residents, our region can be on the cutting-edge of addressing urban runoff and creating healthier communities and watersheds. But this can only be achieved if these diverse voices are impacting the planning process in a meaningful way.

The Laguna Bluebelt Coalition recognizes the challenges and opportunities urban runoff presents to our region, and we want to do our part to implement innovative, sustainable solutions to water pollution. The Laguna Bluebelt Coalition is committed to participating in a Water Quality Improvement Plan development process for the Aliso Watershed.

Among recommended actions to mitigate present impacts to Laguna Beach's creek, estuary, beach and coastal receiving waters are the following:

1. Map all creek and coastal receiving waters indicating water quality impacts. (SCCWRP, Scripps, NOAA,etc.) A Bioregional Watershed Map will identify degraded land elements, offending storm drain outlets and candidate areas for re-forestation and estuarine/coastal restoration.

2. On an annual basis, issue citations against the primary six known storm drain point sources in each watershed. This measure will incrementally compel clean-up and abatement throughout a given watershed bioregion without the burden of costs to abate all points of contamination at once. Failed Best Management Practices (BMPs) urban runoff facilities, required as a Condition of Approval for inland residential developments, can be retrofitted with dry weather diversions to local Publically Owned Treatment Works (POTWs) or, alternatively, re-engineered with deep groundwater injection wells.

3. Fines must be allocated to re-vegetate impaired watersheds and kelp forests to restore the native functions of semi-arid creeks and protected coastal receiving waters. A re-forested Aliso Canyon with a canopy similar to San Mateo Creek will qualify for California Cap and Trade funding to offset costs. Restoration of natural habitats is demonstrated to be the best, most cost effective measure for improving watershed water quality.

4. Restoration of high value coastal wetlands and estuaries will guarantee protection of natural beach sand berms and provide measurable improvement to coastal receiving waters. Funds from the California Coastal Conservancy and other wetland recovery resources can offset costs.

5. Watershed restoration will offer multiple community benefits by reducing destructive stormwater flows, eliminating pollutants and increasing eco-tourist revenues to surrounding cities. Large street cisterns incorporating designs proposed by GeoSynTech for the re-development of the Aliso Golf Course can serve as a model for extensive rainwater harvest/reuse systems. Restoration of some or all of the 1500 foot Aliso Creek Ox Bow in Laguna Niguel can restore hydric soils to reduce stormwater impacts.

6. Increased use of recycled water for wildland fire suppression along the entire Highway 73 Toll Road bisecting the Laguna Greenbelt will maintain a healthy, fire safe wilderness area. Orange County Measure M and State Proposition funds are available to offset costs. Increased use of recycled water reduces ocean discharges to the Laguna State Marine Conservation Area.

7. A citywide network of recycled water for all of Laguna Beach will reduce imported water demand significantly and increase water security, disaster preparedness and fire suppression resources. Revenues from routine use for irrigation mandated Fuel Modification Zones will provide new revenue streams. Laguna Beach is the only Orange County city without a comprehensive recycled water program and remains a "once use" community of valuable imported water.

The Laguna Bluebelt Coalition appreciates the Staff and Regional Board's commitment to supporting key community stakeholder participation opportunities during Water Quality Improvement Plan development and then approves the permit.

Thank you for your dedication to regional water quality improvements for our creeks, canyon and coastal waters.

Jonathan Claypool
Facilitator

jonathan@lagunabluebelt.org

LATITUDE 33
PLANNING & ENGINEERING
5355 Mira Sorrento Place, Suite 650
San Diego, CA 92121
Tel 858.751.0633

Mr. Gary Strawn
Vice Chairman
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

Re: Comment—Tentative Order No. R9-2013-001, Regional MS4 Permit, Place ID: 786088Wchiu

Dear Vice Chair Strawn:

I am responding to the San Diego Regional Water Quality Control Board's Tentative Order R9-2012-0011 ("Permit") dated October 31, 2012. After reviewing the proposed Permit, I am concerned it will impose expensive, onerous, and untested regulations on local governments, businesses, and residents.

Everyone understands the importance of clean, safe water to the region. As a member of the business community, I too am interested in improving San Diego's water. It is important, however, that we use our limited resources wisely, and ensure that our efforts produce the desired outcome of improving water quality.

I applaud the Board's inclusion of Water Quality Improvement Plans (WQIP) as a first step in developing a cost-effective approach to improving our water. Analysis remains a critical component of a successful strategy, and I am glad to see that the Board is committed to finding the best possible solution to water quality improvement.

I am concerned, however, that the costs associated with enforcing and implementing the permit will have a negative impact on my business and San Diego's economy. The three primary areas of concern include: 1) the strict liability for exceeding water quality objectives; 2) the preemption of WQIPs by new and changing regulatory requirements prior to allowing the WQIPs to be developed and implemented; and 3) the lack of reliable funding sources to implement these regulatory changes.

It is necessary to hold individuals, businesses and governments accountable, but it is critical that accountability measures are practical with demonstrable, positive effects on water quality. Because of these concerns, I respectfully request that the Permit focus on the timely development of effective and enforceable WQIPs, and that each of the WQIPs be developed through a process that ensures public participation. I ask also that the designation of appropriate Best Management

Practices in each watershed be determined through the WQIP process rather than the one size fits all strategy currently being proposed in the Permit. I ask further that until the Board adopts a WQIP for a watershed that the provisions of the existing Permit remain in place for that watershed. Finally, in order to avoid unnecessary litigation I request that the Board adopt the WQIPs as Orders implementing the proposed Permit.

I urge you to adopt final permit language that is evidence-based and both environmentally and economically sustainable. Thank you for your consideration. Please contact Ted Shaw at ted.shaw@latitude33.com if you have any questions.

Sincerely,

Theodore RL Shaw
Principal, Latitude 33 Planning & Engineering

April 10 and 11, 2013
Item No. 8
Supporting Document No. 5

Los Peñasquitos Lagoon Foundation

P.O. Box 940, Cardiff by the Sea. CA 92007

January 11, 2013

Attention: Wayne Chiu, P.E.
California Regional Water Quality Control Board, San Diego Region
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

RE: Comments on Tentative Order No. R9-2013-0001 (San Diego Region MS4 Permit Reissuance)

Dear Mr. Chiu,

On behalf of the Los Peñasquitos Lagoon Foundation (LPLF), I would like to submit the following comments on Tentative Order No. R9-2013-0001 San Diego Region MS4 Permit Reissuance (Please see attached Exhibit A). Thank you for this opportunity and I look forward to working with Water Board staff and Co-Permittees on improving and protecting the beneficial uses afforded by Los Peñasquitos Lagoon, a State Preserve that is also listed as an impaired water body in the Clean Water Act Section 303(d).

Please contact me if you have any questions. (760) 271-0574.

Sincerely,

Mike Hastings
Executive Director, Los Peñasquitos Lagoon Foundation

Exhibit A.
Comments for Tentative Order No. R9-2013-0001
San Diego Region MS4 Permit Reissuance
Los Peñasquitos Lagoon Foundation
1/11/13

GENERAL COMMENTS

- Require public participation in Water Quality Improvement Plans (WQIP) development process to improve the Plan and avoid unnecessary "surprises" later on.
- WQIP development, implementation and assessment processes and efforts should be transparent to all stakeholders to facilitate their involvement.
- Provide summarized details on what a jurisdiction is doing in a particular watershed for understanding of RWQCB and public.
- WQIPs should be coordinated with other planning documents developed to improve, enhance and protect beneficial uses of receiving water bodies, including those prepared by third parties (e.g. NGOs).

SPECIFIC COMMENTS

Comment #1.

Page 2, #6. Non-Storm Water Discharges
Page 4, #12. Pollutants in Runoff
Page #15. Non-Storm Water and Storm Water Discharges
Page 65, #2 Illicit Discharges Detection and Elimination

Comment: Provide mechanisms to allow Co-permittees to address dry-weather flows/illicit discharges into receiving waters regardless of whether or not constituents of concern are present within these flows. These mechanisms should be broad enough to allow co-permittees to require landowners to modify their actions (e.g. landscape irrigation) that are identified directly or indirectly as contributing to dry weather discharges into the MS4. Priority given to dry weather discharges into the MS4 that discharge directly into 303(d) listed water bodies.

Context: Dry weather discharges can create serious impacts to the beneficial uses of receiving water bodies that support salt marsh habitats, especially when these discharges are perennial in nature. These flows are directly related to habitat conversion through their ability to alter salinity levels in soils that displace native salt marsh species, often permanently. Numerous studies, including those pertaining to Los Peñasquitos Lagoon, document the impacts of dry weather flows. The current methods available to co-permittees reduce their ability to effectively control all of these discharges.

Example: Ground-water charging from irrigation practices on top of sandstone bluffs. Water filters down, through the sandstone and seeps out at the bottom and into MS4. Although lines of evidence point to the irrigation practices that contribute

Exhibit A.
Comments for Tentative Order No. R9-2013-0001
San Diego Region MS4 Permit Reissuance
Los Peñasquitos Lagoon Foundation
1/11/13

to and/or cause the mounding and subsequent seepage(s) that generated dry weather discharges into the MS4, co-permittees cannot address the source under the current regulatory format.

Figure 1. Perrenial seepage from over-irrigation on mesa top. Flow enter the MS4 and discharge into Los Peñasquitos Lagoon, a 303(d) listed waterbody.

Comment #2.

Page 3. #8. Point Source Discharge of Pollutants.

Comment: Needs to include discharges from the MS4 that generate and/or contribute to pollutant discharges below the outfall (e.g. sediment scoured below MS4 outlets). <u>Or, keep the language under #11 that recognizes natural drainages and conveyances (e.g. creeks) within developed areas as part of the MS4 and receiving waters.</u>

Context: Multiple lines of evidence support this claim (e.g. Los Peñasquitos Lagoon Sediment TMDL).

Comment #3.

Page 4. #13.

Comment. Human Health and Aquatic Impairment. Dry weather flows themselves, especially those that are perennial in nature, can contribute to impacts to receiving water bodies that historically received ephemeral flows (e.g. coastal salt marshes). One such impact is habitat conversion that can contribute to impaired beneficial uses within the receiving water body (e.g. Los Peñasquitos Lagoon) and substantial threats to nearby communities. One example is related to the presence of West Nile Virus (WNV) at Los Peñasquitos Lagoon (LPL), as documented by the County of San Diego's Department of Environmental Health. WNV is transmitted by the freshwater mosquito *Culex tarsalis* that was not present in LPL prior to the recent establishment of riparian and brackish marsh habitats caused by perennial flows of dry weather discharges into the Lagoon's main tributaries and along Lagoon boundaries.

Another impact related to dry weather flows of freshwater include aquatic impairment within tidally influenced lagoons (e.g. salinity/temperature stratification within lagoon tidal channels that can be harmful to aquatic species).

Comment #4.

Page 66, #2(3) Illicit Discharges Detection and Elimination

Comment: Revise language under (3) to replace "…identifies the discharge a source of pollutants to receiving waters" with "…identifies the discharge a source of pollutants and/or contributor to the impairment (e.g. habitat conversion) of the receiving waterbody." Please see Comment #1 for more information and supporting justification for this requested change in language.

Comment #5.

Page 13 & 14, #2 Receiving Water Limitations

Comment: Insert the following (underlined) language under 2a. "Discharge from MS4 must not cause or contribute to the violation of water quality standards and/or impairment to receiving waters, ……."

Comment #6.

Page 19, #2 Priority Water Quality Conditions

Comment: include the following language under the first paragraph - "The Copermittees must work with the appropriate land managers and related management groups directly associated with the receiving water body to identify the water quality priorities within each Watershed Management Area."

This needs to occur since the land managers and associated groups will have a better idea (and supporting data) about what should be priorities for water quality improvements in receiving water bodies. Priority should be given to the land managers and management entities (e.g. NGOs) directly associated with the receiving water body (e.g. lagoon foundations/conservancies). Relevant monitoring programs and management documents (e.g. enhancement plans) for receiving waterbodies should be considered and included in efforts to identify priority water quality conditions.

Comment #7.

Page 24, #3 Water Quality Improvement Strategies

Comment: include the following language under the first paragraph - "The Copermittees must work with the appropriate land managers and related management groups directly associated with the receiving water body to identify and prioritize strategies to address the highest priority water quality conditions identified within a Watershed Management Area."

This needs to occur since the land managers and associated groups will have a better idea (and supporting data) about what should be priorities for water quality improvements in receiving water bodies. Priority should be given to the land managers and management entities (e.g. NGOs) directly associated with the receiving water body (e.g. lagoon foundations/conservancies). Relevant monitoring programs management documents (e.g. enhancement plans) for receiving waterbodies should be considered and included in efforts to identify, develop and implement Water Quality Improvement Strategies.

Comment #8.

Page 25, #4 Water Quality Improvement Monitoring and Assessment Program

Comment: include the following sentence under the paragraph for 4a.- "The Copermittees in each Watershed Management Area must work with the appropriate land managers and related management groups directly associated with the receiving water body to plan, implement and review Water Quality Improvement Monitoring and Assessment Program.

Justification: The use of better data sets collected by land managers and related NGOs over longer periods of time that better describe water quality conditions. Also improves data collection by determining the appropriate monitoring locations by avoiding areas or conditions that can confound monitoring efforts (e.g. salinity stratification in lagoon channels).

Exhibit A.
Comments for Tentative Order No. R9-2013-0001
San Diego Region MS4 Permit Reissuance
Los Peñasquitos Lagoon Foundation
1/11/13

Comment #9.

Page 25, #5 Iterative Approach and Adaptive Management Process

Comment: include the following language in the first sentence - "The Copermittees in each Watershed Management Area must work with the appropriate land managers and related management groups directly associated with the receiving water body to implement the iterative approach ……."

Comment #10.

Page 28, C. Action Levels

Comment: Include action levels for insecticides (e.g. pyrethroids), since they are known to contribute impairment to receiving water bodies and quite possibly directly related to low Index of Biological Integrity (IBI) for macroinvertebrates in most, if not all, receiving water bodies.

Comment #11.

Page 33, D. Monitoring and Assessment Program Requirements

Comment: "The Copermittees in each Watershed Management Area must work with the appropriate land managers and related management groups directly associated with the receiving water body to plan, implement and review Water Quality Improvement Monitoring and Assessment Program.

Justification: The use of better data sets collected by land managers and related NGOs over longer periods of time that better describe water quality conditions. Also improves data collection by determining the appropriate monitoring locations by avoiding areas or conditions that can confound monitoring efforts (e.g. salinity stratification in lagoon channels).

Comment #12.

Page 39, D 1(c). Dry Weather Receiving Water Monitoring

Comment 1: Include continuous flow monitoring at the base of tributaries to 303(d) listed water bodies to better document the transport of pollutants and total volume of dry weather inputs that impair the beneficial uses of receiving water bodies (i.e. salt marshes) by converting lagoon tributaries from seasonal to perennial and facilitating habitat conversion through reductions in soil salinities.

Exhibit A.
Comments for Tentative Order No. R9-2013-0001
San Diego Region MS4 Permit Reissuance
Los Peñasquitos Lagoon Foundation
1/11/13

Comment 2: Include monitoring of groundwater seepages into 303(d) listed water bodies to better document the transport dry weather inputs that impair the beneficial uses of receiving water bodies (i.e. salt marshes) by converting native habitats through reductions in soil salinities.

Comment #13.

Page 39, D 1(d). Wet Weather Receiving Water Monitoring

Comment: Include continuous flow monitoring at the base of tributaries to 303(d) listed water bodies to better document the transport of pollutants, peak discharge and total volume of storm runoff.

Comment #14.

Page 56, #4 Assessment Requirements

Comment: under 4a(2), include language such that the Copermittees must work with local land managers and related management entities (e.g. NGOs) for receiving water bodies to assess the status and trends of receiving water quality conditions. This is essential for the effective management of receiving water bodies and surrounding environs.

From: Jeff Marston
To: Chiu, Wayne@Waterboards
Subject: SDRWQCB Storm Water Permit Administrative Draft
Date: Friday, January 11, 2013 3:39:51 PM

January 11, 2013

Mr. Gary Strawn

Vice Chairman

San Diego Regional Water Quality Control Board

9174 Sky Park Court, Suite 100

San Diego, CA 92123-4340

Re: Comment—Tentative Order No. R9-2013-001, Regional MS4 Permit,

Place ID: 786088Wchiu

Dear Vice Chair Strawn:

I am responding to the San Diego Regional Water Quality Control Board's Tentative Order R9-2012-0011 ("Permit") dated October 31, 2012. After reviewing the proposed Permit and consulting with numerous colleagues, I am concerned it will impose expensive, onerous, and untested regulations on local governments, businesses, and residents alike.

As a business owner, I understand the importance of clean and safe water to the region. It is important, however, that we use our limited resources wisely, and ensure that our efforts produce the desired outcome of improving water quality.

I applaud the Board's inclusion of Water Quality Improvement Plans (WQIP) as a first step in developing a cost-effective approach to improving our water. Analysis remains a critical component of a successful strategy, and I am glad to see that the Board is committed to finding the best possible solution to water quality improvement.

I am concerned, however, that the costs associated with enforcing and implementing the permit will have a negative impact on my business and San Diego's economy. I have three primary areas of concern: 1) the strict liability for exceeding water quality objectives; 2) the preemption of WQIPs by new and changing regulatory requirements prior to allowing the WQIPs to be developed and implemented; and 3) the lack of reliable funding sources to implement these regulatory changes.

While it is necessary to hold individuals, businesses and governments accountable, it is critical that accountability measures are practical, with demonstrable, positive effects on water quality. Because of these concerns, I respectfully request that the Permit focus on the following: timely development of effective and enforceable WQIPs and that each of the WQIPs be developed through a process that ensures public participation. I ask also that the designation of appropriate Best Management Practices in each watershed be determined through the WQIP process rather than the one size fits all strategy currently being proposed in the Permit. Also, that until the Board adopts a WQIP for a watershed that the provisions of the existing Permit remain in place for that watershed. Finally, in order to avoid unnecessary litigation I request that the Board adopt the WQIPs as Orders implementing the proposed Permit.

I urge you to adopt final permit language that is evidence-based and both environmentally and economically sustainable. Thank you for your time and consideration.

Sincerely,

Jeff Marston

President

Marston+Marston, Inc.

From:	Clark,Joyce Truhan
To:	Chiu, Wayne@Waterboards
Cc:	Bell,Janet J
Subject:	"Comment - Tentative Order No. R9-2013-0001, Regional MS4 Permit, Place ID: 786088Wchiu"
Date:	Friday, January 11, 2013 3:00:04 PM
Importance:	High

January 11, 2013

Sent Via E-Mail

Attention: Mr. Wayne Chiu, P.E.
wchiu@waterboards.ca.gov

California Regional Water Quality Control Board
San Diego Region
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4353

Subject: Metropolitan Water District of Southern California – "Comment – Tentative Order No. R9-2013-0001, Regional MS4 Permit, Place ID: 786088Wchiu"

Dear Mr. Chiu:

The Metropolitan Water District of Southern California (MWD) appreciates the opportunity to comment on subject Tentative Order No. R9-2013-0001, Regional MS4 Permit (MS4 Tentative Order). MWD is a consortium of 26 cities and water districts that provides drinking water to nearly 19 million people in parts of Los Angeles, Orange, San Diego, Riverside, San Bernardino, and Ventura counties. MWD delivers an average of 1.7 billion gallons of water per day to a 5,200 square mile service area. Our facilities include the Colorado River Aqueduct, pumping plants, treatment plants, reservoirs, tunnels, pipelines and hydroelectric plants. MWD is enrolled under the current 2010 San Diego Regional Water Quality Control Board's (SDRWQCB) General Permit, Order No.R9-2010-0003 (Existing General Permit), which captures dewatering, hydrostatic testing, and related potable water discharges for our Skinner Water Treatment Plant and water supply pipelines under the jurisdiction of the SDRWQCB.

To ensure continuous safety and protection of water supplies, MWD, our member agencies, and other water supply purveyors must perform various routine operations and maintenance activities that result in planned drinking water system releases of potable water, raw water, or low volume releases. These activities include, but are not limited to, routine dewatering/flushing of distribution systems for maintenance, cleaning and lining of pipe sections, pipeline disinfection, reservoir repairs and reservoir cover cleaning, and hydrostatic testing. Additionally, MWD and other water purveyors may also have unplanned releases that include pipeline breaks, leaks, overflows, and emergency flushing activities.

Comments

In the MS4 Tentative Order, MWD has noted that non-storm water discharges from water purveyors are categorized as "illicit" discharges. We understand the rationale for the MS4 Tentative Order using the term "illicit discharges" to define any discharges to an MS4 that are not composed entirely of storm water, and are not covered under a separate NPDES permit. However, we feel that use of another category would be more appropriate to describe these potable water discharges. Such a category could be similar to those included in the recently adopted Los Angeles Regional Water Quality Control Board's MS4 Permit (e.g. "conditionally exempt essential non-storm water discharges," or "authorized non-storm water discharges separately regulated by an individual or general NPDES permit").

Additionally, the MS4 Tentative Order references Order No. R9-2010-0003, which covers all discharges from water purveyors and community water systems. MWD has reviewed the MS4 Tentative Order against the Existing General Permit, and the abbreviated language in the MS4 Tentative Order is not consistent with the language used to describe these covered discharge in the Existing General Order. The MS4 Tentative Order needs to be consistent with the authorized discharges from water purveyors and community water systems that are captured in the Existing General Permit. As such, MWD staff recommends that SDRWQCB revise the language in the MS4 Tentative Order that applies to water purveyors and community water systems as follows:

Section E – Jurisdictional Runoff Management Programs, 2. Illicit Discharge Detection and Elimination, a. Non-Storm Water Discharges

Item (2) – Current Language: "Discharges of non-storm water from water line flushing and water main breaks to the MS4 must be addressed as illicit discharges unless the discharge has coverage under NPDES Permit No. CAG 679001 (Order No.R9-2010-0003, or subsequent order). This category includes water line flushing and water main break discharges from water purveyors issued a water supply permit by the California Department of Public Health or federal military installations. Discharges from recycled or reclaimed water lines to the MS4 must be addressed as illicit discharges under a separate NPDES permit."

Item(2) – **Suggested Revision:** **"Discharges of non-storm water from water purveyors and community water systems are authorized discharges, and are not considered illicit discharges, if the discharger is enrolled and regulated under an individual or general NPDES permit, such as NPDES Permit No. CAG 679001 (Order No. R9-2010-0003, or subsequent order). This category includes those discharge activities described in Order No. R9-2010-0003, which includes but is not limited to the following: discharges resulting from repair, maintenance, and disinfection of pipelines, tanks, vessels, and reservoirs dedicated to drinking water purveyance and storage, and hydrostatic test water discharges resulting from testing of pipelines, tanks, and vessels that are dedicated to drinking water purveyance and storage."**

Please contact Janet Bell at (213) 217-5516 or via email at jbell@mwdh2o.com, if you have any questions.

Thank you,

Joyce T. Clark
Program Manager
Metropolitan Water District of Southern California
(213) 217-5593
jtruhan@mwdh2o.com

January 11, 2013

Mr. Wayne Chiu, P.E.
California Regional Water Quality Control Board, San Diego Region
9174 Sky Park Court, Suite 100
San Diego California 92123-4340

SUBJECT: Comment – Tentative Order No.R9-2013-0001, Regional MS4 Permit, Place ID: 786088Wchiu

Dear Mr. Chui:

We are in receipt of the proposed Tentative Order No. R9-2013-0001, Regional MS4 Permit ("Tentative Order"). This letter is in response to your request for comments on the Tentative Order to be submitted by January 11, 2013.

National Enterprises, Inc. ("NEI") manages approximately 2,200 acres within the City and County portions of Otay Mesa. We and other Otay Mesa stakeholders support improved water quality and environmentally healthy watersheds and the California Regional Water Quality Control Board's ("Board") goal of clean water for all users in the region.

However, after listening to public testimony at recent board workshops, and being briefed by co-permittees on the proposed Tentative Order, we are writing to express our significant reservations on the Tentative Order. In brief, our concerns fall into these broad categories:

1. Existing Tentative Order No. R9-2007-0001-- Over the last several years, local governments in San Diego have worked together with your staff and a host of technical experts to develop a Hydromodification Management Plan with reasonable and scientifically based standards. Your Board recently approved that Plan in July 2010. This draft permit ignores all of the good work invested in that Plan, which was developed at a significant cost to the public. The existing Plan has only been in effect for 2 years, with 3 years remaining prior to its expiration. Given the short timeframe that the existing Plan has been in practice, we do not yet have adequate data to determine if the measures within the existing Plan are sufficient. Pursuing a new tentative order at this time has not been scientifically validated and is premature.

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2. Legal Issues--The attempt by Board staff to mandate a proposed in lieu fee for watershed and hydrologic unit improvements to projects that have no impacts and therefore no nexus to watershed or unit improvements, appears to contradict CEQA.

3. Clarity on Pre-Development vs. Pre-Project Conditions--We are at a loss to find a definition of the term pre-development conditions in the Tentative Order. For such a significant determination and impact, the lack of clarity on this matter is concerning. In the most current public workshop on December 12, 2012, when a Board member pressed staff on this issue, the staff member was unable to clearly define what the term meant, the time element standard to be utilized to gauge pre-development conditions and when pressed about the source of a soils database found on the internet that would be used as a key determinant of compliance, staff was unable to describe the accuracy or source documents for the website's database.

4. Hydromodification--We disagree with the proposed deletion of the current exemption in the hydromodification permit approved by the Board in July of 2010 for projects that discharge stormwater into lined or engineered channels. Speaker after speaker in the public comment period of the December 12th workshop representing co-permittees and other stakeholders, gave numerous examples of the conflict they had with Board staff on this issue. Further, the potential waste of public and private dollars and man-hours spent on already approved permits under the current hydromod scheme would be excessive. And this leads to our next point.

5. Fiscal Impact--Why is there no credible economic analysis on the potential cost to the co-permittees and the public for the implementation of the Tentative Order? For a regulator, or staff, to propose such broad and sweeping changes to public policy, without any consequence to the cost does not make sense, particularly in today's economic environment.

6. Coordination with neighboring regional boards and publication of previous similar experiences--According to public testimony at the December 12th workshop, the neighboring regional water boards in North Orange County and the Inland Empire have already dealt with several of the issues contemplated in the San Diego Board's Tentative Order. Specific examples include pre-development vs. pre-project conditions. Why hasn't the experience of the neighboring boards on these critical issues been shared with the public so our decision could benefit from their experience?

SANDAG estimates that the industrial development of the East Otay Mesa sub-region can produce up to 42,000 well-paying jobs for San Diegans by 2020. When the total cost of environmental compliance from local, state and federal agencies is placed upon the backs of landowners in East Otay and other parts of our region with other habitat

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and environmental mandates, the incentive for economic investment is severely impeded. Proposed projects will not develop, jobs will not be created, economies will not grow and the dream of an emerging economy will die hard. The cost of doing business in California has already pushed many businesses and developers out of the state. Further disincentives, such as this Tentative Order, would be but another catastrophic loss for California. If implemented as written, this Tentative Order, and the actions of the Board, will further degrade San Diego's economy.

Therefore, we urge the Board to delay implementation of the Proposed Order and revisit the parts of the Tentative Order detailed in our aforementioned comments. The Tentative Order is not ready for implementation and should not be considered until data from the existing 2010 Plan is fully understood.

Sincerely,

David Wick
President
National Enterprises, Inc.
(858) 623-9000, ext. 700
dwick@natent.com

cc: Assemblymember Ben Hueso
Mayor Bob Filner
Supervisor Greg Cox
Councilmember David Alvarez
Richard Crompton, County of San Diego
Stephanie Gaines, County of San Diego

January 11, 2013

<u>*Via electronic mail*</u>

Mr. David Gibson
Executive Officer and Members of the Board
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Re: Comments on Tentative Order R9-2013-0001, San Diego Region MS4 Permit

Dear Mr. Gibson:

On behalf of the Natural Resources Defense Council ("NRDC"), we are writing with regard to the Draft National Pollutant Discharge Elimination System (NPDES) Permit and Waste Discharge Requirements for Discharges from the Municipal Separate Storm Sewer Systems (MS4s) Draining the Watersheds Within the San Diego Region, Draft permit R9-2013-0001, NPDES Permit No. CAS0109266 ("Draft Permit"). We appreciate the opportunity to submit these comments to the San Diego Regional Water Quality Control Board ("Regional Board") on the Draft Permit.[1]

I. <u>Stormwater Runoff is a Leading Source of Water Pollution in the San Diego Region</u>

The U.S. Environmental Protection Agency ("U.S. EPA") considers urban runoff to be "one of the most significant reasons that water quality standards are not being met nationwide."[2] As the U.S. EPA has stated:

> Most stormwater runoff is the result of the man-made hydrologic modifications that normally accompany development. The addition of impervious surfaces, soil compaction, and tree and vegetation removal

[1] NRDC previously submitted comments on the Draft Permit to the Regional Board on September 14, 2012. We incorporate those comments and documents submitted in support by reference here.
[2] U.S. General Accounting Office (June 2001) *Water Quality: Urban Runoff Programs*, Report No. GAO-01-679.

> result in alterations to the movement of water through the environment. As interception, evapotranspiration, and infiltration are reduced and precipitation is converted to overland flow, these modifications affect not only the characteristics of the developed site but also the watershed in which the development is located. Stormwater has been identified as one of the leading sources of pollution for all waterbody types in the United States. Furthermore, the impacts of stormwater pollution are not static; they usually increase with more development and urbanization.[3]

A recent study of the effects of urban development on stream ecosystems by the U.S. Geological Survey showed that urban development impacts stream chemistry, hydrology, habitat, and species composition, and that communities of invertebrate species "Begin to Degrade at the Earliest Stages of Urban Development."[4]

In the San Diego Region, the Regional Board has found that:

- "Land development has created and continues to create new sources of non-storm water discharges and pollutants in storm water discharges as human population density increases. This brings higher levels of car emissions, car maintenance wastes, municipal sewage, pesticides, household hazardous wastes, pet wastes, and trash. Pollutants from these sources are dumped or washed off the surface by non-storm water or storm water flows into and from the MS4s." (Draft Permit, at Finding 10);

- "[C]ommon pollutants in runoff discharged from the MS4s include total suspended solids, sediment, pathogens (e.g., bacteria, viruses, protozoa), heavy metals (e.g., cadmium, copper, lead, and zinc), petroleum products and polynuclear aromatic hydrocarbons, synthetic organics (e.g., pesticides, herbicides, and PCBs), nutrients (e.g., nitrogen and phosphorus), oxygen-demanding substances (e.g., decaying vegetation, animal waste), detergents, and trash." (Draft Permit, at Finding 12); and,

- "The Copermittees' water quality monitoring data . . . documents persistent exceedances of Basin Plan water quality objectives for runoff-related pollutants at various watershed monitoring stations. Persistent toxicity has also been observed at several watershed monitoring stations. In addition, bioassessment data indicate that the majority of the monitored receiving waters have Poor to Very Poor Index

[3] U.S. Environmental Protection Agency (December 2007) *Reducing Stormwater Costs through Low Impact Development (LID) Strategies and Practices*, at v.
[4] U.S. Geological Survey (2012) *Effects of Urban Development on Stream Ecosystems in Nine Metropolitan Study Areas Across the United States*, at 4; see generally, 1-5. Available at: http://pubs.usgs.gov/circ/1373/.

> of Biotic Integrity (IBI) ratings. These findings indicate that runoff discharges are causing or contributing to water quality impairments, and are a leading cause of such impairments in the San Diego Region." (Draft Permit, at Finding 14.)

The Draft Permit establishes requirements critical to addressing this pollution.

II. <u>Pollutants in Stormwater Must be Reduced to the Maximum Extent Practicable</u>

Consistent with the federal Clean Water Act, a fundamental goal of all municipal stormwater permits is to ensure that discharges from storm sewers do not cause or contribute to a violation of water quality standards. (33 U.S.C. § 1341.) In addition, for MS4s covered under the National Pollutant Discharge Elimination System program, permits for discharges from municipal storm sewers:

> shall require controls to reduce the discharge of pollutants to the maximum extent practicable, including management practices, control techniques and system, design and engineering methods, and such other provisions as the Administrator or the State determines appropriate for the control of such pollutants.

(33 U.S.C. § 1342(p)(3)(B)(iii).) The maximum extent practicable ("MEP") standard serves as a floor to performance for regulated parties. This standard does not grant unbridled leeway to Permittees in developing controls to reduce the discharge of pollution. "[W]hat the discharger will do to reduce discharges to the 'maximum extent practicable' . . . crosses the threshold from being an item of procedural correspondence to being a substantive requirement of a regulatory regime." (*Environmental Defense Center, Inc. v. U.S. E.P.A* (9th Cir. 2003) 344 F.3d 832, 853.) The MEP standard "imposes a clear duty on the agency to fulfill the statutory command to the extent that it is feasible or possible." (*Defenders of Wildlife v. Babbitt*, 130 F. Supp. 2d 121, 131 (D.D.C. 2001); *Friends of Boundary Waters Wilderness v. Thomas*, 53 F.3d 881, 885 (8th Cir. 1995) ("feasible" means "physically possible").

As one state hearing board held:

> [MEP] means to the fullest degree technologically feasible for the protection of water quality, except where costs are wholly disproportionate to the potential benefits…. This standard requires more of Permittees than mere compliance with water quality standards or numeric effluent limitations designed to meet such standards…. The term "maximum extent practicable" in the stormwater context implies that the mitigation measures in a stormwater permit must be more than simply adopting standard practices. This definition applies particularly in areas where standard practices are already failing to protect water quality….

(*North Carolina Wildlife Fed. Central Piedmont Group of the NC Sierra Club v. N.C. Division of Water Quality* (N.C.O.A.H. October 13, 2006) 2006 WL 3890348, Conclusions of Law 21-22 (internal citations omitted).) The North Carolina board further found that the permits in question violated the MEP standard both because commenters highlighted measures that would reduce pollution more effectively than the permits' requirements and because other controls, such as infiltration measures, "would [also] reduce discharges more than the measures contained in the permits." (*Id.* at Conclusions of Law 19.)

Nor is MEP a static requirement—the standard anticipates and in fact requires new and additional controls to be included with each successive permit. As U.S. EPA has explained, NPDES permits, including the MEP standard, will "evolve and mature over time" and must be flexible "to reflect changing conditions." (55 Fed. Reg. 47990, 48052.) "EPA envisions application of the MEP standard as an iterative process. MEP should continually adapt to current conditions and BMP effectiveness and should strive to attain water quality standards. Successive iterations of the mix of BMPs and measurable goals will be driven by the objective of assuring maintenance of water quality standards." (64 Fed. Reg. 68722, 68754.) In other words, successive iterations of permits for a given jurisdiction will necessarily evolve, and contain new and more stringent requirements for controlling the discharge of pollutants in runoff.

Although requiring compliance with MEP may be sufficient to achieve water quality standards and other common permit terms, the Clean Water Act independently requires that MS4 permits achieve water quality standard compliance.[5] EPA has stated "all permits for MS4s must include any requirements necessary to achieve compliance with [water quality standards]."[6] Notwithstanding this requirement, permits also require "such other provisions as the Administrator or the State determines appropriate for the control of such pollutants." This language in section 1342(p) has been held by California courts to grant "the EPA (and/or a state approved to issue the NPDES permit) . . . the discretion to impose 'appropriate' water pollution controls in addition to those that come within the definition of 'maximum extent practicable.'" (*Building Industry Ass'n of San*

[5] See, 33 U.S.C. § 1311(a); 1313; 1341(a); 1342(p); 40 C.F.R. § 122.44(d)(1) (permits must contain, as applicable, any requirements necessary to "[a]chieve water quality standards established under section 303 of the CWA, including State narrative criteria for water quality"); Memorandum from E. Donald Elliott, Assistant Administrator and General Counsel, U.S. Environmental Protection Agency, to Nancy J. Marvel, Regional Counsel Region IX, re: Compliance with Water Quality Standards in NPDES Permits Issued to Municipal Separate Storm Sewer Systems, Jan. 9, 1991 ("EPA Elliott Memo"). But see, *Defenders of Wildlife v. Browner* (9th Cir. 1999) 191 F.3d 1159, 1166 (holding that permitting authority is not required to impose strict water quality-based effluent limitations, but has the authority to do so).

[6] EPA Elliott Memo, at 1; *In re: Government of the District of Columbia Municipal Separate Storm Sewer System* (EPA 2002) 10 E.A.D. 323, 2002 WL 257698.

Diego County v. State Water Resources Control Bd. (2004) 124 Cal.App.4th 866, 883 (citing *Defenders of Wildlife v. Browner* (1999) 191 F.3d 1159, at 1165–1167).)

As a result, while the MEP standard represents a statutory floor, rather than limit, for permit requirements, the Regional Board and EPA maintain the authority to impose additional restrictions over and above MEP as they determine appropriate. Both California and federal authority maintain that MS4 permits must include provisions to ensure that discharges do not cause or contribute to exceedances of water quality standards.

III. Permit Provisions

A. The Draft Permit's Receiving Water Limitations Appropriately Prohibit Discharges that Cause or Contribute to the Violation of Water Quality Standards.

Consistent with the 2007 San Diego County MS4 Permit, 2009 South Orange County MS4 Permit, and 2010 Riverside County MS4 Permit,[7] as well as federal authority and State Water Board WQ Order No. 99-05,[8] the Draft Permit requires that "Discharges from MS4s must not cause or contribute to the violation of water quality standards in any receiving waters." (Draft Permit, at II.A.2.a.)[9] Multiple California and federal courts have upheld such provisions, including in prior iterations of the San Diego MS4 Permit.[10]

[7] See, San Diego Regional Water Quality Control Board (January 24, 2007) San Diego County MS4 Permit, Order No. R9-2007-0001, at A.3 ("2007 San Diego Permit"); San Diego Regional Water Quality Control Board (December 16, 2009) South Orange County MS4 Permit, Order No. R9-2009-0002, at A.3; San Diego Regional Water Quality Control Board (November 10, 2010) Riverside County MS4 Permit, Order No. R9-2010-0016, at A.3.

[8] Under Order No. 99-05, the State Board directed the Regional Boards to include receiving water limitations language devised by EPA, without incorporation of a safe harbor provision, into all future MS4 permits.

[9] See, 2007 San Diego Permit, at § A.3; see also, South Orange County MS4 Permit, Order No. R9-2009-0002, at § A.3.

[10] *See, e.g., Building Industry Ass'n of San Diego County*, 124 Cal.App.4th at 883; *In re L.A. County Mun. Storm Water Permit Litigation.*, No. BS 080548 at 4-7 (L.A. Super. Ct. Mar. 24, 2005) ("*L.A. County Mun. Stormwater*"); *County of Los Angeles v. Cal. State Water Res. Control Bd.* (2006) 143 Cal.App.4th 985, 989; *Natural Resources Defense Council v. County of Los Angeles* (2011) 673 F.3d 880, 897. The court in *In re L.A. County Mun. Stormwater* noted that, "the Regional Board acted within its authority when it included Parts 2.1 and 2.2 in the Permit without a 'safe harbor,' whether or not compliance therewith requires efforts that exceed the 'MEP' standard." (*In re L.A. County Mun. Stormwater*, at 7.) But regardless of this authority, the Court found that "the terms of the Permit taken, as a whole [including the Permit's receiving water limitations], constitute the Regional Board's definition of MEP." (*Id.* at 7-8.)

As such, the prohibition against discharges that cause or contribute to violations of water quality standards is appropriately incorporated into the Draft Permit's receiving water limitations here.

Moreover, any weakening of the receiving water limitations language would constitute a violation of the Clean Water Act's anti-backsliding provisions, which require that "a permit may not be renewed, reissued, or modified to contain effluent limitations which are less stringent than the comparable effluent limitations in the previous permit," except in circumstances not presented by the Draft Permit. (33 U.S.C. § 1342(o)(1).) Similarly, federal regulations require that "when a permit is renewed or reissued, interim effluent limitations, standards or conditions must be at least as stringent as the final effluent limitations, standards, or conditions in the previous permit. . . ." (40 C.F.R. § 122.44(l)(1).) Because the prohibition against exceedances of water quality standards was required by the prior San Diego, South Orange County, and Riverside permits, this provision cannot be less stringent in the Draft Permit. A weakening of the receiving water limitations would further violate state and federal antidegradation requirements, which mandate that existing water quality in navigable waters be maintained unless degradation is justified by specific findings.[11] As a result, the adopted permit must require compliance with water quality standards, without restriction.

B. The Draft Permit's Development Planning Requirements Must Require On-Site Retention of at least the 85th Percentile Storm

We strongly support that the Draft Permit establishes requirements for new development and redevelopment projects to retain stormwater runoff on-site. A principal reason to adopt such an approach is the superior pollutant load reduction capacity of LID practices that retain runoff on-site, for a variety of climatic scenarios, including for the San Diego region.[12] However, we are concerned that, as currently drafted, the Draft Permit's Development Planning requirements in many circumstances will allow projects to retain less runoff than has been demonstrated to be practicable. This in turn will result in increased discharge of pollutants to receiving waters over what could practicably be reduced, in violation of Clean Water Act's MEP standard. In particular, the Draft Permit's provision allowing for required runoff retention to be calculated as the "volume

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[11] See, 40 C.F.R. § 131.12; State Board Resolution 68-16; *Associacion de Gente Unida for El Agua v. Central Valley Regional Board* (2012) (210 Cal.App.4th 1255) [149 Cal.Rptr.3d 132, 142; 144] (citing "St. Water Res. Control Bd., Guidance Memorandum (Feb. 16, 1995)).

[12] Dr. Richard Horner and Jocelyn Gretz (December 2011) Investigation of the Feasibility and Benefits of Low-Impact Site Design Practices Applied to Meet Various Potential Stormwater Runoff Regulatory Standards ("Horner and Gretz Runoff Study"); see also, Horner, Richard. Report for Ventura County; Horner, Richard. Initial Investigation for San Francisco Bay Area; Horner, Richard. Supplementary Investigation for San Francisco Bay Area; Horner, Richard. Report for San Diego Region.

of storm water that would be retained on-site if the site was fully undeveloped and naturally vegetated" should be deleted. (See Draft Permit, at E.3.c(1)(a)(ii).)

The Draft Permit requires, under one provision, that the runoff from the 85th percentile, 24-hour rain event must be retained on-site. (Draft Permit, at E.3.c(1)(a)(i).) This requirement, resulting in retention of stormwater runoff with no off-site discharge in the vast majority of storms, is consistent with on-site retention requirements of other permits throughout California, as in permits and ordinances found in all corners of the United States. Similar or more stringent requirements are included in the following permits:

Ventura County: MS4 permit requires on-site retention of ninety-five percent of rainfall from the 85th percentile storm; off-site mitigation allowed if on-site retention is technically infeasible;[13]

South Orange County: MS4 permit requires on-site retention of the 85th percentile storm, off-site mitigation allowed if on-site retention is technically infeasible;[14]

However, the 85th percentile standard is actually less stringent than required by permits in many other parts of the county. For example, permits in the following locations require retention that generally exceeds the 85th percentile storm volume in San Diego:

Washington D.C.: MS4 permit requires retention of the first 1.2 inches of stormwater (which represents the 90th percentile storm) for all new development and redevelopment over 5,000 square feet.[15]

West Virginia: Statewide Phase II MS4 permit requires on-site retention of "the first one inch of rainfall from a 24-hour storm" event unless infeasible;[16] and,

Philadelphia, PA: Infiltrate the first one inch of rainfall from all impervious surfaces; if on-site infiltration is infeasible, the same performance must be achieved off-site.[17]

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[13] Los Angeles Regional Water Quality Control Board (July 8, 2010) Ventura County Municipal Separate Stormwater National Pollutant Discharge Elimination System (NPDES) Permit; Order No. R4-2009-0057; NPDES Permit No. CAS004002.
[14] San Diego Regional Water Quality Control Board (December 16, 2009) South Orange County MS4 Permit, Order No. R9-2009-0002, NPDES Permit No. CAS0108740.
[15] U. S. EPA (2011) Fact Sheet, National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. DC0000221 (Government of the District of Columbia).
[16] State of West Virginia Department of Environmental Protection, Division of Water and Waste Management, General National Pollution Discharge Elimination System Water Pollution Control Permit, NPDES Permit No. WV0116025 at 13-14 (June 22, 2009).
[17] City of Philadelphia (Jan. 29, 2008) Stormwater Management Guidance Manual 2.0, at 1.1, available at.

Further, research conducted by Dr. Richard Horner, a member of the National Academy of Sciences Panel on Reducing Stormwater Discharge Contributions to Water Pollution demonstrates that, for five different types of land use development or redevelopment projects in Southern California, the full 85th percentile, or even the full 95th percentile, 24-hour precipitation event could be retained on-site using *only* infiltration practices on sites overlying soils classified as Group C (typically containing 20 to 40 percent clay) under the Natural Resources Conservation Service (NRCS) major soil orders classification scheme.[18] Critically, even for sites overlying Group D soils (typically 40 percent or more clay with substantially restricted water transmissivity) and assuming *no* infiltration was feasible, greater than 50 percent of the 85th percentile storm (or between 37 and 62 percent of annual runoff) could be retained at each development type using only rooftop runoff dispersion or rooftop harvest and reuse techniques.[19] Additional retention under these scenarios could be achieved through use of evaporation practices, green roofs, or, in cases where some infiltration is feasible, use of infiltration BMPs.

The Permit also allows for required stormwater runoff retention to be calculated as the "volume of storm water that would be retained onsite if the site was fully undeveloped and naturally vegetated" based on site specific soil conditions and natural vegetative cover. (Draft Permit, at E.3.c(1)(a)(ii).) This approach requires only that a development retain the change in runoff between pre-development (or undeveloped) conditions and post-development, or the "delta volume." Yet, as described below, the delta volume approach alone does not achieve control of pollutants to the MEP, and represents a significant departure from both state and national precedents. For this reason, it has been rejected in other California Permits as insufficient to meet statutory requirements.[20]

While the delta volume approach may be appropriate in assessing effects of hydromodification, because preservation of hydrologic profile from pre-development to post-development[21] will not cause modification in the hydrology of the receiving water,

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[18] Horner and Gretz Runoff Study, at Table 16 p. 35; Natural Resources Conservation Service, Distribution Maps of Dominant Soil Orders (http://soils.usda.gov/technical/classification/orders/, last accessed December 16, 2011).

[19] Horner and Gretz Runoff Study, at Table 16 p. 35; 27-34. We note as well that even in areas characterized regionally as underlain by D soils, site specific investigation may establish substantial potential for infiltration of runoff.

[20] See, e.g., Santa Ana Regional Water Quality Control Board, OC MS4 Tentative Order No. R8-2008-0030 (R8-2009-0030) Comments/Responses, at comment 103.

[21] We distinguish delta volume's application to water quality considerations from the otherwise appropriate application of comparisons of pre-development to post development hydrology as a means of establishing hydromodification controls. Irrespective of this approach, however, we note that the Draft Permit should require projects to implement hydromodification controls to meet "predevelopment (naturally occurring)" runoff flow rate (see Draft Permit, at E.3.c.(2)(a)), rather than "pre-project" conditions, or the conditions of a previously developed site immediately prior to

this approach is inappropriate for management of water quality. Under the delta volume approach, the unretained volume of runoff resulting from development (i.e., any amount of runoff greater than would have been retained under undeveloped conditions), will carry pollutants to receiving waters that would not have been present in runoff from undeveloped land.

This is particularly a concern in the San Diego region, which contains significant land area underlain by clay rich soils that may reduce infiltrative capacity.[22] For example, for development sites underlain by C soils, Dr. Horner's research demonstrates that the delta volume approach may actually require the site to retain more runoff than would be retained under the 85th percentile storm standard.[23] However, for development sites underlain by D soils, which may include large portions of the San Diego region, the delta volume approach will result in requiring development to substantially *less* runoff than would be required, or feasibly retained, under the 85th percentile storm standard. Under case studies for the 85th percentile storm standard, development sites would be required to retain between 37 and 62 percent of average annual runoff, with even greater retention possible given use of soil amendments or other practices to augment recharge. For the same sites, the delta volume approach would only require retention of between 27 and 44 percent of annual runoff.[24] Because the delta volume standard allows runoff that could be feasibly retained on-site to be discharged and carry pollutants to receiving waters, the standard violates the Clean Water Act's MEP requirement. The Draft Permit should either delete reference to this standard from section E.3.c(1)(a)(ii), or require that a project site retain the runoff from the 85th percentile, 24-hour storm event, or the delta volume approach, *whichever is greater*.

1. The Draft Permit Must Require a Determination that it is Technically Infeasible to Retain the Design Storm On-Site Before Biofiltration or Off-site Mitigation/Retrofitting is Authorized.

While we support the inclusion of strong retention standards for stormwater runoff, and the Draft Permit's requirement to incorporate on-site treatment in addition to performance of off-site mitigation in the event of technical infeasibility for on-site retention, we are concerned by statements of Regional Board staff that they "would like to make a shift away from determining what is infeasible onsite to determining what is

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construction. This issue is of concern for both natural, non-hardened channels, and for concrete lined or hardened channels, where allowing use of a "pre-project" standard for hydromodification may serve to prevent stream rehabilitation.

[22] See, e.g., Horner and Gretz Runoff Study, at 15-16.

[23] *Id*., at Table 16 p 35. In the San Marcos case studies, the delta volume approach would require retention of 72 to 80 percent of average annual runoff, while retention of the 85th percentile storm event would result in retention of 62 percent of average annual runoff.

[24] *Id*.

feasible onsite"[25] and Draft Permit provisions allowing for use of biofiltration and off-site mitigation even where on-site retention is feasible. Because retention of the 85th Percentile Storm event has been established as MEP in California Permits,[26] the project proponent must meet this standard or demonstrate that it cannot be met.

The jurisdictions identified in sections above have recognized the paramount importance of mandating on-site retention of a certain quantity of stormwater since, in contrast to retention practices, which ensure that 100 percent of the pollutant load in the retained volume of runoff does not reach receiving waters, biofiltration practices (or tree-box filters and other similar practices) that treat and then discharge runoff through an underdrain result in the release of pollutants to receiving waters. Indeed, in order to achieve equivalent pollutant load reduction benefits to the use of on-site retention, biofiltration practices would have to be 100 percent effective at filtering pollutants from the same volume of runoff, which they are invariably not. As a result, while biofiltration practices (or conventional flow-through practices) may be appropriate for on-site treatment when coupled with an off-site mitigation requirement in cases of technical infeasibility (discussed further below), they are not a proper substitute for low impact development ("LID") practices that retain water on-site.

This conclusion is borne out by data presented in the Draft Ventura County Technical Guidance Manual, which estimates pollutant removal efficiency for total suspended solids to be 54-89 percent, and for total zinc to be 48-96 percent.[27] Biofiltration has additionally been shown to be a particularly ineffective method of pollutant removal for addressing nitrogen or phosphorous, two common contaminants found in stormwater.[28] The Draft Ventura Technical Guidance, for example, indicates that biofiltration achieves

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[25] Regional MS4 Permit RWQCB Workshop Notes, September 5, 2012, at 4.
[26] See, e.g., Ventura County MS4 Permit, Order No. R4-2009-0057; San Francisco Bay Area MS4 Permit, Order No. R2-2009-0074; North Orange County MS4 Permit, Order No. R8-2009-0030; South Orange County MS4 Permit, Order No. R9-2009-0002.
[27] Ventura County Low Impact Development Technical Guidance Manual, July 13, 2011, at D-7.
[28] Lawn irrigation has been identified as a "hot spot" for nutrient contamination in urban watersheds—lawns "contribute greater concentrations of Total N, Total P and dissolved phosphorus than other urban source areas . . . source research suggests that nutrient concentrations in lawn runoff can be as much as four times greater than other urban sources such as streets, rooftops or driveways." Center for Watershed Protection (March 2003) *Impacts of Impervious Cover on Aquatic Systems* at 69; see also H.S. Garn (2002) *Effects of lawn fertilizer on nutrient concentration in runoff from lakeshore lawns, Lauderdale Lakes, Wisconsin*. U.S. Geological Survey Water- Resources Investigations Report 02-4130 (In an investigation of runoff from lawns in Wisconsin, runoff from fertilized lawns contained elevated concentrations of phosphorous and dissolved phosphorous).

pollutant removal efficiency for total nitrogen at between only 21-54 percent,[29] as compared with 100 percent for runoff retained on-site. As a result, even where a multiplier is applied requiring 1.5 times as much runoff be treated using biofiltration as would otherwise be retained, biofiltration may achieve substantially less pollution reduction as would retention.

Likewise, the Draft Permit's provisions allowing for a project to perform off-site mitigation through off-site regional BMPs or retrofits may violate the Clean Water Act's MEP requirement because it does not provide any actual mechanism to ensure that an alternative "off-site" location will provide "greater overall water quality benefit" to on-site retention. (Draft Permit, at E.3.c(3)(b).) NRDC supports use of regional projects that may provide multiple benefits, including increased local water supply, where runoff is *conveyed* from a project site to a regional facility that will retain that runoff, albeit at a different location, with no discharge to receiving waters, as this process typically does not implicate significant water quality concerns. Where the same, specific quantum of runoff from the project is ultimately retained, 100 percent of the pollution contained in that particular volume of water will be prevented from reaching receiving waters.

In contrast, where a project, performs off-site mitigation or retrofit at some other location within the same watershed or sub-watershed that is not hydrologically connected to the original project site, it raises substantial concerns as to whether the alternate location will provide equal water quality benefits to the receiving surface water. Among the issues presented by this form of off-site mitigation are whether the off-site mitigation will be performed at a similar land use type; whether the mitigation project will achieve equivalent pollutant load reduction; and if so, what pollutants it will be monitored for. In practice it may prove exceedingly difficult to assess the equivalency of benefits to surface water quality from retention at one site to the next. Further, while we note that the Regional Board has included a multiplier for retention 1.1 times the design volume not retained on-site in cases of off-site mitigation, (Draft Permit, at E.3.c(3)(b)(iv)) the Board has not provided any analysis or evidence to demonstrate that this volume will be sufficient to offset the release of pollution from on-site sources. As a result, off-site mitigation should be allowed only where on-site retention or regional projects where runoff is conveyed directly to the retention site are infeasible.

Finally, while we support development under the USGCB LEED program, the Board has not provided any analysis to demonstrate that meeting the criteria set forth in section E.3.c(3)(b)(ii) will result in a reduction of pollution equivalent to the Permit's otherwise

[29] Ventura County Low Impact Development Technical Guidance Manual, July 13, 2011, at D-7. See also, BASMAA (December 1, 2010) *Draft Model Bioretention Soil Media Specifications-MRP Provision C.3.c.iii*, at Annotated Bibliography section 3.0 (noting nutrient removal from synthetic stormwater runoff demonstrated only 55 to 65 percent of total Kjeldahl nitrogen removal and that only 20 percent of nitrate is removed from the runoff).

applicable retention standard, or to the MEP. This section should therefore be revised accordingly or deleted.

2. <u>LID Is Cost-Effective and Provides Significant Economic Benefits</u>

LID "provides ecosystem services and associated economic benefits that conventional stormwater controls do not."[30] Because traditional stormwater management approaches involve the construction of complex systems of infrastructure, they can entail substantial costs. Since LID emphasizes storage and use, infiltration, and use of a site's existing drainage conditions, "[c]ost savings are typically seen in reduced infrastructure because the total volume of runoff to be managed is minimized."[31] A 2007 U.S. EPA study found that "in the vast majority of cases . . . implementing well-chosen LID practices saves money for developers, property owners, and communities while protecting and restoring water quality."[32] With only "a few exceptions," the EPA study found that "[t]otal capital cost savings ranged from 15 to 80 percent when LID methods were used" instead of conventional stormwater management techniques.[33] The savings identified in documented studies are noteworthy considering they do not reflect the additional economically beneficial attributes LID provides, including reduced costs of municipal infrastructure, reduced costs of municipal stormwater management, and increased value of real estate.[34]

Nor is the EPA study alone in reaching this conclusion. A survey released by the American Society of Landscape Architects in 2011 found that green infrastructure reduced or did not influence project costs 75 percent of the time.[35] A joint project by the University of New Hampshire Stormwater Center and Virginia Commonwealth University found that use of LID provided stormwater management cost savings of 6 percent for residential development and 26 percent for commercial developments as compared with conventional stormwater management.[36] And while the economics of

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[30] ECONorthwest, The Economics of Low-Impact Development: A Literature Review, at iii. (2007) ("ECONorthwest") (Exh. 61).
[31] U.S. EPA Cost Study, at 2; U.S. Department of Housing and Urban Development, The Practice of Low Impact Development, at 33 (2003) (Exh. 62).
[32] U.S. EPA Cost Study, at iii.
[33] *Id.* at iv.
[34] See ECONorthwest, at 5; *Id.* at 15 (disconnecting downspouts to allow for natural infiltration in the Beecher Water District near Flint, Michigan cost the district about $15,000, but decreased the mean volume of sewer flows by 26 percent, and saved the district more than $8,000 per month in stormwater fees); U.S. EPA Cost Study, at 7.
[35] American Society of Landscape Architects (2011) Advocacy: Stormwater Case Studies.
[36] Roseen, R., T. Janeski, J. Houle, M. Simpson, and J. Gunderson (2011) *Forging the Link: Linking the Economic Benefits of Low Impact Development and Community*

integrating LID into redevelopment projects vary slightly from new development, there is little evidence it typically raises project costs. An analysis of three communities by ECONorthwest found that while complying with stormwater standards, including strict runoff volume reduction requirements, is a cost consideration, it is rarely, if ever, a driving factor in decisions to undertake redevelopment projects.[37]

Further, LID can provide substantial benefits for the San Diego region in terms of increased local supply of water and reduced energy usage, in addition to the stormwater runoff and pollution benefits it can provide.[38]

C. The Requirements for Water Quality Improvement Plans Lack Sufficient Detail, Represent an Illicit Self Regulatory Scheme, and Violate Clean Water Act Prohibitions Against the Discharge of Non-stormwater

1. <u>The Draft Permit Must Provide for Adequate Public and Agency Review of Any Substantive Permit Requirements Designed by the Permittees</u>

While we support watershed based efforts to address stormwater pollution in the San Diego region, the Draft Permit's requirements for Water Quality Improvement Plans are in many parts vague, essentially directing Permittees to develop their own priorities and requirements, which are subject only to minimal, inadequate public review or Regional Board oversight. In this way, the provisions represent a "plan to develop a plan," rather than any form of plan in itself. In *Environmental Defense Center, Inc. v. U.S. E.P.A* ((9th Cir. 2003) 344 F.3d 832, 854-56), the court explained: "[S]tormwater management programs that are designed by regulated parties must, in every instance, be subject to meaningful review by an appropriate regulating entity. . . . Congress identified public participation rights as a critical means of advancing the goals of the Clean Water Act in

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Decisions. University of New Hampshire Stormwater Center, the Virginia Commonwealth University, and Antioch University New England. Available at: http://www.unh.edu/unhsc/resource-manual-and-fact-sheets; see generally, NRDC (2011) Rooftops to Rivers II: Green Strategies for Controlling Stormwater and Combined Sewer Overflows, at 19-30.

[37] ECONorthwest (2011) "Managing Stormwater in Redevelopment and Greenfield Development Projects Using Green Infrastructure: Economic Factors that Influence Developers Decisions,"prepared by S. Reich et al, at 2.

[38] See, NRDC and University of California at Santa Barbara (2009) A Clear Blue Future: How Greening California Cities Can Address Water Resources and Climate Challenges in the 21st Century; See also, NRDC (2011) Capturing Rainwater from Rooftops: An Efficient Water Resource Management Strategy that Increases Supply and Reduces Pollution; NRDC and University of California at Los Angeles (2012) Looking Up: How Green Roofs and Cool Roofs Can Reduce Energy Use, Address Climate Change, and Protect Water Resources in Southern California.

its primary statement of the Act's approach and philosophy." Provisions or substantive permit terms such as these which get at the core of permit requirements, and are designed or developed by the Permittees must be subject to proper opportunity for public comment to the Regional Board, and should be properly reviewed by the Regional Board at public hearing prior to approval and implementation.

2. The Permit's use of Numeric Action Limits Violates Clean Water Act Prohibitions Against the Discharge of Non-Stormwater

While we support the Regional Board's attempt to provide increased focus on dry weather, non-storm water discharges, we are concerned that the provisions for use of "numeric action limits" ("NALs") as drafted in the Water Quality Improvement Plans (Draft Permit, at II.C.1), do not fully support the Clean Water Act's absolute prohibition against the discharge of non-storm water to the MS4 system. The federal Clean Water Act mandates that MS4 permits "include a requirement to effectively prohibit non-stormwater discharges into the storm sewers." (33 U.S.C. § 1342(p)(3)(B)(ii); see 40 C.F.R. § 122.26(d)(2)(iv)(B)(1).) The Permit incorporates this requirement under section II.A.1.b. To support the development and prioritization of water quality improvement strategies for addressing non-storm water discharges to and from the MS4s and identify sources of non-stormwater pollution or potential violations of Permit provisions, the Draft Permit establishes (or requires Permittees to establish) quantifiable discharge goals for specific pollutants in the form of NALs.

We presume that the NAL provisions are intended to support the goal of compliance with the Clean Water Act's prohibition. However, the Draft Permit, which states that "NALs are not considered by the San Diego Water Board to be enforceable limitations," could be confusingly taken to suggest that the Permit allows for non-storm water discharges to occur or to contribute pollutants to the MS4 system so long as the pollution occurs at levels below the NALs.[39] This would violate both the Clean Water Act's absolute prohibition against non-storm water discharges to the MS4 under 33 U.S.C. § 1342(p)(3)(B)(ii), and the Act's implementing regulations, which require that "where such discharges are identified by the municipality as sources of pollutants to waters of the United States," in any amount, they must be addressed by the Permittee. (40 C.F.R. § 122.26(d)(2)(iv)(B)(1).)[40] The Draft Permit must require action by the Permittees to address non-stormwater discharges for pollution observed at levels both above *and* below

[39] We note a similar concern with respect to "SALs" for stormwater discharges, as this provision could be interpreted as authorizing the discharge of pollutants below the SAL, but which may contribute to an exceedance of water quality standards. (Draft Permit, at II.C.2.)

[40] Critically in this regard, any amount of pollution from an exempt source is prohibited, regardless of whether it occurs at levels below the NALs. As a result, action should be required of the Copermittees even for pollution occurring at levels below the NALs

the specified NALs in order to meet obligations fixed by the Clean Water Act, as the Act requires action to prohibit all discharges, regardless of the discharge's pollutant load.

IV. <u>Conclusion</u>

We appreciate this opportunity to comment on the Draft Permit. Please feel free to contact us with any questions or concerns you may have.

Sincerely,

Noah Garrison
Project Attorney
Natural Resources Defense Council

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January 11, 2013

Mr. David Gibson, Executive Officer, and Members of the Board
California Regional Water Quality Control Board, San Diego Region
9174 Sky Park Court, Suite 100
San Diego, CA 92123

Dear Mr. Gibson and Board Members:

I am writing with respect to a provision with which I disagree among the Storm Water Pollutant Control BMP Requirements of Tentative Order No. R9-2013-0001, NPDES No. CAS0109266 ("the Tentative Order"). I base my comments on my extensive experience in the stormwater management field, summarized in the attachment to this letter. My full *curriculum vitae* are available on request.

I refer specifically to Tentative Order section E.3.c(1)(a)(ii), which gives as one of two options for a standard of runoff retention (i.e., interception, storage, infiltration, and/or evapotranspiration):

> The volume of storm water that would be retained onsite if the site was fully undeveloped and naturally vegetated, as determined using continuous simulation modeling techniques based on site-specific soil conditions and typical native vegetative cover.

The implication of this passage is that the retention requirement is equal to the difference between the post- and pre-development stormwater runoff volumes. In this letter I refer to this requirement as the "differential volume standard".

I disagree with the Tentative Order's allowing application of the differential volume standard, in any case and without restriction, as an alternative to a retention requirement based on the full volume of storm water produced by the 85th percentile, 24-hour storm event [i.e., provision E.3.c(1)(a)(i)]. Broadly exercising the differential volume option instead of the alternative would result in considerably greater volumes of urban stormwater discharge over the San Diego region as a whole, with concomitant, substantial increases in the mass loading to receiving waters of a range of pollutants.[1] It also departs from standard and well-accepted practice around the nation. This letter provides supporting documentation for my opinion.

[1] For purposes of my analysis and comments I assume that the difference implied by the provision is between the post- and pre-development average annual runoff volumes. If, on the other hand, the intent is to apply it up to a certain rainfall event cap (e.g., the 85th percentile, 24-hour storm), I object even more strenuously to allowance of this option. I do so because that capped standard would result in the release of even more stormwater pollutant mass, as shown later in this letter.

Basis of Full-Volume Standard

Using the differential volume between pre- and post-development conditions breaks the long-standing precedent, in California and elsewhere, of using the full volume of stormwater discharged from the developed site in a designated event as the basis for stormwater best management practices ("BMPs") that store runoff for longer than a few minutes.[1] The widespread adoption (see examples below) of the full water quality volume instead of the differential volume occurred for good reasons. The total runoff volume from the 85th percentile, 24-hour event—the prevailing design standard in southern California—was determined through objective analysis to represent the point above which substantially diminishing returns in water quality improvement would accompany considerable BMP size enlargement and, therefore, cost (Guo and Urbonas 1996).[2] The analysis identified the full volume generated by the 85th percentile, 24-hour event— not some lesser quantity like the differential volume—as the appropriate threshold at which the decrease in benefits accelerates.

The use of a differential hydrologic measure that compares pre- and post-development states is common in the management of storm runoff quantity (i.e., hydromodification). The pre- vs. post-development measure is appropriate in that situation because successfully matching pre- and post-development hydrologic characteristics causes no modification in the hydrologic status of the receiving water and, hence, no negative physical effects.

When managing water quality, in contrast, any untreated volume (in the differential volume scenario, this would be the amount that originally flowed from the undeveloped land) would deliver to the receiving water the many pollutants characteristic of urban runoff. There, these pollutants would create negative physical, chemical, and biological effects. On the other hand, if the appropriate water quality volume is used (i.e., no less than the full volume of the 85th percentile, 24-hour event), the retentive stormwater management BMPs would deliver no pollutants to the receiving water in any rainfall up to and including the design event. Undeveloped land generates runoff discharged to surface waters as a function of factors such as its soils, hydrogeology, topography, and vegetative cover. Sites having conditions such as soils of relatively fine texture, high groundwater table, steep slopes, and/or scanty vegetation can produce substantial surface runoff flows in the undeveloped state compared to locations not having such characteristics.

Comparative Quantitative Assessment of Alternative Standards for the San Diego Area

A fairly common condition in the San Diego area is soil relatively restrictive to infiltration of water (Hydrologic Soil Group D soils). Lands with these soils, even in the undeveloped

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[1] There is a different basis for BMPs through which water flows rapidly (e.g., biofiltration swales), as given by Tentative Order provision E.3.c(1)(c)(ii).
[2] Guo, J.C.Y. and B. Urbonas. 1996. Maximized Detention Volume Determined by Runoff Capture Ratio. *Journal of Water Resources Planning and Management*, January/February.

condition, produce substantially more runoff than other soils, the least restrictive of which yield very little runoff at all when undeveloped. However, that D soil runoff is uncontaminated with the numerous pollutants characteristic of urban runoff. Developing on these soils and allowing retention only of the differential runoff volume still releases the relatively high pre-development quantity of runoff, now contaminated with the urban pollutants.

I performed an analysis and prepared a report on the relative benefits of five potential runoff retention standards, including: Standard 1—the 85th percentile, 24-hour event standard; Standard 4—a differential standard based on the average annual runoff volume; and Standard 5—a differential standard capped at the 85th percentile, 24-hour event (standard numerical designation are from the original report, Horner and Gretz 2011).[1] I applied "low impact development" (LID) runoff retention strategies to attempt to meet each standard for a range of land uses from single-family residential, to "big-box" commercial, to high-density infill redevelopment. I divided the strategies into Basic ARCD and Full ARCD (ARCD is aquatic resources conservation design, essentially a synonym for LID). When infiltration alone (Basic ARCD) could not accomplish full retention according to the standard, roof runoff management strategies were selected as appropriate for the land use case (Full ARCD). For the retail commercial development, roof runoff management would be accomplished by harvesting, temporarily storing, and applying water to use in the building. In residential cases roof runoff would be dispersed on the landscape for evapotranspiration and some infiltration. I performed the analysis for four locations around the nation, including the San Diego area (a specific location based on San Marcos). I used the two most common soil types around San Marcos, Hydrologic Soil Groups C (somewhat restrictive to infiltration) and D.

My calculations showed that it is possible to retain <u>all</u> of the average annual runoff volume on the C soil using only Basic ARCD.[2] No urban stormwater pollutants would enter receiving waters in an average year in that situation. Any retention standard that might be set by a permit could be met with that soil condition, and also in any less restrictive Hydrologic Soil Group (e.g, A and B soils) present. With D soils I estimated that Full ARCD would retain 37-66 percent of the average annual runoff volume, depending on the land use and its land cover characteristics. The pollutant mass (the multiplication product of pollutant concentration and runoff volume) prevented from entering receiving waters would be somewhat greater as a percentage of the total produced in an average year, because the BMPs would reduce concentrations as well as volume.

I also analyzed the water quality benefits that would be realized if each standard was <u>just</u> met; i.e., the BMPs do not necessarily accomplish all that they could but just enough to meet the respective standard. With the San Diego area D soil I determined that the 85th percentile, 24-

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[1] Horner, R.R. and J. Gretz. 2011. Investigation of the Feasibility and Benefits of Low-Impact Site Design Practices Applied to Meet Various Potential Stormwater Runoff Regulatory Standards. Report to U.S. Environmental Protection Agency by Natural Resources Defense Council.

[2] As a result, a more stringent standard, such as retention of runoff from the 90th or 95th percentile, 24-hour storm event or, alternatively, 90 or 95 percent of the average annual runoff volume would be appropriately applied in the permit. Retention Standards 2 and 3 assessed by Horner and Gretz (2011) were based , respectively, on the 95th percentile, 24-hour event and 90 percent of the average annual volume

hour event standard (Standard 1) would not actually be met with Full ARCD strategies for most land use cases. However, in attempting to meet that standard those strategies would retain 37-62 percent of the average annual runoff volume, again depending on the land use. The capped differential volume standard (Standard 5) would be met with Full ARCD for all land use cases, but the average annual volume retention would be only 16-28 percent. The differential standard based on the average annual runoff volume (Standard 4) would be achieved with all but one land use, retaining 27-44 percent of the average annual volume, still less than with Standard 1. This analysis demonstrates the clear superiority of Standard 1, especially over the capped differential volume standard, on the relatively restrictive soils. Priority projects should be required to comply with this standard on-site to the extent possible and to compensate for any shortfall by creating or contributing to off-site retention opportunities in the same watershed.

As I noted above, all standards can be achieved for any land use considered on the C soils. If those standards are just met, Standard 1 would result in retention of 62 percent of the average annual runoff volume in all land use cases. Standard 4 would actually out-perform Standard 1with these soils, retaining an estimated 72-80 percent. However, Standard 5 would again yield lesser benefits, retaining only 44-49 percent. Accordingly, here should be no consideration of a capped differential volume standard in my opinion; and there should be no consideration of a differential volume standard on D soils or where this standard under-performs the standard based on retention of the 85th percentile, 24-hour storm event.

My Recommendations

For optimum water quality benefits, I recommend and encourage that the Tentative Order be revised to require the larger of the two retention volumes determined according to both provisions E.3.c(1)(a)(i) and E.3.c(1)(a)(ii). The latter standard should be clarified to constitute the difference between the post- and pre-development average annual runoff volumes, with the pre-development state taken as the typical land cover existing before European settlement of an area. Furthermore, I urge that the permit require compensation for any shortfall in meeting the retention requirement by creating or contributing to off-site retention opportunities in the same watershed.

Example Standards from Elsewhere in the United States

As pointed out above, adopting a volumetric basis for stormwater treatment design and then subjecting that full volume to onsite retention or treatment has been the rule in the United States. Jurisdictions take differing approaches to defining that volume; but, once it is set, they utilize the entire quantity as the basis for BMP design. Common approaches include the storm percentile method: a storm event of selected frequency and duration is chosen, which correlates to a certain depth of precipitation spread over a watershed area. In addition to southern California, Georgia provides an example of this approach (http://www.georgiastormwater.com/vol2/1-3.pdf at 1.3-1):

> Treat the runoff from 85% of the storms that occur in an average year. For Georgia, this equates to providing water quality treatment for the runoff resulting from a rainfall depth

of 1.2 inches.

The state of Washington employs a second approach, originally developed according to a storm percentile analysis (http://www.ecy.wa.gov/pubs/0510029.pdf at 2-28):

> Water Quality Design Storm Volume: The volume of runoff predicted from a 24-hour storm with a 6-month return frequency (a.k.a., 6-month, 24-hour storm). Wetpool facilities are sized based upon the volume of runoff predicted through use of the Natural Resource Conservation Service curve number equations … for the 6-month, 24-hour storm. Alternatively, the 91st percentile, 24-hour runoff volume indicated by an approved continuous runoff model may be used.

Numerous jurisdictions, such as Maine, use the precipitation depth approach (http://www.maine.gov/dep/blwq/docstand/stormwater/stormwaterbmps/vol3/chapter2.pdf at 2-12):

> Stormwater management facilities must be designed to treat the first 1 inch of runoff ...

Similarly, Maryland's standard is (http://www.mde.state.md.us/assets/document/chapter2.pdf at 2.1):

> P= rainfall depth in inches and is equal to 1.0" in the Eastern Rainfall Zone and 0.9" in the Western Rainfall Zone ...

Pennsylvania specifies (http://www.depweb.state.pa.us/watershedmgmt/cwp/view.asp?a=1437&q=529063&watershedmgmtNav=| at 3.3.4):

- Stormwater facilities shall be sized to capture at least the first two inches (2") of runoff from all contributing impervious surfaces.

- At least the first one inch (1.0") of runoff from new impervious surfaces shall be permanently removed from the runoff flow – i.e., it shall not be released into the surface Waters of this Commonwealth. Removal options include reuse, evaporation, transpiration, and infiltration.

North Carolina's approach is (http://h2o.enr.state.nc.us/su/documents/BMPManual_WholeDocument_CoverRevisedDec2007.pdf at 2-2):

> Non-coastal counties: Control and treat the first 1.0" of rain. (Note: a more complex basis applies to coastal counties.)

In none of these cases does the stormwater treatment design basis involve a differential volume computation, and certainly not one capped at a certain event. I encourage the San Diego Regional Board to take notice.

I would be glad to discuss my comments and invite you to contact me if you wish to do so.

Sincerely,

Richard R. Horner

Richard R. Horner

Attachment: Richard R. Horner, Ph.D., Background and Experience

RICHARD R. HORNER, PH.D.

BACKGROUND AND EXPERIENCE

I have 36 years of experience in the urban stormwater management field and 11 additional years of engineering practice. During this period I have performed research, taught, and offered consulting services on all aspects of the subject, including investigating the sources of pollutants and other causes of aquatic ecological damage, impacts on organisms in waters receiving urban stormwater drainage, and the full range of methods of avoiding or reducing these impacts.

I received a Ph.D. in Civil and Environmental Engineering from the University of Washington in 1978, following two Mechanical Engineering degrees from the University of Pennsylvania. Although my degrees are all in engineering, I have had substantial course work and practical experience in aquatic biology and chemistry. For 12 years beginning in 1981, I was a full-time research professor in the University of Washington's Department of Civil and Environmental Engineering. From 1993 until 2011, I served half time in that position and had adjunct appointments in two additional departments (Landscape Architecture and the College of the Environment's Center for Urban Horticulture). I spent the remainder of my time in private consulting through a sole proprietorship. My appointment became emeritus in late 2011, but I continue university research and teaching at a reduced level while maintaining my consulting practice.

I have conducted numerous research investigations and consulting projects involving all aspects of stormwater management. Serving as a principal or co-principal investigator on more than 40 research studies, my work has produced three books, approximately 30 papers in the peer-reviewed literature, and over 20 reviewed papers in conference proceedings. I have also authored or co-authored more than 80 scientific or technical reports. In addition to graduate and undergraduate teaching, I have taught many continuing education short courses to professionals in practice. My consulting clients include federal, state, and local government agencies; citizens' environmental groups; and private firms that work for these entities, primarily on the West Coast of the United States and Canada but in some instances elsewhere in the nation.

Over an 18-year period I spent a major share of my time as the principal investigator on two extended research projects concerning the ecological responses of freshwater resources to urban conditions and the urbanization process. I led an interdisciplinary team for 11 years in studying the effects of human activities on freshwater wetlands of the Puget Sound lowlands. This work led to a comprehensive set of management guidelines to reduce negative effects and a published book detailing the study and its results. The second effort, extending 10 years, involved an analogous investigation of human effects on Puget Sound's salmon spawning and rearing streams. These two research programs had broad sponsorship, including the U.S. Environmental Protection Agency, the Washington Department of Ecology, and a number of local governments.

I have helped to develop stormwater management programs in Washington State, California, and British Columbia and studied such programs around the nation. I was one of four principal participants in a U.S. Environmental Protection Agency-sponsored assessment of 32 state, regional, and local programs spread among 14 states in arid, semi-arid, and humid areas of the West and Southwest, as well as the Midwest, Northeast, and Southeast. This evaluation led to the 1997 publication of "Institutional Aspects of Urban Runoff Management: A Guide for Program Development and Implementation" (subtitled "A Comprehensive Review of the Institutional Framework of Successful Urban Runoff Management Programs").

My background includes 19 years of work in California, where I have been a federal court-appointed overseer of stormwater program development and implementation at the city and county level and for two Caltrans districts. I was directly involved in the process of developing the 13 volumes of Los Angeles County's Stormwater Program Implementation Manual, working under the terms of a settlement agreement in federal court as the plaintiffs' technical representative. My role was to provide quality-control review of multiple drafts of each volume and contribute to bringing the program and all of its elements to an adequate level. I have also evaluated the stormwater programs in San Diego, Orange, Riverside, San Bernardino, Ventura, Santa Barbara, San Luis Obispo, and Monterey Counties, as well as a regional program for the San Francisco Bay Area. My clients in these cases include Natural Resources Defense Council, Santa Monica Baykeeper, Orange County Coastkeeper, Ventura Coastkeeper, Santa Barbara Channelkeeper, Russian Riverkeeper, and San Diego Coastkeeper. At the recommendation of the latter organization, I have been a consultant on stormwater issues to the City of San Diego, the San Diego Unified Port District, and the San Diego County Regional Airport Authority.

For the last six years I have been a member of Salmon-Safe's assessment team. Salmon-Safe is an organization based in Portland, Oregon that certifies academic and professional campuses and other developed lands for maintaining practices supportive of salmon protection and recovery. We have assessed numerous parcels in Oregon and Washington and extended certification to those whose practices met our criteria or conditions imposed to achieve certification.

I was a member of the National Academy of Sciences-National Research Council (NAS-NRC) committee on Reducing Stormwater Discharge Contributions to Water Pollution. NAS-NRC committees bring together experts to address broad national issues and give unbiased advice to the federal government. The present panel was the first ever to be appointed on the subject of stormwater. Its broad goals were to understand better the links between stormwater discharges and impacts on water resources, to assess the state of the science of stormwater management, and to apply the findings to make policy recommendations to the U.S. Environmental Protection Agency relative to municipal, industrial, and construction stormwater permitting. The committee issued its final report in October 2008.

April 10 and 11, 2013
Item No. 8
Supporting Document No. 5

INVESTIGATION OF THE FEASIBILITY AND BENEFITS OF LOW-IMPACT SITE DESIGN PRACTICES APPLIED TO MEET VARIOUS POTENTIAL STORMWATER RUNOFF REGULATORY STANDARDS

By

Richard R. Horner[1] and Jocelyn Gretz[2]

Report to

U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

From

Natural Resources Defense Council
1314 Second Street
Santa Monica, CA 90401

December, 2011

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[2] Master's of Environmental Science & Management, Bren School of Environmental Science & Management, University of California, Santa Barbara, California.

EXECUTIVE SUMMARY

STUDY DESIGN

A study was performed to investigate the degree to which stormwater management practices, commonly referred to as “low-impact development” methods or “green infrastructure,” can retain urban runoff and meet five possible regulatory standards that could be applied nationally. Retention is defined as preventing the conversion of precipitation to runoff discharging from a development site on the surface, from where it can enter a receiving water. Retaining runoff from impervious and pollutant generating pervious surfaces prevents the introduction of urban runoff pollutants to receiving waters as well as reduces runoff volume to prevent stream channel and habitat damage, flooding, and loss of groundwater recharge. ARCD methods were assessed for their ability to: (1-2) meet standards pertaining to retention of the runoff generated by the 85th and 95th percentile, 24-hour precipitation events; (3) retain 90 percent of the post-development runoff; and (4-5) retain the difference between the post- and pre-development runoff, both with and without a cap at the 85th percentile, 24-hour event. The study assessed five urban land use types (three residential, one retail commercial, and one infill redevelopment), each placed in four climate regions in the continental United States on two regionally common soil types.

Infiltrating bioretention was applied as an initial strategy in the analysis of each case. When the initial strategy could not fully retain post-development runoff, additional methods were applied, involving roof runoff harvesting in the most impervious development cases and roof water dispersion in those with substantial pervious area. Benefits were assessed with respect to reduction of the annual average surface runoff volume from the quantity estimated without any stormwater management practices, the associated maintenance of pre-development groundwater recharge, and water quality improvement achieved through preventing discharge to receiving waters of pollutants generated with developed land uses.

RETENTION AND POLLUTANT REDUCTION CAPABILITIES

The initial strategy of infiltrating bioretention could retain all post-development runoff and pre-existing groundwater recharge, as well as attenuate all pollutant transport, in the three residential land use development types on hydrologic soil group (HSG) B soils, in all cases, in all regions, taking a fraction of the available pervious area to do so. For the more highly impervious commercial retail and redevelopment cases, bioretention would retain about 45 percent of the runoff and pollutants generated and save about 40 percent of the pre-development recharge. Adding roof runoff management measures in these cases would approximately double retention and pollutant reduction for the retail commercial land use and raise it to 100 percent for the redevelopment. Results were generally similar with HSG C soils, although more of the pervious portion of sites was required to equal the retention seen on B soils.

For development on the D soils in all climate regions, use of roof runoff management techniques was estimated to increase runoff retention and pollutant reduction from zero to between about one-third to two-thirds of the post-development runoff generated, depending on the land use case. These strategies would offer little groundwater recharge benefit with this soil condition, but would still have the potential to significantly reduce runoff volume and pollutant loading.

ABILITY TO MEET STANDARDS

The projected ability to meet the five standards identified above was found to vary mostly in relation to soil type (B or C versus D) and the relative imperviousness of development. The ability to meet the five standards varied much less across climate regions. With B and C soils, the methods considered were projected to meet all five standards in all but 12 of 125 evaluations. With D soils, however, only three standards could be met at all and those only occasionally. However, even on D soils, all cases for Standard 1 (retention of the 85^{th} percentile, 24-hour precipitation event) were able to retain greater than 50 percent of the required runoff volume. Moreover, opportunities to use ARCD practices or site design principles not modeled in this analysis have the potential to further increase runoff retention volume.

Standard 3 (retain 90 percent of the average annual post-development runoff volume) would be the most environmentally protective standard. Meeting or coming as close as possible to meeting, but not exceeding, this standard was estimated to lead to 66-90 percent of total runoff retention and pollutant loading reduction on B and C soils and 37-66 percent runoff retention on D soils. Standard 2 (retain the runoff produced by the 95^{th} percentile, 24-hour precipitation event) would yield equivalent protection on D soils and only slightly less protection with B and C soils. The outcome with this standard would also be more consistent region to region than with the alternative standard 1, based on the 85^{th} instead of the 95^{th} percentile precipitation event. Sites located on B or C soils were able retain the runoff produced by the 85^{th} percentile storm in 24 of 25 cases modeled (in 18 of the 25 cases by using infiltrating bioretention alone), and were able to retain the runoff produced by the 95^{th} percentile storm in 22 of 25 cases modeled.

Standards 4 and 5, based on the differential between pre- and post-development runoff volume, are inconsistent in retaining runoff and reducing pollutants, in that they are relatively protective where pre-development runoff is estimated to be low relative to post-development flow, but result in progressively lower retention and pollutant loading reduction as pre- and post-development volumes converge, such as in several cases on D soils. Standard 5 is especially weak in this regard. The potentially low level of retention and pollutant loading reduction renders these standards based on the change in pre- versus post-development runoff volume poor candidates for national application, at least as formulated in these terms.

In summary, standards 2 and 3 are clearly superior to the other three options from both a volume and pollutant load reduction standpoint. Standard 3 is entirely consistent from place to place in degree of environmental protection, and standard 2 does not deviate much. Analysis of the five development cases on two soil groups in each of four regions demonstrated the two standards are virtually identical in the runoff retention and pollutant loading reduction they would bring about. Of the remaining standards, standard 1 (retantion of the runoff produced by the 85^{th} percentile storm event) remains more consistent across regions and more protective of water quality for development on D soils than either standard 4 or 5, and is preferable to those standards in this regard.

INTRODUCTION

GENERAL STUDY DESCRIPTION

Study Design

This purpose of this study was to investigate the degree to which low-impact development (LID) [1] practices can meet or exceed the requirements of various potential stormwater management facility design standards and to determine the environmental benefits that can be realized by applying these techniques. The investigation was performed by estimating the stormwater retention possible with full application of low-impact options under a range of conditions broadly representative of different regions within the United States and then determining the implications of the findings for achieving various standards and for providing benefits. Retention is defined as preventing the conversion of precipitation to surface runoff from urbanized land uses through infiltration, evapotranspiration, and/or harvesting for some water supply purpose. Retaining runoff from impervious and pollutant generating pervious surfaces prevents the introduction of urban runoff pollutants to receiving waters as well as reduces runoff volume to prevent stream channel and habitat damage, flooding, and loss of groundwater recharge. Benefits were assessed with respect to reduction of the potential developed land surface runoff volume, the associated maintenance of pre-development groundwater recharge, and water quality improvement achieved through preventing discharge to receiving waters of pollutants generated with developed land uses.

The potential regulatory standards investigated were capture and retention of, at minimum:

- Standard 1—The runoff produced by the 85th percentile, 24-hour precipitation event,[2] a standard commonly used in California;
- Standard 2—The runoff produced by the 95th percentile, 24-hour precipitation event, the standard adopted under Section 438 of the Energy Independence and Security Act;
- Standard 3—90 percent of the average annual post-development runoff volume;
- Standard 4—The difference between the post- and pre-development[3] average annual runoff volumes; and
- Standard 5—The difference between the post- and pre-development runoff volumes for all events up to and including the 85th percentile, 24-hour precipitation event.

Conditions broadly representative of the nation were selected by, first, considering the climate regions defined in USEPA's (1983) Nationwide Urban Runoff Project (NURP) report. For full analysis, climate regions 1 (Northeast-Upper Midwest), 3 (Southeast), 5 (South Central), and 6 (Southwest) were chosen as providing a wide range of climatological conditions and geographic distribution. Once the four regions were picked, a metropolitan area and a specific city in each were chosen to serve as typical models of development circumstances in the general area, as

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[1] The National Research Council (NRC, 2009) renamed LID, also known as green infrastructure, as aquatic resources conservation design (ARCD), the term used henceforth in this report.

[2] The 85th percentile, 24-hour event represents the precipitation quantity in a 24-hour period not exceeded in 85 percent of all events in an extended record.

[3] In this study the pre-development state is taken as the typical land cover existing before European settlement of an area.

detailed in the Case Studies discussion below. In addition, region 7 (Pacific Northwest) was identified as an additional location to be discussed. This region is the site of a considerable amount of ARCD application in an area somewhat different climatologically than other selected regions, in having persistent winter rainfall totaling annually, in the major urban areas, intermediately among the other regions. Results of research on ARCD conducted in this region are discussed at several points in this report.

Soils and topography were the next considerations in developing broadly representative conditions. U.S. Department of Agriculture websites were the source of general soil characterizations for the study regions and specific soil survey data in and around the representative metropolitan areas. Soils generally represented some range in textural classes and associated hydraulic conductivities. For each region, a soil type predominating among those representing hydraulic conductivities relatively high and low for the region were selected to serve as a basis for the analyses. The effect of slope was also investigated but ultimately found not to affect results substantially.

Five types of urban development were selected to represent breadth in land use: (1) multi-family residential, (2) small-scale single-family residential, (3) large-scale single-family residential, (4) large-scale commercial, and (5) infill redevelopment. Building permit data from each region were consulted to determine typical distributions of site features for each (e.g., land cover by buildings, parking areas, roadways, walkways, driveways, landscaping).

Case studies thus comprised four climate regions, each with two soil conditions and five land use types, for a total of 40 permutations. For each, the ability of the site to accommodate soil- and vegetation-based ARCD practices was investigated. Runoff quantities were estimated and compared to the five potential regulatory standards. Annual mass loading discharges were estimated for four pollutants: total suspended solids (TSS), total recoverable copper (TCu) and zinc (TZn), and total phosphorus (TP). In any case where soil- and vegetation-based ARCD infiltration techniques appeared not to be able to attenuate all runoff, specific roof runoff management strategies were investigated as possible measures to achieve additional retention. Runoff quantities and pollutant discharges were recalculated based on use of these additional practices in place.

This report covers the methods employed in the investigation, data sources, and references for both. It then presents the results, discusses their consequences, draws conclusions, and makes recommendations relative to the feasibility of utilizing low-impact development practices to meet the respective potential regulatory standards.

AQUATIC RESOURCES CONSERVATION DESIGN PRACTICES

<u>General Description</u>

As the stormwater management field developed, it passed through several stages. First, it was thought that the key to success was to match post-development with pre-development peak flow rates, while also reducing a few common pollutants (usually, TSS) by a set percentage. Finding that these efforts generally required large ponds, but that they did not forestall impacts, stormwater managers next deduced that runoff volumes and high discharge durations would also have to decrease. Almost simultaneously, although not necessarily in concert, the idea of low-impact development arose to offer a way to achieve actual avoidance, or at least minimization, of discharge quantity and pollutant increases reaching far above pre-development levels. These methods reduce storm runoff and its contaminants by decreasing their generation at sources, infiltrating into the soil or evaporating or transpiring[4] storm flows before they can enter surface receiving waters, and treating flow remaining on the surface through contact with vegetation and soil, or a combination of these strategies.

The National Research Council ("NRC") (2009) renamed LID as Aquatic Resources Conservation Design (ARCD) for several reasons. First, this term signifies that the principles and many of the methods apply not only to building on previously undeveloped sites, but also to redeveloping and retrofitting existing development. Second, incorporating aquatic resources conservation in the title is a direct reminder of the central reason for improving stormwater regulation and management. ARCD encompasses the complete range of practices to counteract all negative urban runoff impacts; i.e., the full suite of practices that emphasize and accomplish retention as defined above. These practices aim at decreasing surface runoff peak flow rates, volumes, and elevated flow durations, as well as avoiding or at least minimizing the introduction of pollutants to any surface runoff produced. Reducing the concentration of pollutants, together with runoff volume decrease, cuts the cumulative mass loadings (mass per unit time) of pollutants entering receiving waters over time.

The menu of ARCD practices begins with conserving, as much as possible, existing trees, other vegetation, and soils, as well as natural drainage features (e.g., depressions, dispersed sheet flows, swales). Clustering development to affect less land is a fundamental practice advancing this goal. Conserving natural features would further entail performing construction in such a way that vegetation and soils are not needlessly disturbed and soils are not compacted by heavy equipment. Using less of polluting materials, isolating contaminating materials and activities from contact with rainfall or runoff, and reducing the introduction of irrigation and other non-stormwater flows into storm drain systems are essential. Many ARCD practices fall into the category of minimizing impervious areas through decreasing building footprints and restricting the widths of streets and other pavements to the minimums necessary. Another important category of ARCD practices involves directing runoff from roofs and pavements onto pervious areas as sheet flow, where all or much of the runoff can infiltrate or evaporate in many situations.

Water can be harvested from impervious surfaces, especially roofs, and put to use for irrigation, non-potable indoor water supply. Harvesting is a standard technique for Leadership in Energy and Environmental Design (LEED) buildings (U.S. Green Building Council, 2008). Many successful systems of this type are in operation, with examples such as the Natural Resources Defense Council offices (Santa Monica, CA), the King County Administration Building (Seattle, WA), and two buildings on the Portland State University campus (Portland, OR). Harvesting is feasible at the small scale using rain barrels and at larger scales using larger collection cisterns and piping systems. These small-scale applications have been used throughout the world for centuries and are rapidly spreading in the United States today (See, e.g., Texas Water Development Board, 2005; Georgia Department of Community Affairs, 2009).

If these practices are used but runoff is still produced, ARCD offers an array of techniques to retain it on-site through infiltration and evapotranspiration (ET). The bioretention cell (rain garden) is the workhorse practice in this category, but swales conveying flow slowly, filter strips set up for sheet flows, and other modes are also important. Relatively low traffic areas can be constructed with permeable surfaces such as porous asphalt, open-graded Portland cement concrete, coarse granular materials, concrete or plastic unit pavers, or plastic grid systems to allow for infiltration.

[4] Transpiration refers to vaporization of water from plant tissue, while evaporation applies to vaporization from a liquid (e.g., pool) or solid (e.g., leaf) surface. The terms are often combined to form the compound evapotranspiration (ET).

ARCD practices should be selected and applied as close to sources as possible to stem runoff and pollutant production near the point of potential generation. However, these practices must also work well together and, in many cases, must be supplemented with strategies operating farther downstream. For example, the City of Seattle, in its "natural drainage system" retrofit initiative, built serial bioretention cells flanking relatively flat streets. "Cascades" of vegetated stepped pools created by weirs were installed along more sloping streets. In some cases the cells drain to downstream cascades. The upstream components are highly effective in attenuating most or even all runoff. Flowing at higher velocities on sloped surfaces, the cascades do not perform at such a high level, although under favorable conditions they can still infiltrate or evapotranspire the majority of the incoming runoff (Chapman 2006, Chapman and Horner 2010). Even if not as impressive statistically, cascades can actually decrease storm discharge to streams more than the cells do, because of their generally greater size. Also, the cascades extract pollutants from remnant runoff through mechanisms mediated by vegetation and soils. The success of Seattle's natural drainage systems demonstrates that well designed ARCD practices can mimic natural landscapes hydrologically, and thereby avoid raising discharge quantities.

A watershed-based program emphasizing ARCD practices would convey significant benefits beyond greatly improved stormwater management. ARCD techniques overall would advance water conservation, and infiltrative practices would increase recharge of groundwater resources. ARCD practices can be made attractive and thereby improve neighborhood aesthetics and property values. Retention of more natural vegetation can both save wildlife habitat and provide recreational opportunities. Municipalities could use the program in their general urban improvement initiatives, giving incentives to property owners to contribute to goals in that area while also protecting water resources.

A Catalogue of ARCD Practices

ARCD practices are numerous and expanding as existing configurations are applied in new ways. Table 1 presents a catalogue adapted from USEPA (2007) and NRC (2009). This catalogue contains practices that are not equally applicable in all settings; e.g., nevertheless, each category offers practices applicable in a broad variety of circumstances.

The best strategy for choosing among and implementing these practices is a decentralized, integrated one; i.e., selecting practices that fit together as a system, starting at or near sources and working through the landscape until management objectives are met. This strategy makes maximum possible use of practices in the first three categories, which prevent stormwater quantity and quality problems, and then selects among the remaining classifications in relation to the localized and overall site conditions. Source control and preservation of existing vegetation and soils obviously avoid post-development runoff quantity and pollutant increases from any portion of the site that can be so treated. Among all strategies, these best maintain natural infiltration and ET patterns and yield of materials flowing from the site. This preventive strategy is supplemented by strategies to create as little impervious cover as possible. The remaining practices then contend with the excess runoff and pollutants over pre-development levels generated by the development.

For the practices that infiltrate water, a site's soil characteristics and depth to groundwater can and should be determined through infiltration rate testing and excavation to determine the infiltration capability. Because of the often substantial variability of conditions around a site, these determinations should be made at multiple points. If the natural infiltration rate is low, generally < 0.5 inch/hour (< 1.25 cm/h, Geosyntec 2008), in many situations the soil can be amended, usually with organic compost, to apply an infiltrative practice.

In addition to soil characteristics, the position of the groundwater table is a crucial determinant of whether or not stormwater infiltration should be promoted by applying ground-based ARCD practices. A seasonal high water table too close to the surface results in rapid saturation of a thin soil column and retarded infiltration. Ponding water longer than 72 hours can permit mosquito growth, damage vegetation, and promote clogging of the facility by microorganism growths and polysaccharide organic materials that form in the reduced-oxygen environment accompanying excessive ponding time (Mitchell and Nevo 1964, Ronner and Wong 1996). Also, storm runoff flow through a short soil column or very rapidly through a coarse-textured soil can convey contaminants to groundwater.

Evidence gathering from available performance data is that evapotranspiration (ET) can be a substantial factor in water retention (discussed below) but may be difficult to quantify at a given site without more research. A conservative approach is to design on the basis of infiltration rate, calculated to include consideration of soil amendments, if any. Together with careful investigation of soils and hydrogeologic conditions, this means of proceeding is very likely to produce facilities that retain at least as much runoff as predicted, and almost certainly more as a result of unquantified ET.

Table 1. A Catalogue of Aquatic Resources Conservation Design Practices (USEPA [2007] and NRC [2009])

Category	Definition	Examples
Source control	Minimizing pollutants or isolating them from contact with rainfall or runoff	• Substituting less for more polluting products • Segregating, covering, containing, and/or enclosing pollutant-generating materials, wastes, and activities • Avoiding or minimizing fertilizer and pesticide applications • Removing animal wastes deposited outdoors • Conserving water to reduce non-stormwater discharges
Conservation site design	Minimizing the generation of runoff by preserving open space and reducing the amount of land disturbance and impervious surface	• Clustering development • Preserving wetlands, riparian areas, forested tracts, and porous soils • Reducing pavement widths (streets, sidewalks, driveways, parking lot aisles) • Reducing building footprints
Conservation construction	Retaining vegetation and avoiding removing topsoil or compacting soil	• Minimizing site clearing • Minimizing site grading • Prohibiting heavy vehicles from driving anywhere unnecessary
Runoff harvesting	Capturing rainwater, generally from roofs, for a beneficial use	• Using storage and distribution systems (rain barrels or cisterns) for irrigation and/or indoor supply for public and private buildings
Natural runoff conveyance practices	Maintaining natural drainage patterns (e.g., depressions, natural swales) as much as possible, and designing drainage paths to increase the time before runoff leaves the site	• Emphasizing sheet instead of concentrated flow • Eliminating curb-and-gutter systems in favor of natural drainage systems • Roughening land surfaces • Creating long flow paths over landscaped areas • When flow must be concentrated, using vegetated channels with flow controls (e.g., check dams)
Practices for temporary runoff storage followed by infiltration and/or evapotranspiration[a]	Use of soil pore space and vegetative tissue to increase the opportunity for runoff to percolate to groundwater or vaporize to the atmosphere	• Bioretention cells (rain garden) • Vegetated swales (channel flow) • Vegetated filter strips (sheet flow) • Planter boxes • Tree pits • Infiltration basins • Infiltration trenches • Roof downspout surface or subsurface dispersal • Permeable pavement • Vegetated (green) roofs
ARCD landscaping[b]	Soil amendment and/or plant selection to increase storage, infiltration, and evapotranspiration	• Organic compost soil amendments • Native, drought-tolerant plantings • Reforestation • Turf conversion to meadow, shrubs, and/or trees

[a] Some of these practices are also conventional stormwater BMPs but are ARCD practices when ARCD landscaping methods are employed as necessary to maximize storage, infiltration, and evapotranspiration. The first five examples can be constructed with an impermeable liner and an underdrain connection to a storm sewer, if full retention is technically infeasible (see further discussion later). Vegetated roofs store and evapotranspire water but offer no infiltration opportunity, unless their discharge is directed to a secondary, ground-based facility.
[b] Selection of landscaping methods depends on the ARCD practice to which it applies and the stormwater management objectives, but amending soils unless they are highly infiltrative and planting several vegetation canopy layers (e.g., herbaceous growth, shrubs, and trees) are generally conducive to increasing storage, infiltration, and evapotranspiration.

Application of ARCD Practices in This Study

The investigation performed for this study first assessed the capacity of each case study site to infiltrate the full average annual post-development storm runoff volume and thereby reduce pollutant releases to zero. The report terms this initial evaluation as the "Basic ARCD Analysis". The means of infiltration was not distinguished at this level of analysis. For example, it was not specified if runoff would be distributed in sheet flow across a pervious area or channeled into a rain garden. As detailed later in the Methods of Analysis section, this analysis was limited to the estimated infiltration capacity of the case study soil type, possibly compost-amended, and the available pervious area.

Critically, there was no attempt to estimate the loss of surface runoff through ET in the Basic ARCD analysis (ET is considered, to address rooftop runoff only, as part of our "Full ARCD analysis," discussed below). In general, the estimated mean annual evapotranspiration in the Southeast is about 70 percent of the precipitation, or roughly 35 inches per year. For large areas of the Southwest, evapotranspiration is virtually equal to 100 percent of the precipitation, which is only about 10 inches per year. The ratio of estimated mean annual evapotranspiration to precipitation is least in the mountains of the Pacific Northwest and New England where evapotranspiration is about 40 percent of the precipitation (Hanson, 1991). By leaving out these substantial losses, generally 40 percent of precipitation or more, the retention estimates in this study can be considered quite conservative.

Additionally, there was no consideration of many ARCD practices in the Table 1 catalogue that could be applied in site-specific design. For example, there were no refinements of the prevailing building standards to reduce street widths or cluster buildings and reduce their footprints. Further, green roofs were not considered in this study, although they are already making a contribution to runoff reduction around the nation and reflect a significant additional opportunity to retain runoff on-site. The U.S. EPA has stated that "a 3.5-4 in. (8 -10 cm) deep green roof can retain 50% or more of the annual precipitation." (U.S. EPA, 2009a). For water quality, we did not assume any source control implementation. Thus, actual site design could take advantage of substantial additional capabilities not considered in this study.

In cases where the practices incorporated in the initial level of analysis (infiltration through bioretention) did not, according to the estimates, fully attenuate post-development pollutant discharges, specific attention was directed at ways of extracting additional water from surface discharge by managing roof runoff. This assessment is called the "Full ARCD Analysis" in the report. The options broadly divide into harvesting water for a purpose such as irrigation and/or non-potable indoor supply, or making special provisions to infiltrate or evapotranspire roof runoff even if soil conditions are limiting. Harvesting applies best to relatively large developments having sufficient demand for the collected water. While single-family residences can harvest water into rain barrels or cisterns for lawn and garden watering, these containers may be small in volume relative to runoff production; and though opportunity exists, no credit was taken for them in this study. However, even in poorly infiltrating soils, options exist to disperse house roof runoff as sheet flow for storage in vegetation and soil until evapotranspiration and some infiltration occurs.

CASE STUDIES

CLIMATE REGIONS

Basis of Selection

The Nationwide Urban Runoff Project divided the nation into nine regions based on differences in volume, intensity, and duration of precipitation and interval between precipitation events (USEPA 1983). For broad representation of the U.S. generally this study chose regions 1 (Northeast-Upper Midwest), 3 (Southeast), 5 (South Central), and 6 (Southwest) for analysis. Table 2 provides the annual precipitation statistics from the NURP compilation.

Table 2. Precipitation Statistics (Means) for Four NURP Regions Selected for Study (USEPA 1983)

Region	Volume (inch)	Intensity (inch/hour)	Duration (hours)	Interval (hours)
1—Northeast-Upper Midwest	0.26	0.051	5.8	73
3—Southeast	0.49	0.102	5.2	89
5—South Central	0.33	0.080	4.0	108
6—Southwest	0.17	0.045	3.6	277

The selected regions represent a volume differential of about a factor of three, intensity variation of approximately two times, and inter-storm interval varying by almost four times. The NURP report shows coefficients of variation (mean/standard deviation) of greater than 1.0 for all of these means, indicating an overall high degree of dispersion.

Figure 1 visually depicts variation in mean annual precipitation across the continental United States. It shows that the selected regions are overall representative of the broadly prevailing range across the nation, particularly its major urban and still urbanizing areas.

Region 7 (Pacific Northwest) was also identified for discussion of research results on ARCD, although not full analysis. It has less intense (mean 0.024 inch/hour) but much more extended (mean 20.0 hours) precipitation compared to any other region in the nation. Mean storm volume ranks with region 3 (mean 0.48 inch); but fewer storms, especially in the summer, yield overall less total annual precipitation in lowland areas holding all urban development in region 7. It was of interest because of the already occurring use of ARCD techniques in a relatively rainy part of the country.

Representative Metropolitan Areas and Cities

Once the regions were identified, a metropolitan area within each area was chosen as a basis for assigning specific precipitation and development characteristics. The areas considered were USEPA-designated Urban Areas: “An urbanized area is a land area comprising one or more places – central place(s) – and the adjacent densely settled surrounding area – urban fringe – that together have a residential population of at least 50,000 and an overall population density of at least 1,000 people per square mile” (USEPA 2007). Stormwater regulations would have the most impact in areas that are being quickly developed, redeveloped, or both. Five of the twenty fastest growing counties in the nation from 2000 to 2009 were near Atlanta, GA and five were in the state of Texas (U.S. Census Bureau 2010). These statistics factored into the decision to focus on records from these regions.

Each selected metropolitan area is generally representative of its region in precipitation and development characteristics. Each is also undergoing relatively active new development and redevelopment, offering candidate locations where a prospective stormwater standard would frequently be applied. These metropolitan areas are: region 1—Boston, MA, region 3—Atlanta, GA, region 5—Austin, TX, and region 6—San Diego, CA

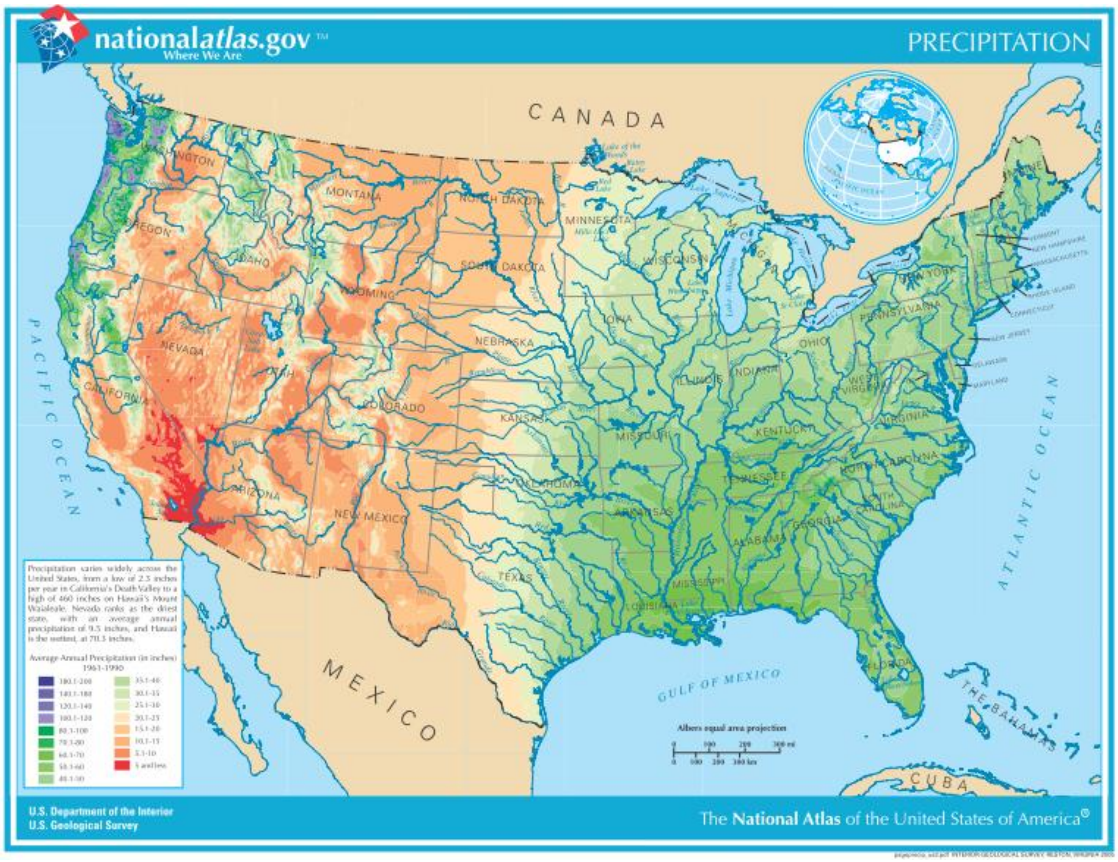

Figure 1. Precipitation of the Conterminous States of the United States, National Atlas of the United States, 2011.

Finally, a city with a high rate of development (and often redevelopment) was picked in each metropolitan area for investigation of building patterns and standards. The intent was to match regional patterns of climate, soils (see discussion on physiographic data, below), and land use and land cover realistically. After substantial investigation, the conclusion was that building standards, how land is used, and the relative allocation of impervious and pervious lands do not vary in any systematic way across the nation and cannot be regionally distinguished. Therefore, the variables of interest came down to precipitation and soils.

Alpharetta, about 30 miles north of Atlanta, represents that metropolitan area. In 1981 it was a small town of approximately 3,000 residents but grew to 51,243 by 2007. During the workday, the city swells to more than 120,000 residents, workers, and visitors. Alpharetta is home to large corporations such as AT&T (3500 employees), Verizon Wireless (3000 employees), and ADP, Inc./National Account Services (2100 employees). Infill redevelopment projects are anticipated in the downtown area (City of Alpharetta, 2011).

Round Rock is a typical developing city located 15 miles to the north of Austin, TX. In 1970 there were only 2,700 residents in this town, while today the population exceeds 100,000. Round Rock is the eighth-fastest growing city in the nation and the location of several large corporate campuses.

The Town of Framingham, 20 miles west of Boston, represents the northeastern climate zone. At nearly 67,000 inhabitants, Framingham is the largest entity designated as a “town” in the Commonwealth of Massachusetts. It is home to three large corporations and overall 2200 businesses providing 45,000 jobs. Differing greatly from the representative communities in other regions, Framingham was incorporated in 1700 and developed early in the nation's history. Today's activity includes redevelopment of brownfields and downtown revitalization, although some agricultural land still remains within the town limits (Town of Framingham, 2011).

San Marcos, representing the San Diego area and located about 35 miles north of the city, grew from a population of 17,479 in 1980 to 82,743 by 2008. Major institutions in the city include California State University San Marcos and Palomar Community College. At this stage the city is only approximately 72 percent built out, and thus new development continues (City of San Marcos, 2011).

Precipitation Data

Average monthly precipitation data were obtained from the NOAA Hourly Precipitation Data Rainfall Event Statistics[5] for one station with a long-term record in each region: Southeast—Atlanta/Hartsfield International Airport (Station #90451), South Central—Austin/Robert Mueller Municipal Airport (410428), Northeast—Boston/Logan International Airport (190770), and Southwest—San Diego/San Diego International Airport (Lindbergh Field) (47740). Atlanta receives the most precipitation, averaging about 49 inches per year, followed by Boston (47 inches/year), Austin (33 inches/year), and San Diego (10 inches/year). Figure 2 depicts precipitation variations over more than 50 years.

Values for either the 85th and 95th percentile, 24-hour storms were available in a number of state-specific resources, including the Georgia Stormwater Standards Supplement (Center for Watershed Protection 2009) and the Integrated Stormwater Management Program (North Central Texas Council of Governments 2010), as well as national publications such as an USEPA's technical guidance documents (USEPA 2009). However, few references had values for both 85th and 95th percentile storms. Therefore, these values were calculated following the methodology outlined in the USEPA's Technical Guidance on Implementing the Stormwater Runoff Requirements (USEPA 2009, page 30). Daily precipitation and temperature data from the National Climatic Data Center's TD Summary of the Day data set were collected and analyzed for the four stations lover a time period of 60 years, January 1, 1950 to January, 31 2010.

[5] National Climatic Data Center, Hourly Precipitation Data Rainfall Event Statistics (http://cdo.ncdc.noaa.gov/cgi-bin/HPD/HPDStats.pl, last accessed December 15, 2011).

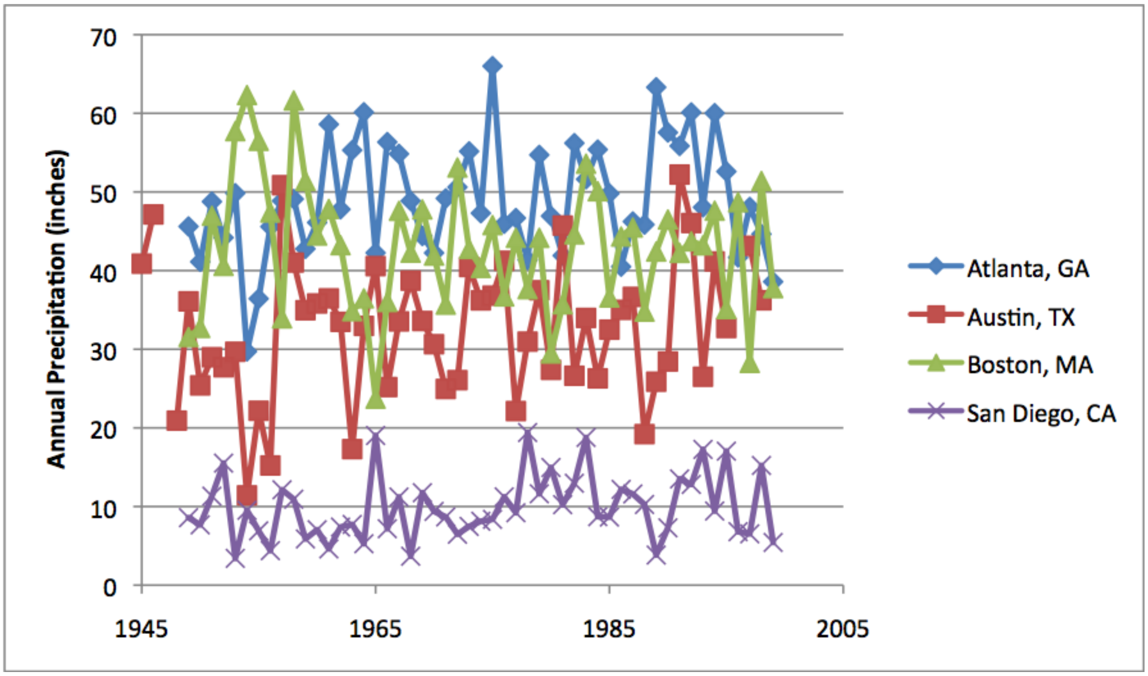

Figure 2. Average Annual Precipitation for Four Climate Regions over the Latter Part of the Twentieth Century (from NOAA Hourly Precipitation Data Rainfall Event Statistics, http://cdo.ncdc.noaa.gov/cgi-bin/HPD/HPDStats.pl)

For snowfall days, snow water equivalent (SWE) was calculated according to the guidelines provided by a National Climate Data Center's (NCDC) document, Estimating the Water Equivalent of Snow, utilizing the reported mean temperature for the day (National Climatic Data Center, accessed December 16, 2011). The NCDC tables calculate that the SWE is at most, about 10 percent of the total snowfall depth. In the methodology for determining the 85th and 95th percentile events, all days with < 0.1 inch precipitation are removed, lowering the impact of snow on the results. Snowfall had no effect in the Southwest region, a very minor effect in the Southeast and South Central, and still a relatively small effect in the Northeast, as follows: San Diego—0 snow days; Atlanta—74 of 4600 total days having ≥ 0.1 inch (1.6 percent), with a contribution ranging 0.01-0.79 inch precipitation; Austin—32 of 2418 days (1.3 percent), contributing 0.01-0.50 inch; and Boston—993 of 4783 days (20.8 percent), contributing 0.01-2.24 inch. Since snow does add to runoff that must be managed in a location like the Northeast, these snow water equivalents were left in the records. Table 3 summarizes precipitation data used in the analyses for the four regions.

Table 3. Precipitation Summary for Study Regions

Region	Average Annual Precipitation (inches)	85th Percentile, 24-Hour Event		95th Percentile, 24-Hour Event	
		Depth (inch)[a]	Fraction Covered[b]	Depth (inch)[a]	Fraction Covered[b]
Southeast	49.02	1.13	0.63	1.79	0.87
South Central	32.67	1.19	0.58	1.99	0.82
Northeast	47.03	1.07	0.81	1.72	0.89
Southwest	9.68	0.76	0.62	1.26	0.83

[a] Calculated from National Climatic Data Center's TD Summary of the Day, for all precipitation days >0.1 inch for period January 1, 1950 – December 31, 2009
[b] Fraction of total annual precipitation covered by event standard

Physiographic Data

General Methods

This section of the report covers the soils, groundwater, and topographic data underlying the analyses. Soil characteristics are largely a product of climate, geology and topography. The characteristics of most interest for this study were those controlling infiltration of surface water and percolation to an aquifer. Although there is variation within each climate region, the major soil orders can be used to identify regional characteristics. The Natural Resources Conservation Service (NRCS) website[6] describing the major soil orders and their locations was the initial source of these data. Maps generated by Miller and White (1998) gave information from the State Soil Geographic Database (STATSGO), including characteristics such as soil texture and hydrologic soil group. These resources were employed to gain a broad view of the soils in each of the four regions.

To extend the scope of the study, soils were investigated in the Upper Midwest, in addition to the Southeast, South Central, Northeast, and Southwest climate regions. Upper Midwest and Northeast soils share general similarities. Both regions also have temperate, seasonal, humid climates. While average annual precipitation is overall somewhat greater in the Northeast compared to the Upper Midwest, the two regions were deemed similar enough physiographically and climatologically to be considered together. This report henceforth groups them as the Northeast – Upper Midwest climate region.

To validate the regional patterns emerging from the general sources, custom “soil resource” reports for four cities were generated using the NRCS Web Soil Survey[7] tool. These reports collected characteristics related to infiltration rates and runoff including soil texture, hydrologic soil group, drainage classification, representative slope, and depth to water table. Using this tool requires selecting an “area of interest”. This examination utilized a size of at least 8,000 acres (10,000 acres is the maximum allowed) to insure a representative sample of soil and related conditions.

Hydrologic soil group assignment is a means of generally categorizing soils according to their tendency to admit and transmit water. The hydrologic soil group (HSG) is determined with respect to the water-transmitting soil layer with the lowest saturated hydraulic conductivity and depth to any layer that is more or less water impermeable (such as a fragipan or duripan) or depth to a water table. Box 1 summarizes the characteristics of the four HSGs (NRCS 2007).

The position of the groundwater table is a crucial determinant of whether or not stormwater infiltration should be promoted by applying ground-based ARCD practices. A seasonal high water table too close to the surface results in rapid saturation of a thin soil column and retarded infiltration. Ponding water longer than 72 hours can permit mosquito growth, damage vegetation, and promote clogging of the facility by microorganism growths and polysaccharide organic materials that form in the reduced-oxygen environment accompanying excessive ponding time (Mitchell and Nevo 1964, Ronner and Wong 1996). Also, storm runoff flow through a short soil column or very rapidly through a coarse-textured soil can potentially convey contaminants to groundwater. To avoid entertaining stormwater management strategies threatening development of these problems, data on depth to groundwater was obtained from the U.S. Geological Survey’s (USGS) Groundwater-Level Annual Statistics (USGS 2011).

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[6] Natural Resources Conservation Service, Distribution Maps of Dominant Soil Orders (http://soils.usda.gov/technical/classification/orders/, last accessed December 16, 2011).

[7] Natural Resources Conservation Service, 2011, Web Soil Survey (http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm).

Topographic slope influences runoff production by setting incident precipitation in motion downslope, thus producing a horizontal component of velocity vector partially counteracting the tendency to penetrate the soil vertically. This study investigated that importance of that effect by considering two slopes typical of urban development sites. As discussed during the presentation of results, below, this factor did not have a large effect on the analysis.

Box 1. Summary of Hydrologic Soil Groups (NRCS 2007)

Group A—Soils in this group have low runoff potential when thoroughly wet. Water is transmitted freely through the soil. Group A soils typically have less than 10 percent clay and more than 90 percent sand or gravel and have gravel or sand textures. Some soils having loamy sand, sandy loam, loam or silt loam textures may be placed in this group if they are well aggregated, of low bulk density, or contain greater than 35 percent rock fragments. The saturated hydraulic conductivity of all soil layers exceeds 5.67 inches per hour. The depth to any water-impermeable layer is greater than 20 inches. The depth to the water table is greater than 24 inches. Soils deeper than 40 inches to a water-impermeable layer are in group A if the saturated hydraulic conductivity of all soil layers within 40 inches of the surface exceeds 1.42 inch per hour.[a]

Group B—Soils in this group have moderately low runoff potential when thoroughly wet. Water transmission through the soil is unimpeded. Group B soils typically have between 10 percent and 20 percent clay and 50 percent to 90 percent sand and have loamy sand or sandy loam textures. Some soils having loam, silt loam, silt, or sandy clay loam textures may be placed in this group if they are well aggregated, of low bulk density, or contain greater than 35 percent rock fragments. The saturated hydraulic conductivity in the least transmissive layer between the surface and 20 inches ranges from 10.0 1.42 to 5.67 inches per hour. The depth to any water-impermeable layer is greater than 20 inches. The depth to the water table is greater than 24 inches. Soils deeper than 40 inches to a water- impermeable layer or water table are in group B if the saturated hydraulic conductivity of all soil layers within 40 inches of the surface exceeds 0.57 inch per hour but is less than 1.42 inch per hour.

Group C—Soils in this group have moderately high runoff potential when thoroughly wet. Water transmission through the soil is somewhat restricted. Group C soils typically have between 20 percent and 40 percent clay and less than 50 percent sand and have loam, silt loam, sandy clay loam, clay loam, and silty clay loam textures. Some soils having clay, silty clay, or sandy clay textures may be placed in this group if they are well aggregated, of low bulk density, or contain greater than 35 percent rock fragments. The saturated hydraulic conductivity in the least transmissive layer between the surface and 20 inches is between 0.14 and 1.42 inch per hour. The depth to any water-impermeable layer is greater than 20 inches. The depth to the water table is greater than 24 inches. Soils deeper than 40 inches to a restriction or water table are in group C if the saturated hydraulic conductivity of all soil layers within 40 inches of the surface exceeds 0.06 inch per hour but is less than 0.57 inch per hour.

Group D—Soils in this group have high runoff potential when thoroughly wet. Water movement through the soil is restricted or very restricted. Group D soils typically have greater than 40 percent clay, less than 50 percent sand, and have clayey textures. In some areas, they also have high shrink-swell potential. All soils with a depth to a water-impermeable layer less than 20 inches and all soils with a water table within 24 inches of the surface are in this group, although some may have a dual classification if they can be adequately drained. For soils with a water-impermeable layer at a depth between 20 and 40 inches, the saturated hydraulic conductivity in the least transmissive soil layer is less than or equal to 0.14 inch per hour. For soils deeper than 40 inches to a restriction or water table, the saturated hydraulic conductivity of all soil layers within 40 inches of the surface is less than or equal to 0.06 inch per hour.

[a] While Group A soils are present across large areas of the country, our analysis considers only Group B, C, and D soils to provide a conservative assessment of infiltration potential in urban areas, and to account for potential issues such as soil compaction that may occur for lawn and other landscaping in urban and suburban development.

Southeast Climate Region

The major soil order found throughout the southeastern United States is Utisols, sub-order Udults. The humid climate with frequent rainfall gives the soils an udic moisture regime; soils are rarely dry for more than 45 consecutive days. Utisols are highly weathered and are deficient in calcium and other bases. Georgia is known for its red soils, which are the unhydrated iron oxides left in the weathered material. Pre-European contact, these soils supported mixed conifer and deciduous woodlands. Due to its relatively flat topography and warmer temperatures, Florida has primarily Spodosols, Alphisols and Histosols (Soil Survey Staff, NRCS 2011).

This region has a variety of soil textures, ranging from sand and sandy loam throughout Mississippi, Alabama, and Georgia; silty loam soils near the Appalachian Mountains; and some areas with significant organic materials in Florida. The major soil hydrologic groups of the region are varied as well, with C and D soils dominating the Georgia coastline and most of Florida. Group A and B soils are more prevalent in the interior parts of the region, in central Georgia and Alabama (Miller and White 1998).

A NRCS web soil survey was conducted for an area of interest (AOI) centered in Alpharetta, GA. The selected AOI did not have complete soil survey coverage, and findings were compared with another AOI of 8990.5 acres north of the city in Fulton County. In both AOIs, the leading HSG is B (86 percent of AOI), followed by group C (11 percent of AOI). Approximately 97 percent of the AOI has a sandy loam soil texture. The leading drainage classification was well drained (86 percent of AOI), followed by somewhat poorly drained (10 percent of AOI). The selected AOI was moderately steep, with approximately 70 percent of the AOI having slopes between 8 and 12 percent.

Fulton County, Georgia has four wells in the USGS record, three with depth-to-groundwater data. Two wells have only one recorded depth: site 08CC08 had a depth of 2.447 ft in 1986, and site 10DD01 had a depth of 16.131 ft in 1968. Site 10DD02 has been monitored annually from 1977-2010 and has an annual well-depth average in this time period of 6.292 ft.

South Central Climate Region

The major soil order in Texas is Mollisols, sub-order ustolls. These soils span the sub-humid and semiarid climate zones, and are common on the western Great Plains and throughout the Rocky Mountain States. These soils originally supported grasslands and (in mountainous regions) forests, and now are ranched or farmed. Houston black soils are also characteristic of the region and are important in agriculture and urban areas, occurring throughout central Texas. Dry soils in the Order Aridisols, sub-orders Argids and Calcids, are found in west Texas and large portions of New Mexico as well. These soils were formerly sparsely vegetated areas, now used for rangeland or wildlife habitat (Soil Survey Staff, NRCS 2011).

Soil characteristic maps generated by Miller & White (1998) indicate that the majority of soil types in the South Central climate region are diverse: sandy loam and clay dominate eastern Texas, clay soils are prevalent in central parts of the state and loam soils are in western Texas and New Mexico. Most soils tend to be in the C and D hydrologic groups, however B soils are found in bands in New Mexico (Miller & White, 1998).

A web soil survey was conducted for an area of interest of 8267.5 acres centered in Round Rock, TX. The leading HSG is D (68 percent of AOI), followed by group C (22 percent of AOI) and group B (10 percent). Primary soil textures are clay (33 percent), silty clay (27 percent), extremely stony clay (17 percent), and silty clay loam (10 percent). The leading drainage classification is well drained (79 percent of AOI) followed by moderately well drained (21 percent). The selected AOI is relatively flat; approximately 70 percent of the AOI has slopes under 2 percent, and 20 percent has slopes of 3-4 percent.

Travis County, Texas had three wells that were measured in 2003 and recorded by USGS (site YD-58-50-216) and 2004 (sites YD-58-50-216 and YD-58-25-907). Groundwater is very deep in each location, averaging 220 ft below the ground surface.

Northeast – Upper Midwest Climate Region

This climate region has significant variation in dominant soil orders. The Spodsols order, sub-order Orthods, dominates the northern portions (northern Minnesota, Wisconsin, Michigan, Vermont, and Maine) and is generally considered infertile without soil amendments. Inceptisols, sub-order Udepts, are also prevalent in the region, especially in New England states, through the Appalachian Mountains and northeastern Minnesota. Alfisols, sub-order Udalfs, too are prevalent in the region, extending from Minnesota east to New York. These two soils both have an udic moisture regime, and are rarely dry for more than 45 consecutive days due to the year-round precipitation in the area (Soil Survey Staff, NRCS 2011). The state soil of Massachusetts is the Paxton fine sandy loam and also extends into New Hampshire, New York and Vermont. These deep soils were formed in acid subglacial till and are derived from schist, gneiss and granite (NRCS undated).

Based on maps generated by Miller and White (1998), sandy loam and silt loam soils tend to dominate the region, with small areas of clay and silty clay soils. Hydrologic soil group B is most prevalent in the Midwestern states (Minnesota, Wisconsin, Illinois), and Group C is most common in the rest of the region, spanning from Indiana to Maine. The region primarily supported forest ecosystems before development.

A web soil survey was conducted for an area of interest centered in Framingham, MA with an AOI of 8645.6 acres. The region has relatively equal amounts of each HSG: 20 percent of the AOI in Group A, 19 percent in group B, 20 percent in Group C, and 24 percent in Group D. Soil textures represented are fine sandy loam (49 percent), muck (10 percent), loamy sand (9 percent), and moderately decomposed plant material (8 percent). The leading drainage classification is well drained (32 percent of AOI) followed by very poorly drained (16 percent), somewhat excessively drained (12 percent), and moderately well drained (11 percent). Fourteen percent of the AOI has slopes of 1 percent or less, with 18 percent at 2-5 percent, 23 percent at 6-8 percent, and another 23 percent at 8-12 percent slopes.

There are three wells in the USGS record for Middlesex County, MA including 5 years of record for an Acton well averaging 17.75 ft, 6 years for the Wakefield well with an average depth of 6.59 ft, and 11 years at the Wilmington well with an average of 8.09 ft.

Southwest Climate Region

There are multiple soil orders in California due to its variation in climate, topography and geologic history. Entisols occur in the southern parts of the state; sub-order Psamments is a frequently found sandy soil that makes productive rangeland. Order Mollisols, sub-order Xerolls, are freely drained and dry soils found in the Mediterranean climate along the coast of California. Pre-settlement ecosystems supported by these soils include oak savanna, grasslands, and chaparral. Current soils may be used as cropland or rangeland (Soil Survey Staff, NRCS 2011).

A web soil survey was conducted for an 8267.5-acre area of interest centered in San Marcos, CA. The leading HSG is D (58 percent of AOI), followed by group C (26 percent) and group B (14 percent). Soil texture include sandy loam (19 percent), coarse sandy loam (17 percent), silt loam (15 percent), very fine sandy loam (14 percent), loamy fine sand (12 percent), loam (7 percent), and clay (5 percent). The leading drainage classification is well drained (51 percent of AOI), followed by moderately well drained (34 percent). Approximately 10 percent of the AOI has slopes ≤ 5 percent, and 66 percent has slopes of 5-10 percent.

There are no groundwater records for San Diego County available on the USGS website. Data were collected from the California Department of Water Resource Water Data Library[8]. Ten wells west of San Marcos near Escondido were sampled in 1987. The depth to groundwater ranged from 2.0 to 28.1 ft for an average of 11.6 ft.

Summary of Physiographic Characteristics

Due to the large area of land encompassed in each climate region, it is difficult to select one location that is truly "representative" of the entire region. By selecting four cities that are spaced throughout the country with different climate and soil characteristics, however, this study can demonstrate the different potential for ARCD strategies in regions around the nation. Table 4 summarizes the major soils, groundwater, and topographic characteristics for these regions. Figure 3 shows the distributions of hydrologic soil groups in areas of interest investigated in the four metropolitan areas.

Table 4. Summary of Physiographic Data

Characteristic	Southeast	South Central	Northeast – Upper Midwest	Southwest
Main soil types	Sandy loam	Clay, clay loam	Sandy loam, silt loam	Sandy loam, loam
Hydrologic soil group near study site	B (GA, AL, SC)	D (TX)	C (Northeastern states)	D
Other hydrologic soil group in climate region	D (FL)	C (NM)	B (MN, WI, IL, MI)	C
Predominant pre-development land cover	Woods	Semi-arid herbaceous	Woods	Narrow-leaved chaparral
Predominant slopes	70% @ 8-12%	90% < 4%	65% < 12%	76% < 10%

LAND USE CASES

Five cases were selected to represent a range of urban development types considered to be representative of the nation. These cases involved: a multi-family residential complex (MFR), a relatively small-scale (23 homes) single-family residential development (Sm-SFR), a relatively large (1000 homes) single-family residential development (Lg-SFR), a sizeable commercial retail installation (COMM), and an urban redevelopment (REDEV).

Building permit records from the City of San Marcos in San Diego County, California provided data on total site areas for the first three cases, including numbers of buildings, building footprint areas (including porch and garage for Sm-SFR), and numbers of parking spaces associated with the development projects. Information was not as complete for cities in other regions, but what data was available indicated no substantial difference in these site features. Therefore, the San Marcos data were used for all regional case studies. This uniformity had the advantage of placing comparisons completely on the basis of the major variables of interest, climatological and soils characteristics.

[8] http://www.water.ca.gov/waterdatalibrary (last accessed December 16, 2011).

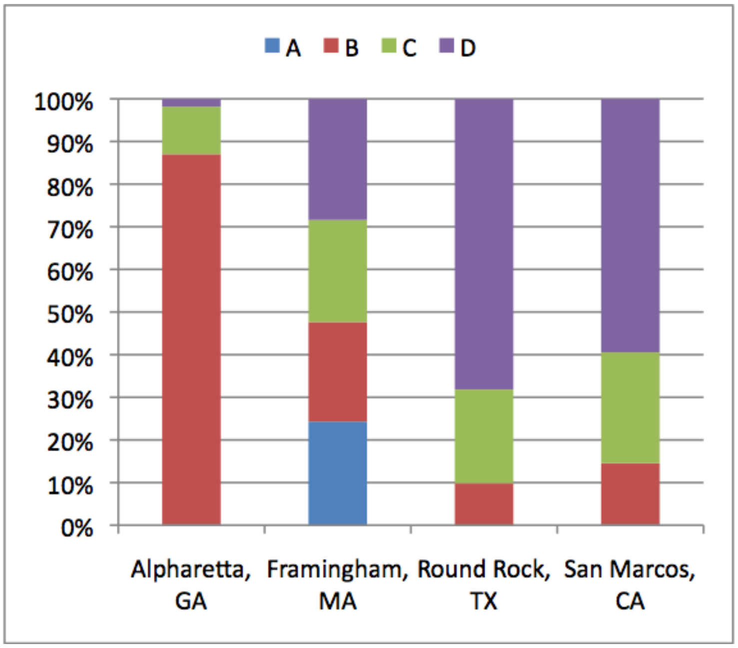


Figure 3. Distribution of Hydrologic Soil Groups in Four Study Cities

The REDEV case was taken from an actual project in Berkeley, California involving conversion of an existing structure, built originally as a corner grocery store, to apartments and addition of a new building to create a nine-unit, mixed-use, urban infill project. Space remained for a large side yard.

Larger developments were not represented in the sampling of building permits from the San Marcos database. To take larger development projects into account in the subsequent analysis, the two larger scale cases were hypothesized. The Lg-SFR scenario scaled up all land use estimates from the Sm-SFR case in the ratio of 1000:23. The hypothetical COMM scenario consisted of a building with a 2-acre footprint and 500 parking spaces. As with the smaller-scale cases, these hypothetical developments were assumed to have roadways, walkways, and landscaping, as described below.

While the building permit records made no reference to features such as roadways, walkways, and landscaping normally associated with development projects, these features were taken into account in the case studies using assumptions described herein. Parking spaces were estimated to be 176 square ft in area, which corresponds to 8 ft width by 22 ft length dimensions. Code requirements vary by jurisdiction, with the tendency now to drop below the traditional 200 square ft average. About 180 square ft is common, but various standards for full- and compact-car spaces, and for the mix of the two, can raise or lower the average (Gibbons, 2009). The 176 square ft size is considered to be a reasonable value for conventional practice.

Roadways and walkways assume a wide variety of patterns. Exclusive of the two SFR cases, simple, square parking lots with roadways around the four sides and square buildings with walkways also around the four sides were assumed. Roadways and walkways were taken to be 20 ft and 6 ft wide, respectively.

Each single-family residences (SFR) was assumed to have a lot area of 5749 square ft,, and a driveway 20 ft wide and 30 ft long. Assuming a square lot, each would have a sidewalk 76 feet by 4 feet wide, and a walkway that is 40 feet by 4 feet. .

Exclusive of the COMM case, the total area for all of these impervious features was subtracted from the total site area to estimate the pervious area, which was assumed to have conventional landscaping cover (grass, small herbaceous decorative plants, bushes, and a few trees). For the COMM scenario, an additional 10 percent was added to the building, parking lot, access road, and walkway area to represent the landscaping, on the belief that a typical retail commercial establishment would be mostly impervious.

Table 5 summarizes the characteristics of the five land use cases. The table also provides the recorded or estimated areas in each land use and cover type.

Table 5. Summary of Cases with Land Use and Land Cover Areas

	MFR[a]	Sm-SFR[a]	Lg-SFR[a]	COMM[a]	REDEV[a]
No. buildings	11	23	1000	1	2
Total area (ft^2)	476,982	132,227	5,749,000	226,529	5,451
Roof area (ft^2)	184,338	34,949	1,519,522	87,120	3,435
No. parking spaces[b]	438	-	-	500	2
Parking area (ft^2) [b]	77,088	-	-	88,000	316
Access road area (ft^2)	22,212	-	-	23,732	-
Walkway area (ft^2)	33,960	10,656	463,289	7,084	350
Driveway area (ft^2)	-	13,800	600,000	-	650
Landscape area (ft^2)	159,384	72,822	3,166,190	20,594	700

[a] MFR—multi-family residential; Sm-SFR—small-scale single-family residential; Lg-SFR—large-scale single-family residential; COMM—retail commercial; REDEV—redevelopment
[b] Uncovered

METHODS OF ANALYSIS

AVERAGE EVENT AND ANNUAL STORMWATER RUNOFF VOLUMES

Calculation Methods

Surface runoff volumes produced were estimated for both pre- and post-development conditions for each case study. The pre-development state was considered to be the predominant land cover for each region prior to European settlement.

For impervious areas, average event and annual runoff volumes were computed as the product of event or average annual precipitation, contributing drainage area, and a runoff coefficient (ratio of runoff produced to precipitation received) according to the familiar Rational Method equation. The runoff coefficient was determined from the equation C = (0.009) I + 0.05, where I is the impervious percentage. This equation was derived by Schueler (1987) from Nationwide Urban Runoff Program data (USEPA 1983). With I = 100 percent for fully impervious surfaces, C is 0.95.

The basis for pervious area runoff coefficients, for both the pre-development state and landscaped areas in developments, was the NRCS's Urban Hydrology for Small Watersheds (NRCS 1986, as revised from the original 1975 edition). This model estimates storm event runoff (R, inch) as a function of precipitation (P, inch) and a variable representing land cover and soil, termed the curve number (CN, dimensionless). CN enters the calculation via a variable S, which is the potential maximum soil moisture retention after runoff begins. The equations for English units of measurement are:

$$R = \frac{(P - 0.2S)^2}{P + 0.8S} \qquad\qquad S = \frac{1000}{CN} - 10$$

The runoff equation is valid for P > 0.2S, which represents the initial abstraction, the amount of water retained before runoff begins by vegetative interception and infiltration (NRCS 1986). According to this model, larger events are forecast to produce a greater amount of runoff in relation to amount of precipitation, because they more fully saturate the soil. Therefore, use of the model to estimate annual runoff requires selecting some event or group of events to compute an average runoff coefficient representing the year.

Average pre- and post-development pervious area average runoff coefficients were derived by computing runoff from a series of precipitation events ranging from 0.1 inch up to the 95th percentile, 24-hour event for the respective metropolitan areas, dividing by the associated precipitation, and averaging for all event amounts > 0.2S. Average annual runoff volumes for pervious areas were estimated based on these runoff coefficients and average annual precipitation quantities recorded at the respective gauging locations.

Curve Number Selection

Pre-development curve numbers were determined from existing studies and NRCS (1986) CN tables based on pre-European settlement land cover. Before development, woods predominated in Georgia and Massachusetts. Pre-development Texas had principally arid and semi-arid range with herbaceous cover. Chaparral was the predominant land cover in the San Diego area, however, this land cover type is not listed in the NRCS tables. For that region the selection came from a study by Easterbrook (undated) on curve numbers and associated soil hydrologic groups in an investigation of mainly chaparral lands before and after wildfires in the San Diego area.

Conversion to landscaping typical of development modifies soil and water infiltration characteristics by removing topsoil and even subsoil, compacting the remaining soil, and changing the vegetative cover. For pervious landscaping after development, CN was based on 1/8-acre urban development for all building types.

To demonstrate a range of results, runoff estimates were made for two soils in each region falling in B and C, B and D, or C and D HSGs. The more infiltrative soil was assumed to be in "good" condition and the less permeable one in "poor" condition, differentiations made in the NRCS tables. Table 6 summarizes the curve numbers used in the analyses. The paragraphs following the table detail how the selections were made for each region.

Table 6. Summary of Curve Numbers for Study Regions

	Southeast		South Central		Northeast – Upper Midwest		Southwest	
Hydrologic soil group-condition	B-good	D-poor	C-good	D-poor	B-good	C-poor	C-good	D-poor
Pre-development	55	83	74	93	55	77	77	90
Post-development	85	92	90	93	85	90	91	93

The Georgia Stormwater Manual Supplement recommends that watershed managers select curve numbers proposed by the NRCS based on hydrologic soil groups A through D and hydrologic condition of the site (Center for Watershed Protection 2009). As aforementioned, the pre-European land cover of the southeastern United States was forested. A study by Dyke (2001) in Forsyth and Hall Counties northeast of Atlanta confirmed that, immediately prior to development, approximately 50 percent of urban lands were forested, with 22 percent in agricultural use.

Because the region includes B soils in the interior of Alabama and Georgia, and poorly draining D soils in Florida and along the coasts, it was decided, for the purpose of demonstrating a range of results, to base NRCS Curve number values on B soils in good condition and D soils in poor condition. The corresponding pre- and post-development curve numbers are 55 and 83 and 85 and 92, respectively.

Prior to human development, approximately 80 percent of Texas, mostly in the central part, was covered in short and tall grassland communities; the western 10 percent of the state was desert grassland; and the eastern 10 percent was forested (University of Texas 2000). McLendon (2002) conducted a study on the observed and predicted curve numbers in 107 watersheds in Texas. For rural watersheds the CNs ranged from 48 to 88. The range in Austin was 49-89 and in Dallas 60-90. The Texas Department of Transportation's (2001) Hydraulic Design Manual Section 7 lists values for pre-development curve numbers for arid and semi- arid rangelands. Based on these sources, the respective pre- and post-development CN choices were 74 (C—good soil) and 93 (D—poor soil) and 90 (C—good soil) and 93 (D—poor soil).

Before European development, most of the Northeast – Upper Midwest region was covered in mixed hardwood and coniferous forests. A recent USGS report confirms that most urban development in the region from 1973 to 2000 has converted forestland (47 percent of all changes), followed by farmland (11 percent) (Auch undated). For this study's pre-development curve number, the woods cover type, soil group B in good condition and C soil in poor condition gave corresponding curve numbers of 55 and 77, respectively. Post-development curve numbers for these soil types at 1/8-acre development size were 85 and 90 for the good B and poor C soils, respectively. These post-development curve numbers are similar to a recent study in the Aberjona River watershed, an urban catchment northwest of Boston, where the authors used an overall CN of 89 to represent the more impervious parts of the watershed (Perez-Pedini et al. 2005).

With the lack of NRCS data for chaparral, CN selection for the San Diego area was based on an analysis performed in the area of the 2003 Cedar Fire in San Diego County by Easterbrook (undated). For pre-development C soils in good condition and D soils in poor condition, the choices were 77 and 90, respectively. Post-development curve numbers were selected from Easterbrook's estimation of CN after a high-burn fire; for good C soils CN = 91, and for poor D soils CN = 93.

Effect of Slope on Curve Number

NRCS documents developing the curve number concept and associated methods did not cover the effect of land slope. Independent researchers have given some attention to the question though. Sharpley and Williams (1990) introduced the empirical equation that has been most often used to adjust CN relative to slope:

$$CN_s = 0.333(CN_w - CN)(1 - 2e^{-13.86s}) + CN$$

where CN is the curve number reported in NRCS tables for an average soil moisture condition and assumed slope ≤ 5 percent, CN_s = slope-adjusted CN, CN_w = CN in an initially wet soil condition, and s = slope (ft/ft). Ward and Trimble provided factors to adjust tabulated CN values to obtain CN_w. Carrying through the analysis in this manner demonstrated that results deviated between two assessed slopes (5 and 10 percent) by only around 2-6 percent. This small difference was considered minimal in the context of the approximations and assumptions inherent in the modeling process. While the results presentation gives some additional data on slope effects, full coverage is given only for 5 percent, the topographic basis of the NRCS model and by far the subject of its greatest application.

ESTIMATING INFILTRATION CAPACITY OF THE CASE STUDY SITES

Infiltration Rates

Infiltrating sufficient runoff to maintain pre-development hydrologic characteristics and prevent pollutant transport is the most effective way to protect surface receiving waters. Successfully applying infiltration requires soils and hydrogeological conditions that will pass water sufficiently rapidly to avoid overly-lengthy ponding, while not allowing percolating water to reach groundwater before the soil column captures pollutants.

The study assumed that infiltration would occur in surface facilities and not in below-ground trenches. The use of trenches is certainly possible. However, the intent of this investigation was to determine the ability of pervious areas to manage the site runoff, and their exclusion is consistent with the conservative approach to modeling taken in this analysis. This inquiry was accomplished by evaluating the ability of the predominant soil types identified for each region to provide an infiltration rate of at least 0.5 inch/hour, the rate often regarded in the stormwater management field as the minimum for the use of infiltration practices (e.g., Geosyntec Consultants 2008). The assessment considered soils that either would provide this rate, at a minimum, in their original condition or could be organically amended to augment soil water storage and increase infiltration, while also safeguarding groundwater. Therefore, prevailing groundwater depths were assessed in relation to runoff percolation times generally regarded as safe.

Infiltration rates were based on saturated hydraulic conductivities (obtained from Leij et al. 1996) typical of the basic soil types incorporated in the U.S. Department of Agriculture (USDA, 1987) soil textural triangle. Sand, loamy sand, sandy loam have conductivities well above 0.5 inch/hour. As Table 4 indicates, three of the four regions have a sandy loam as the dominant soil type. For such a soil in the B HSG in these regions, the infiltration rate was taken as 1.74

inch/hour (Leij et al. 1996). Other textures represented that would generally fall in the C group are mostly loam and silt loam. These soil types either have conductivities in excess of 0.5 inch/hour or, in the first author's experience, can be and have been successfully organically amended to produce such a rate and infiltrate accumulated water within 72 hours, and usually less time. The D soils in some study regions, silty clay and clay, were regarded as not amendable to reach 0.5 inch/hour conductivity to host conventional or ARCD-type facilities designed specifically for infiltration. Still, locations with these soils could distribute sheet flow over pervious areas for evapotranspiration and some infiltration at slow rates and could utilize roof downspout surface or subsurface dispersal.

Groundwater Protection Assessment

Avoidance of groundwater contamination was assessed by assuming a hydraulic conductivity generally regarded as the maximum rate for the use of infiltration practices, 2.4 inches/hour (e.g., Geosyntec Consultants 2008), and a minimum spacing to seasonal high groundwater from the bed of an infiltration facility of 4 ft. These conditions would provide a travel time of 20 hours, during which contaminant capture would occur through soil contact. This 20-hour travel time was regarded as a minimum for any soil type. For example, infiltrating on loamy sand with a hydraulic conductivity of 5.7 inches/hour would require minimum spacing from the infiltration surface to groundwater of 10 ft. This consideration did not actually become an issue for analyses in any region in this study, because all predominant soil types have infiltration rates under 2.4 inches/hour and groundwater spacings that exceed 4 ft.

Site Infiltration Capacities

Runoff volumes were estimated for the 85th and 95th percentile, 24-hour events as described previously. Bioretention cell surface area to accommodate these volumes was calculated based on a method in the City of Santa Barbara's Storm Water BMP Guidance Manual (Geosyntec Consultants 2008) (adapted from the Georgia Stormwater Manual (Atlanta Regional Commission, 2001)):

$$A = \frac{(V_{design})(l)}{(t)(k_{design})(d + l)}$$

where:

V_{design} = design volume of runoff to be infiltrated (ft3);

k_{design} = design infiltration rate (in/hr), taken as 0.5 times the typical rate for the soil type naturally or amended as a safety factor;

d = ponding depth (ft), assumed as 0.25 ft for a shallow landscape feature on the recommendation of the Georgia manual;

l = depth of planting media (ft), assumed as 4 ft on the recommendation of the Georgia manual;

t = required drawdown time (hr), taken as 48 hours.

The design variable selections are conservative in applying a safety factor to hydraulic conductivity, using minimum depths for economy and limiting site disruption, and applying a drain time lower than the maximum of 72 hours.

In considering the long-term capacity of a facility designed to infiltrate, the potential for groundwater mounding below or aside the unit is a concern. To avoid this problem a basic analysis was made using a groundwater rise equation from Zomorodi (2005):

$$\text{Rise} = 0.86\,\frac{(K_v)(W)}{(K_h - K_v)}$$

where:

Rise = mounding occurring in a year of use (ft);

K_v = vertical saturated hydraulic conductivity (ft/year);

W = bioretention cell width (ft); and

K_h = horizontal saturated hydraulic conductivity (ft/year).

This equation was solved for K_v for computation of the allowable annual infiltration rate, assuming a rise limited to 1 ft. It was assumed that the bioretention surface area would be broken up to have no more than one basin for each 5 acres of total site area, another measure safeguarding against groundwater mounding. Also assumed was a square cell (i.e., W was computed as the square root of the surface area calculated according to the equation for A above). Horizontal hydraulic conductivites for loams such as represented among the B and C soils in the study regions tend to run in the range of 10 to 1000 meters/year (0.1 to 9 ft/day. A conservative value of 3 ft/day was used in the analysis.

The yearly rate of infiltration from a bioretention cell can be expressed in terms of volume of runoff per unit infiltrating surface area, acre-ft/acre-year, which is equivalent to K_v expressed as ft/year. The K_v value avoiding groundwater monitoring was therefore used to assess maximum annual infiltration capacity by multiplying by the total available pervious surface area. However, the K_v value was capped at a rate found in a study of infiltration capacity and benefits for Los Angeles' San Fernando Valley by Chralowicz et al. (2001). The Los Angeles study posited providing 0.1-0.5 acre for infiltration basins to serve each 5 acres of contributing drainage area. At 2-3 ft deep, it was estimated that such basins could infiltrate 0.90-1.87 acre-ft/year of runoff in San Fernando Valley conditions. Three types of soils predominate in the study area: sandy loams (35 percent of the area), a clay loam (23 percent), and a silty clay loam (29 percent). The balance of 13 percent includes small amounts at both ends of the textural spectrum, a clay and loamy sands. Infiltration rates are in the approximate range of 0.5-2.0 inches/hour, within the span generally regarded as ideal for successful infiltration without threatening groundwater. Computing the ratios of the rate and basin size data of Chralowicz et al. (2001), K_v maximized at approximately 20 acre-ft of runoff/acre infiltration surface-year under the most limiting conditions of soils and basin dimensions. This value was applied in this study if calculated rates were higher, another conservative feature to obtain the most realistic projections of infiltration potential.

In some cases analyzed, the maximum annual infiltration capacity was estimated at greater than post-development runoff volume production. In these instances complete retention would be possible with excess capacity left, and only a fraction of the available pervious area would have to be devoted to bioretention. That fraction was expressed as the ratio of annual runoff production to infiltration capacity.

STORMWATER RUNOFF VOLUME AND POLLUTANT DISCHARGES

Urban Land Use Pollutant Yields

Annual pollutant mass loadings prior to application of any stormwater management practices were estimated as the product of annual runoff volumes produced by the various land use and cover types and pollutant concentrations typical of those areas. General land use types (e.g., single-family residential, commercial) have typically been the basis for measuring and reporting stormwater pollutant data. However, an investigation of ARCD practices of the type of interest in this study demands data on specific land coverages. The literature offers few data on this basis. Those available and used herein were assembled by a consultant to the City of Seattle for a project in which the author participated. They appear in Attachment A (Herrera Environmental Consultants, Inc. undated). Table 7 summarizes the representative values used in the analysis.

Table 7. Pollutant Concentrations in Runoff from Developed Land Uses (after Herrera Environmental Consultants, Inc. undated)

Land Use	Total Suspended Solids (mg/L)	Total Copper (µg/L)	Total Zinc (µg/L)	Total Phosphorus (µg/L)
Residential roof	25	13	159	110
Commercial roof	18	14	281	140
Access road/driveway	120	22	118	660
Parking	75	36	97	140
Walkway	25	13	59	110
Landscaping	213	13	59	2040

Pollutant concentrations expected to occur typically in the mixed runoff from the several land use and cover types making up a development were estimated by mass balance; i.e., the concentrations from the different areas of the sites were combined in proportion to their contribution to the total runoff.

Estimating Retention

The principal interest of this study was to estimate how much of the post-development runoff volume for the various land use cases could be retained by ARCD measures and prevented from discharging from the site on the surface. The analyses initially evaluated the runoff volume that could potentially be infiltrated by using a portion or all of the available pervious area for bioretention facilities. In some instances judicious use of the pervious area could infiltrate the full volume. In other cases use of the pervious area for as much infiltration as possible plus special management of roof runoff would fully attenuate post-development runoff.

Complete retention would, of course, exceed any ordinary regulatory standard intended to govern discharge quantity and quality. To the extent that full retention could not be expected, the study was interested in assessing the degree to which bioretention and roof runoff management could meet the specific potential standards outlined earlier. Performance was estimated in terms of volume retained versus released, the extent to which pre-development groundwater recharge would be preserved, and the pollutant loading reduction accompanying volume retention in comparison to the quantities that would enter receiving waters with no stormwater management actions. These measures expressed in equation form are:

$$\text{Runoff retention (\%)} = \frac{(\text{Volume with no practices} - \text{Volume with ARCD practices})}{\text{Volume with no practices}} x100$$

(expresses amount of the theoretical maximum post-development runoff prevented from discharging by ARCD)

$$\text{Recharge retention (\%)} = [1 - \frac{(\text{Predevelopment recharge} - \text{Postdevelopment recharge with ARCD})}{\text{Predevelopment recharge}}]x100$$

Pre-development recharge = Rainfall volume – Predevelopment runoff volume

Post-development recharge = The smaller of rainfall volume or post-development infiltration volume

$$\text{Loading reduction (\%)} = \frac{(\text{Loading with no practices} - \text{Loading with ARCD practices})}{\text{Loading with no practices}} x100$$

It should be noted that runoff retention and recharge retention express different quantities and are not equal numerically.

When infiltration alone (Basic ARCD) could not accomplish full retention, roof runoff management strategies were selected as appropriate for the land use case (Full ARCD). For the retail commercial development (COMM), roof runoff management was assumed to be accomplished by harvesting, temporarily storing, and applying water to use in the building. To this end, the assumption was made that the commercial development would be able to manage and would have capacity to store and make use of the entire roof runoff volume. While this particular assumption is, on its own, speculative, the commercial development would, as discussed in the section on Application of ARCD Practices, earlier, see a reduction in runoff as a result of evapotranspiration, and would have the option to employ ARCD site design principles to reduce impervious surface area, to install a green roof to retain runoff, or to implement any of a number of other ARCD practices designed to reduce runoff volume and pollutant loading. As a result, the overall analysis of the commercial site remains conservative in its assessment of the potential to retain runoff onsite.

In the three multi-family and single-family residential cases it was assumed that the roof water would be dispersed on or within the pervious area according to accepted and standardized practices. For example, the Washington Department of Ecology's (2005) Stormwater Management Manual for Western Washington provides design criteria for two methods: splash blocks followed by vegetated dispersion areas and gravel-filled trenches. These devices can be used wherever space is sufficient regardless of infiltration rates, as they operate by evapotranspiration and slow infiltration. Even clay can infiltrate at an approximate rate of 0.2 inch/hour or higher (Leij et al. 1996; Pitt, Chen, and Clark 2002). Care was taken to assure that pervious area already allocated to infiltration would not also be counted upon for dispersion. While dispersion was assumed for simplification of the study analyses, in reality a site designer would have the option of using rain barrels, cisterns, and/or green roofs instead of or along with ground dispersion to manage roof water. Analyses for the final case, the redevelopment scenario (REDEV), assumed dispersion and/or small-scale harvesting of roof runoff above whatever level of infiltration could be accomplished given the soil condition.

<u>Additional Analyses When Full Retention Cannot Be Expected</u>

Retaining runoff from impervious and pollutant generating pervious surfaces is the best stormwater management policy, because it prevents the introduction of urban runoff pollutants to receiving waters as well as serves quantity discharge control requirements. Maintaining pre-development peak flow rates, volumes, and elevated flow durations prevents stream channel and habitat damage, flooding, and loss of groundwater recharge. When conditions were expected to render full retention technically infeasible for the study cases, estimates were made of the volume and pollutant loadings that would be discharged assuming the remaining surface runoff is released to a receiving water with and without treatment. Treatment was assumed to be provided by bioretention discharging either directly on the surface or via an underdrain. While not as environmentally beneficial as retention, such treatment is superior to conventional stormwater management practices like ponds and sand filters. It captures pollutants through a number of mechanisms as contaminants are held for a time in the facility and contact vegetation and soil, such as sedimentation, filtration by plants, and adsorption and ion exchange in soil.

The effectiveness of bioretention in removing pollutants from surface runoff was estimated according to measurements by Chapman and Horner (2010). This study was performed on a linear bioretention device located on a slope and made up of a number of cells separated by weirs (termed a "cascade"). While an estimated 74 percent of all entering runoff infiltrated or evapotranspired before discharging, the flows reaching the end in the larger storms would have less residence time in the facility than in a unit on flat ground percolating water through soil before surface discharge via an underdrain. Therefore, pollutant concentrations exiting such a unit could be less yet. On the other hand, some bioretention facilities bypass the relatively rare higher flows, affording no treatment, while the cascade was designed to convey all runoff, even beyond its water quality design storm flow, and provide some treatment. On balance between the advantage and disadvantage of the facility providing the data, the discharge concentrations are considered to be representative of bioretention.

Chapman and Horner (2010) computed volume-weighted average discharge pollutant concentrations by multiplying concentrations times flow volumes for each monitored storm, summing, and dividing by total volume. The resulting values for the contaminants considered in this study are: total suspended solids (TSS)—30 mg/L, total copper—6.3 µg/L, total zinc—47 µg/L, and total phosphorus—133 µg/L. In a few instances these concentrations are higher than those in Table 7, an expression of the observation sometimes made in stormwater management that treatment cannot reduce concentrations in relatively "clean" flows below certain minimum values. In these situations the concentrations in Table 8 were also used in computing discharge loadings; i.e., no concentration reduction was applied in estimating discharge loadings, although flow volume would still be decreased to the extent infiltration could occur.

RESULTS OF THE ANALYSIS

ASSESSMENT OF MAXIMUM ARCD CAPABILITIES

Runoff Retention and Groundwater Recharge

Basic ARCD

One goal of this exercise was to determine if ARCD practices could eliminate post-development runoff production, and the pollutants it transports, and maintain pre-development groundwater recharge. The first assessment, termed the Basic ARCD analysis in this report, was to estimate if each site's pervious area is sufficient for full infiltration if given to this purpose to the extent necessary without compromising other uses. Accordingly, shallow, unobtrusive bioretention cells (i.e., rain gardens) are envisioned, dispersed through sites at no more than one for each 5 acres. It bears reemphasis that no credit was taken for water loss through evapotranspiration in this assessment, although a substantial, but not necessarily easily quantifiable, amount would undoubtedly occur. Estimates of runoff retention are therefore conservative.

Table 8 presents comparisons, for the Southeast climate region, between estimated annual runoff volumes generated before development and then post-development with and without Basic ARCD stormwater management. The table also gives annual groundwater recharge estimates for these same conditions.

Table 8. Runoff and Groundwater Recharge Volumes with Basic ARCD: Southeast Climate Region[a]

Period	Volume (acre-ft) or Percentage Measure	MFR	Sm-SFR	Lg-SFR	COMM	REDEV
B soil						
Pre-dev.	Runoff	0.046	0.013	0.56	0.022	0.001
	Recharge	44.7	12.4	539	21.2	0.51
Post-dev.	Runoff without stormwater practices	29.5	6.85	298	18.7	0.45
	Runoff retained with Basic ARCD	29.5	6.85	298	8.30	0.21
	Runoff released with Basic ARCD	0	0	0	10.4	0.25
	Runoff retention (%)	100%	100%	100%	44%	45%
	Recharge without stormwater practices	15.3	5.55	241	2.53	0.06
	Recharge with Basic ARCD	44.7	12.4	539	8.30	0.21
	Recharge retention (%)	100%	100	100%	39%	40%
	Pervious area needed (%)[b]	36%	22%	22%	100%	100%
D soil						
Pre-dev.	Runoff	13.5	3.76	163	6.43	0.16
	Recharge	31.2	8.64	376	14.8	0.36
Post-dev.	Runoff without stormwater practices	Full ARCD needed to maximize retention on D soil				
	Runoff retained with Basic ARCD					
	Runoff released with Basic ARCD					
	Runoff retention (%)					
	Recharge without stormwater practices	11.6	4.17	181	2.12	0.05
	Recharge with Basic ARCD	Full ARCD needed to maximize retention on D soil				
	Recharge retention (%)	37%	48%	48%	14%	14%
	Pervious area needed (%)[b]	Full ARCD needed to maximize retention on D soil				

[a] Pre-dev.—pre-development; post-dev.—post-development; ARCD—aquatic resources conservation design; MFR—multi-family residential; Sm-SFR—small-scale single-family residential; Lg-SFR—large-scale single-family residential; COMM—retail commercial; REDEV—infill redevelopment; Basic ARCD—infiltrating bioretention; runoff—quantity of water discharged from the site on the surface; recharge--quantity of water infiltrating the soil
[b] Proportion of the total pervious area on the site required for bioretention to achieve given results

In all cases the majority of the infiltration that would recharge groundwater in the undeveloped state would be lost to surface runoff after development. These losses would approach 90 percent in the most impervious developments. The greatly increased surface flow would raise peak flow rates and volumes in receiving water courses, increase flooding risk, and transport pollutants.

Basic ARCD could retain all post-development runoff and pre-existing groundwater recharge in the three residential cases on the B soils, using from less than one-fourth to just over one-third of the available pervious area for bioretention cells. Taking all available pervious area for the more highly impervious COMM and REDEV cases on B soil, bioretention would retain about 45 percent of the runoff generated and save about 40 percent of the pre-development recharge. To illustrate the relatively small role that slope increase from 5 to 10 percent plays in runoff retention, full retention would still be expected in the three residential cases and for the remaining two cases (COMM and REDEV) would decrease from 44-45 percent only slightly to 40-41 percent (not shown in table).

On the D soil, infiltrating bioretention may not be technically feasible and was not relied upon for retention estimates. Without the use of additional measures in the Full ARCD category, only incidental post-development runoff would be retained; and most pre-development recharge would be lost.

Tables 9-11 are companions to Table 8 for the South Central, Northeast – Upper Midwest, and Southwest climate regions, respectively. Results for the Northeast - Upper Midwest B soil are very close to those for the Southeast B soil, as would be expected given the similar precipitation quantities and soil characteristics. In the three regions having C soils, Basic ARCD can retain all runoff for the MFR, Sm-SFR, and Lg-SFR residential cases. With these soils, except in the Southwest, achieving full retention requires more of the available pervious area than with B soils, up to 69 percent, but is still fully attainable.

The effect of lower rainfall is evident in the South Central and, especially, the Southwest regions. In the latter location, not only the residential cases but also the COMM and REDEV scenarios can achieve full runoff retention with Basic ARCD on the C soil. The residential cases need much smaller percentages of the available pervious area for bioretention than for the same cases on C and even B soils elsewhere. Applying Basic ARCD to the South Central, C soil, REDEV case results in higher runoff retention than for the B soil cases in higher rainfall regions.

The study cases demonstrated two interesting points about groundwater recharge. First, with effective infiltrating bioretention it is possible for post-development annual recharge to exceed the pre-development quantity. This phenomenon is most evident in comparing the two amounts for cases with 100 percent runoff retention on C soils, which in the natural state produce much less recharge in relation to runoff than B soils. The B soils have a recharge-to-runoff ratio of about 500, whereas that ratio is only 4-6 for the C soils studied. One reason for higher post- compared to pre-development recharge is that bioretention is set up to hold water, increasing the time for infiltration to occur, instead of letting it run off. Another is that soils, especially in the C HSG, are often improved by organic amendments to yield both more water storage capacity and higher infiltration rates than the pre-existing soils.

A related point is that the percentage of pre-development recharge retained after development can be higher with C than B soils. This situation can best be seen in cases without full runoff retention, COMM and sometimes REDEV. In terms of recharge, installing bioretention conveys a greater advantage to the C than the B soils, which already have more pore space for water storage and higher infiltration and recharge rates.

Table 9. Runoff and Groundwater Recharge Volumes with Basic ARCD: South Central Climate Region[a]

Period	Volume (acre-ft) or Percentage Measure	MFR	Sm-SFR	Lg-SFR	COMM	REDEV
C soil						
Pre-dev.	Runoff	4.10	1.14	49.4	1.95	0.05
	Recharge	25.7	7.13	310	12.2	0.29
Post-dev.	Runoff without stormwater practices	21.2	5.15	224	12.7	0.31
	Runoff retained with Basic ARCD	21.2	5.15	224	4.33	0.21
	Runoff released with Basic ARCD	0	0	0	8.32	0.10
	Runoff retention (%)	100	100	100	34	67
	Recharge without stormwater practices	8.62	3.11	135	1.51	0.03
	Recharge with Basic ARCD	29.8	8.3	359	4.33	0.21
	Recharge retention (%)	100	100	100	38	70
	Pervious area needed (%)[b]	51	23	30	100	100
D soil						
Pre-dev.	Runoff	18.5	5.14	223	8.80	0.21
	Recharge	11.3	3.13	136	5.36	0.13
Post-dev.	Runoff without stormwater practices	Full ARCD needed to maximize retention on D soil				
	Runoff retained with Basic ARCD					
	Runoff released with Basic ARCD					
	Runoff retention (%)					
	Recharge without stormwater practices	7.23	7.59	112	1.35	0.03
	Recharge with Basic ARCD	Full ARCD needed to maximize retention on D soil				
	Recharge retention (%)	64	83	83	25	24
	Pervious area needed (%)[b]	Full ARCD needed to maximize retention on D soil				

Table 10. Runoff and Groundwater Recharge Volumes with Basic ARCD: Northeast – Upper Midwest Climate Region[a]

Period	Volume (acre-ft) or Percentage Measure	MFR	Sm-SFR	Lg-SFR	COMM	REDEV
B soil						
Pre-dev.	Runoff	0.04	0.01	0.54	0.02	0.001
	Recharge	42.9	11.9	517	20.4	0.49
Post-dev.	Runoff without stormwater practices	28.3	6.68	286	18.0	0.44
	Runoff retained with Basic ARCD	28.3	6.68	286	8.53	0.21
	Runoff released with Basic ARCD	0	0	0	9.43	0.23
	Runoff retention (%)	100	100	100	48	47
	Recharge without stormwater practices	14.6	5.32	231	2.42	0.06
	Recharge with Basic ARCD	42.9	11.9	517	8.53	0.21
	Recharge retention (%)	100	100	100	42	42
	Pervious area needed (%)[b]	34	21	21	100	100
C soil						
Pre-dev.	Runoff	7.87	2.18	94.8	3.74	0.09
	Recharge	35.1	9.72	422	16.6	0.40
Post-dev.	Runoff without stormwater practices	30.5	7.42	323	18.2	0.44
	Runoff retained with Basic ARCD	30.5	7.42	323	4.57	0.21
	Runoff released with Basic ARCD	0	0	0	13.6	0.24
	Runoff retention (%)	100	100	100	25	47
	Recharge without stormwater practices	12.4	4.48	195	2.17	0.05
	Recharge with Basic ARCD	42.9	11.9	517	4.57	0.21
	Recharge retention (%)	100	100	100	27	51
	Pervious area needed (%)[b]	69	31	40	100	100

Table 11. Runoff and Groundwater Recharge Volumes with Basic ARCD: Southwest Climate Region[a]

Period	Volume (acre-ft) or Percentage Measure	MFR	Sm-SFR	Lg-SFR	COMM	REDEV
C soil						
Pre-dev.	Runoff	1.62	0.45	19.5	0.77	0.02
	Recharge	7.22	2.00	87.0	3.43	0.08
Post-dev.	Runoff without stormwater practices	6.41	1.57	68.5	3.77	0.09
	Runoff retained with Basic ARCD	6.41	1.57	68.5	3.77	0.09
	Runoff released with Basic ARCD	0	0	0	0	0
	Runoff retention (%)	100	100	100	100	100
	Recharge without stormwater practices	2.43	0.88	38.1	0.43	0.01
	Recharge with Basic ARCD	8.84	2.45	107	4.20	0.10
	Recharge retention (%)	100	100	100	100	100
	Pervious area needed (%)[b]	12	5	7	69	44
D soil						
Pre-dev.	Runoff	4.47	1.24	53.8	2.12	0.05
	Recharge	4.37	1.21	52.7	2.08	0.05
Post-dev.	Runoff without stormwater practices	Full ARCD needed to maximize retention on D soil				
	Runoff retained with Basic ARCD					
	Runoff released with Basic ARCD					
	Runoff retention (%)					
	Recharge without stormwater practices	2.14	0.77	33.3	0.40	0.01
	Recharge with Basic ARCD	Full ARCD needed to maximize retention on D soil				
	Recharge retention (%)	49	63	63	19	18
	Pervious area needed (%)[b]	Full ARCD needed to maximize retention on D soil				

Full ARCD

Infiltration is one of a wide variety of ARCD-based source reduction techniques. Where site conditions such as soil quality or available area limit a site's infiltration capacity, other ARCD measures can enhance a site's runoff retention capability. Such practices can also be used where infiltration capacity is adequate, but the developer desires greater flexibility for land use on-site. Among those techniques, this study considered special management of roof water in those cases where bioretention could not infiltrate all post-development runoff.

Specifically, water harvesting for supply of irrigation and/or non-potable indoor uses was investigated for the retail commercial development. In residential cases with insufficient capacity for infiltrative bioretention but remaining space not already devoted to infiltration, efficiently directing roof runoff into the soil through downspout dispersion systems was the method of choice. Such cases invariably occurred with HSG D soils. The Full-ARCD scenario applied to the redevelopment case was roof water dispersion, harvesting, or a combination of the two practices. Generally speaking, infiltration consumed all available pervious area in the REDEV cases on B and C soils, making roof runoff harvesting the mechanism to retain more water. With no bioretention facility on D soil, the pervious area would be available for dispersion. Of course, harvesting could be applied instead of or along with dispersion. Again, it was assumed that that the commercial and, as needed, redevelopment sites had capacity to harvest and make use of the full volume of roof runoff generated, however, the analysis remains conservative in terms of the potential for onsite retention as it does not consider the use of ARCD site design principles to reduce impervious surfaces, green roofs, and evaporation/evapotranspration from surfaces other than rooftops.

Table 12 gives Southeast climate region results with the addition of Full ARCD techniques: roof runoff management, consisting of harvesting for reuse in the COMM case, dispersion on or within pervious land for the three residential cases, and a combination of these measures for REDEV. On the B soil runoff retention would approximately double for the retail commercial land use and reach 100 percent for the redevelopment. Groundwater recharge would not be expected to increase over the Basic ARCD case, though; because harvesting still keeps water out of the soil system.

For development on the D soil, use of roof runoff management techniques was estimated to increase runoff retention from zero to about one-third to two-thirds of the post-development runoff generated, depending on the land use case. Groundwater recharge would not materially benefit, however; because harvest does not contribute to it. Also, no recharge credit was taken for dispersion, since infiltration is restricted and loss by ET would tend to occur before infiltration. Some small amount of recharge would still be likely though. To illustrate further the small role of topography, in this D soil, Full ARCD scenario runoff retention is forecast to decrease by only 1-2 percent at a 10 percent slope compared to a 5 percent slope (not shown in table).

Table 12. Runoff and Groundwater Recharge Volumes with Full ARCD: Southeast Climate Region[a]

Period	Volume (acre-ft) or Percentage Measure	MFR	Sm-SFR	Lg-SFR	COMM	REDEV
	B soil					
Pre-dev.	Runoff	0.046	0.013	0.56	0.022	0.001
	Recharge	44.7	12.4	539	21.2	0.51
Post-dev.	Runoff without stormwater practices	Complete retention possible with Basic ARCD			18.7	0.45
	Runoff retained with Full ARCD				16.1	0.45
	Runoff released with Full ARCD				2.66	0
	Runoff retention (%)				86%	100%
	Recharge without stormwater practices				2.53	0.06
	Recharge with Full ARCD				8.30	0.21
	Recharge retention (%)				39%	40%
	Pervious area needed (%)[b]				100%	100%
	D soil					
Pre-dev.	Runoff	13.5	3.76	163	6.43	0.16
	Recharge	31.2	8.64	376	14.8	0.36
Post-dev.	Runoff without stormwater practices	33.1	8.23	358	19.1	0.46
	Runoff retained with Full ARCD	16.4	3.11	135	7.76	0.31
	Runoff released with Full ARCD	16.7	5.12	222	11.4	0.16
	Runoff retention (%)	50%	38%	38%	41%	66%
	Recharge without stormwater practices	11.6	4.17	181	2.12	0.05
	Recharge with Full ARCD	11.6	4.17	181	2.12	0.05
	Recharge retention (%)	37.2%	48.3%	48.3%	14.3%	13.6%
	Pervious area needed (%)[b]	100%	100%	100%	100%	100%

[a] Pre-dev.—pre-development; post-dev.—post-development; ARCD—aquatic resources conservation design; MFR—multi-family residential; Sm-SFR—small-scale single-family residential; Lg-SFR—large-scale single-family residential; COMM—retail commercial; REDEV—infill redevelopment; Full ARCD—infiltrating bioretention, roof runoff harvesting, and/or roof runoff dispersion; runoff—quantity of water discharged from the site on the surface; recharge--quantity of water infiltrating the soil
[b] Proportion of the total pervious area on the site required for bioretention to achieve given results

Tables 13-15 give data analogous to Table 12 for the South Central, Northeast – Upper Midwest, and Southwest climate regions, respectively. Results are similar to those reported for the Southeast region. Full ARCD can approximately double runoff retention from the Basic ARCD level for the COMM case and extend runoff retention to 100 percent for the redevelopment on both B and C soils. Once again, application of Full ARCD to the D soil cases increases runoff retention from zero to one-third to two-thirds of the volume produced, depending on land use case.

Table 13. Runoff and Groundwater Recharge Volumes with Full ARCD: South Central Climate Region[a]

Period	Volume (acre-ft) or Percentage Measure	MFR	Sm-SFR	Lg-SFR	COMM	REDEV
C soil						
Pre-dev.	Runoff	4.10	1.14	49.4	1.95	0.05
	Recharge	25.7	7.13	310	12.2	0.29
Post-dev.	Runoff without stormwater practices	Complete retention possible with Basic ARCD			12.7	0.31
	Runoff retained with Full ARCD				9.51	0.31
	Runoff released with Full ARCD				3.15	0
	Runoff retention (%)				75	100
	Recharge without stormwater practices				1.51	0.03
	Recharge with Full ARCD				4.33	0.21
	Recharge retention (%)				35	72
	Pervious area needed (%)[b]				100	100
D soil						
Pre-dev.	Runoff	18.5	5.14	223	8.80	0.21
	Recharge	11.3	3.13	136	5.36	0.13
Post-dev.	Runoff without stormwater practices	22.6	5.68	247	12.8	0.31
	Runoff retained with Full ARCD	11.0	2.08	90.3	5.17	0.20
	Runoff released with Full ARCD	11.6	3.60	157	7.63	0.11
	Runoff retention (%)	49	37	37	40	66
	Recharge without stormwater practices	7.23	2.59	112	1.35	0.03
	Recharge with Full ARCD	7.23	2.59	112	1.35	0.03
	Recharge retention (%)	64	83	83	25	24
	Pervious area needed (%)[b]	100	100	100	100	100

Table 14. Runoff and Groundwater Recharge Volumes with Full ARCD: Northeast – Upper Midwest Climate Region[a]

Period	Volume (acre-ft) or Percentage Measure	MFR	Sm-SFR	Lg-SFR	COMM	REDEV
B soil						
Pre-dev.	Runoff	0.04	0.01	0.54	0.02	0.001
	Recharge	42.9	11.9	51.7	20.4	0.49
Post-dev.	Runoff without stormwater practices	Complete retention possible with Basic ARCD			18.0	0.44
	Runoff retained with Full ARCD				16.0	0.44
	Runoff released with Full ARCD				2.00	0
	Runoff retention (%)				89	100
	Recharge without stormwater practices				2.42	0.06
	Recharge with Full ARCD				8.53	0.21
	Recharge retention (%)				42	43
	Pervious area needed (%)[b]				100	100
C soil						
Pre-dev.	Runoff	7.87	2.18	94.8	3.74	0.09
	Recharge	35.1	9.72	422	16.6	0.40
Post-dev.	Runoff without stormwater practices	Complete retention possible with Basic ARCD			18.2	0.44
	Runoff retained with Full ARCD				12.0	0.44
	Runoff released with Full ARCD				6.19	0
	Runoff retention (%)				66	100
	Recharge without stormwater practices				2.17	0.05
	Recharge with Full ARCD				4.57	0.21
	Recharge retention (%)				28	43
	Pervious area needed (%)[b]				100	100

Table 15. Runoff and Groundwater Recharge Volumes with Full ARCD: Southwest Climate Region[a]

Period	Volume (acre-ft) or Percentage Measure	MFR	Sm-SFR	Lg-SFR	COMM	REDEV
C soil						
Pre-dev.	Runoff	1.62	0.45	19.5	0.77	0.02
	Recharge	7.22	2.00	87.0	3.43	0.08
Post-dev.	Runoff without stormwater practices	Complete retention possible with Basic ARCD				
	Runoff retained with Full ARCD					
	Runoff released with Full ARCD					
	Runoff retention (%)					
	Recharge without *stormwater* practices					
	Recharge with Full ARCD					
	Recharge retention (%)					
	Pervious area needed (%)[b]					
D soil						
Pre-dev.	Runoff	4.47	1.24	53.8	2.12	0.05
	Recharge	4.37	1.21	52.7	2.08	0.05
Post-dev.	Runoff without stormwater practices	6.70	1.68	73.2	3.80	0.09
	Runoff retained with Full ARCD	3.25	0.62	26.8	1.53	0.06
	Runoff released with Full ARCD	3.45	1.07	46.5	2.26	0.03
	Runoff retention (%)	49	37	37	40	66
	Recharge without stormwater practices	2.14	0.77	33.3	0.40	0.01
	Recharge with Full ARCD	2.14	0.77	33.3	0.40	0.01
	Recharge retention (%)	49	63	63	19	18
	Pervious area needed (%)[b]	100	100	100	100	100

Pollutant Loading Reductions

The examination of maximum ARCD capabilities considered the reductions of annual mass loadings of four water pollutants that would accompany runoff retention. Since retention means no surface discharge, these loading reductions are, at a minimum, equal to the percentages of runoff retention. In those cases with less than full runoff retention, there is good reason to expect pollutant loading reductions higher than the percentage of runoff retained. The early runoff ("first flush"), occurring when the soils are least saturated, is more likely to be retained than later runoff. It is frequently observed that the first flush has higher pollutant concentrations than later runoff, particularly in the wash off after relatively extended dry periods.

For the B and D soil and the residential cases on C soils, the reductions were very consistent among regions:

- B and C soils, Basic ARCD, residential cases—100%;
- B soil, Basic ARCD, COMM and REDEV cases—44-45%;
- B soil, Full ARCD, COMM and REDEV cases—86-100%;
- D soil, Full ARCD, SFR and COMM cases—38-41%;
- D soil, Full ARCD, MFR case—50%; and
- D soil, Full ARCD, REDEV case—66%.

For the most highly impervious cases, COMM and REDEV, on C soils reduction was variable and dependent on precipitation. With Basic ARCD the range was from 25 to 100 percent, going from relatively high to low precipitation. Full ARCD is expected to raise the lowest reductions to 100 percent for REDEV and at least 66 percent for COMM.

Therefore, taking the greatest advantage of what ARCD offers could prevent the addition to receiving waters of all or almost all pollutant mass that would otherwise discharge from a range of urban developments on B and C soils. With D soils, Full ARCD can accomplish loading reductions approaching or somewhat exceeding 50 percent.

ABILITY TO MEET POTENTIAL STANDARDS

General Summary

This section evaluates the ability of the Basic and Full ARCD strategies to meet each of the five potential stormwater management standards enumerated in the beginning of the report. It also examines the extent of pollutant loading reduction if the standards are just met; i.e., if runoff is retained at the minimum needed to meet the standard. It has already been demonstrated that retention of all post-development runoff and full pollutant attenuation is possible in some circumstances. Table 16 summarizes the results for all regions and cases and both ARCD strategies.

Ability to Meet Standards

The projected ability to meet the standards overall varies mostly in relation to soil type (B or C versus D) and the relative imperviousness of development, and much less across climate regions. The one exception to this generality is that implementing Basic ARCD practices on the Southwest region C soil would meet all five standards. This uniformity does not occur elsewhere on either B or C soils, and is apparently primarily a function of the relatively low precipitation in the region.

Setting aside the Southwest region, success in complying with standards is mostly comparable among the various B and C soils, with a small number of instances where a development type meets a standard on B but not on C soil. Basic ARCD methods invariably can meet all standards on B and C soils for the residential development cases (MFR and Sm- and Lg-SFR). Full ARCD practices are forecast to meet all standards for the redevelopment case on B soils but only standards 1 and 5 consistently on C soils. The combination of infiltration and roof runoff management applied to the retail commercial development allows meeting these same two standards on B soils but only the latter on both of the C soils occurring outside the Southwest region. The only standards that cannot be met on B and C soils by the ARCD methods considered are standards 2-4 for the COMM case. Therefore, of the 125 standards assessments, ARCD practices are projected to meet 113 (90.4 percent) with B and C soils.

The ability to meet these standards is much reduced on D soils. Standard 1 can be met occasionally with Full ARCD used in the redevelopment. All cases with Full ARCD comply with standard 4 on this soil where pre-development runoff is estimated to be relatively high, reflecting a low overall requirement for retention volume. Standard 5 can be met with Full ARCD with the exception of one COMM case. Standards 2 and 3 were never estimated to be met in any D soil case. All in all, with this soil 26 of the 75 scenarios (34.7 percent) are expected to meet a standard.

Table 16. Ability to Meet Potential Regulatory Standards with Basic/Full ARCD Practices

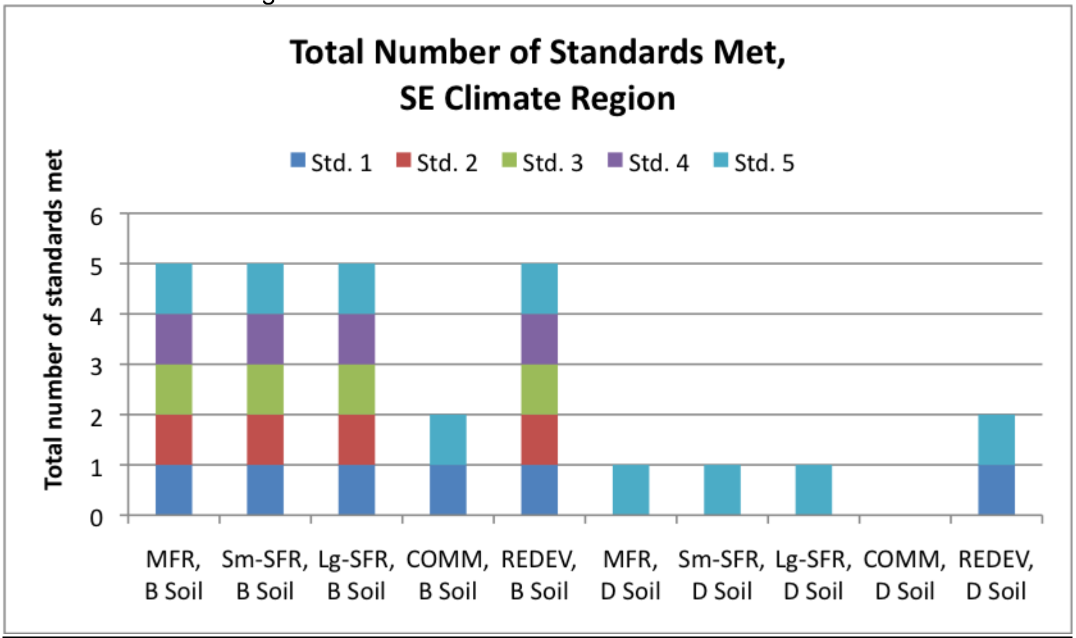
Region-Case[a]	Standards Met—Basic ARCD[b]	Standards Met—Full ARCD[b]	Runoff Retention and Pollutant Loading Reduction (%)[b, c]				
			Std. 1	Std. 2	Std. 3	Std. 4	Std. 5
SE(B)-MFR	1, 2, 3, 4, 5		63	87	90	>99	63
Sm-SFR	1, 2, 3, 4, 5		63	87	90	>99	63
Lg-SFR	1, 2, 3, 4, 5		63	87	90	>99	63
COMM		1, 5	63	86	86	86	63
REDEV		1, 2, 3, 4, 5	63	87	90	>99	63
SE(D)-MFR		5	50	50	50	50	37
Sm-SFR		5	38	38	38	38	34
Lg-SFR		5	38	38	38	38	34
COMM			41	41	41	41	41
REDEV		1, 5	63	66	66	66	42
SC(C)-MFR	1, 2, 3, 4, 5		58	82	90	81	47
Sm-SFR	1, 2, 3, 4, 5		58	82	90	78	45
Lg-SFR	1, 2, 3, 4, 5		58	82	90	78	45
COMM		1, 5	58	75	75	75	49
REDEV		1, 2, 3, 4, 5	58	82	90	84	49
SC(D)-MFR		4, 5	49	49	49	18	10
Sm-SFR		4, 5	37	37	37	10	6
Lg-SFR		4, 5	37	37	37	10	6
COMM		4, 5	40	40	40	31	18
REDEV		1, 4, 5	58	66	66	32	18
NM(B)-MFR	1, 2, 3, 4, 5		81	89	90	>99	81
Sm-SFR	1, 2, 3, 4, 5		81	89	90	>99	81
Lg-SFR	1, 2, 3, 4, 5		81	89	90	>99	81
COMM		1, 2, 5	81	89	89	89	81
REDEV		1, 2, 3, 4, 5	81	89	90	>99	81
NM(C)-MFR	1, 2, 3, 4, 5		81	89	90	74	60
Sm-SFR	1, 2, 3, 4, 5		81	89	90	71	57
Lg-SFR	1, 2, 3, 4, 5		81	89	90	71	57
COMM		5	66	66	66	66	64
REDEV		1, 2, 3, 4, 5	81	89	90	80	64
SW(C)-MFR	1, 2, 3, 4, 5		62	83	90	75	46
Sm-SFR	1, 2, 3, 4, 5		62	83	90	72	44
Lg-SFR	1, 2, 3, 4, 5		62	83	90	72	44
COMM	1, 2, 3, 4, 5		62	83	90	80	49
REDEV	1, 2, 3, 4, 5		62	83	90	80	49
SW(D)-MFR		4, 5	49	49	49	33	21
Sm-SFR		4, 5	37	37	37	27	16
Lg-SFR		4, 5	37	37	37	27	16
COMM		5	40	40	40	40	27
REDEV		1, 4, 5	62	66	66	44	28

[a] Region (hydrologic soil group)—land use; regions: SE—Southeast, SC—South-central, NM—Northeast-Upper Midwest, SW—Southwest; land uses: MFR—multi-family residential, Sm-SFR—small single-family residential, Lg-SFR--large single-family residential, COMM—retail commercial, REDEV--redevelopment

[b] Standard (Std.) 1—Retain the runoff produced by the 85th percentile, 24-hour precipitation event
Standard 2—Retain the runoff produced by the 95th percentile, 24-hour precipitation event
Standard 3—Retain 90 percent of the average annual post-development runoff volume
Standard 4—Retain the difference between the post- and pre-development average annual runoff volumes
Standard 5—Retain the difference between the post- and pre-development runoff volumes for all events up to and including the 85th percentile, 24-hour precipitation event

[c] Reduction estimated to result from meeting the standard, to the extent it can be met (fully met if so indicated in preceding columns), without treatment of remaining discharge. Where a standard can be met using Basic or Full ARCD application it is indicated in black, where a standard cannot be met using Basic or Full ARCD it is highlighted red.

Figure 4a. Ability to Meet Potential Regulatory Standards with Basic/Full ARCD Practices for Southeast Climate Region



MFR—multi-family residential, Sm-SFR—small single-family residential, Lg-SFR--large single-family residential, COMM—retail commercial, REDEV—redevelopment. Standard (Std.) 1—Retain the runoff produced by the 85th percentile, 24-hour precipitation event; Standard 2—the 95th percentile, 24-hour precipitation event; Standard 3—90 percent of the average annual post-development runoff volume; Standard 4—the difference between the post- and pre-development average annual runoff volumes; and, Standard 5—the difference between the post- and pre-development runoff volumes for all events up to and including the 85th percentile, 24-hour precipitation event

Figure 4b. Ability to Meet Potential Regulatory Standards with Basic/Full ARCD Practices for South Central Climate Region

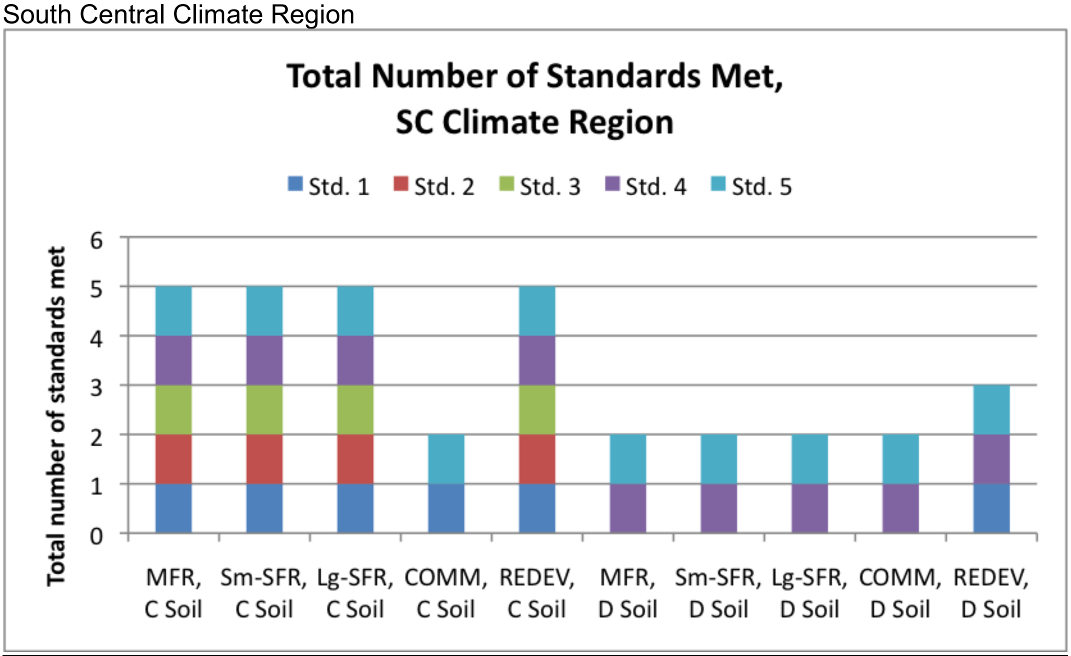


Figure 4c. Ability to Meet Potential Regulatory Standards with Basic/Full ARCD Practices for Northeast-Midwest Climate Region

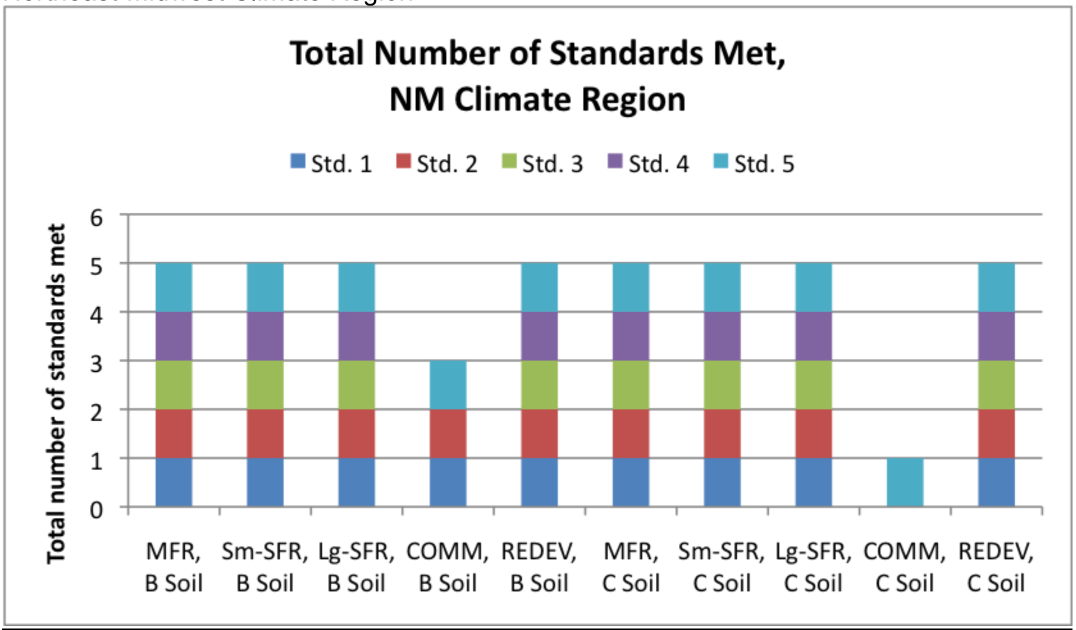


Figure 4d. Ability to Meet Potential Regulatory Standards with Basic/Full ARCD Practices for Southwest Climate Region

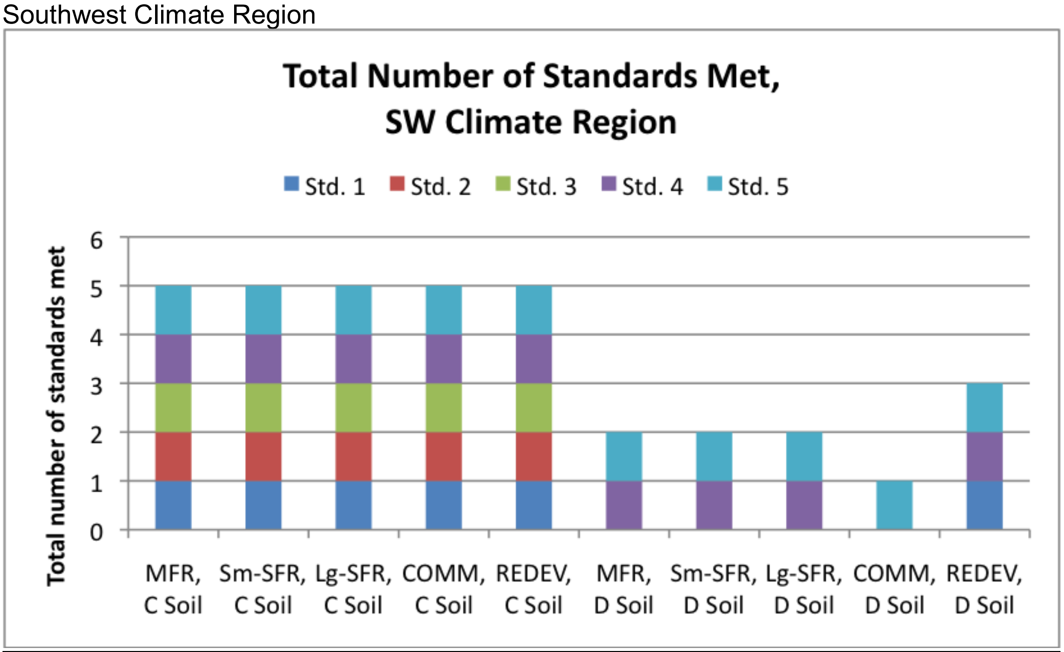
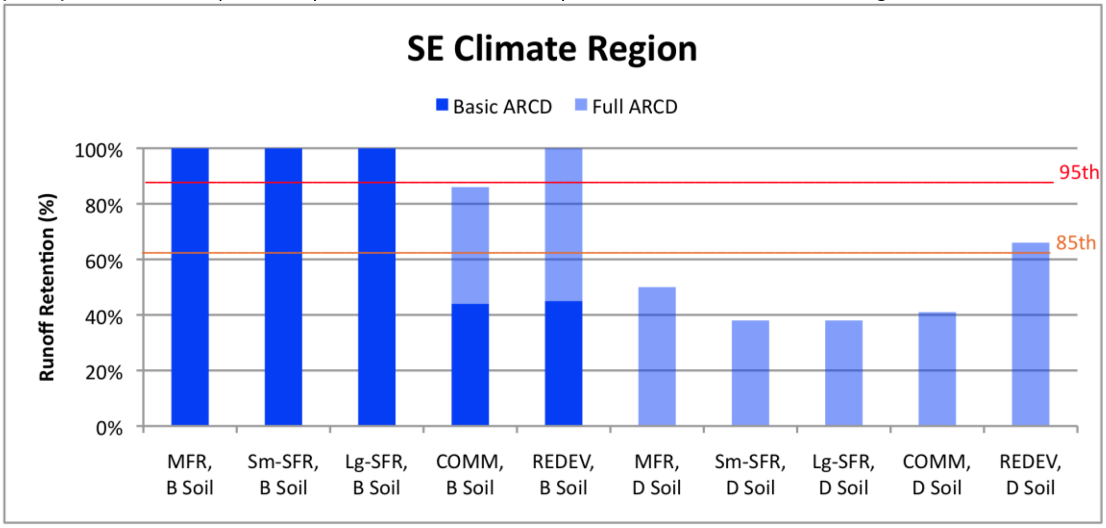


Figure 5a. Percentage of Runoff Retained Relative to Standards 1 (85th Percentile, 24-hour precipitation event) and 2 (95th Percentile event) for Southeast Climate Region



MFR—multi-family residential, Sm-SFR—small single-family residential, Lg-SFR--large single-family residential, COMM—retail commercial, REDEV—redevelopment. Standard (Std.) 1—Retain the runoff produced by the 85th percentile, 24-hour precipitation event; Standard 2—the 95th percentile, 24-hour precipitation event; Standard 3—90 percent of the average annual post-development runoff volume; Standard 4—the difference between the post- and pre-development average annual runoff volumes; and, Standard 5—the difference between the post- and pre-development runoff volumes for all events up to and including the 85th percentile, 24-hour precipitation event

Figures 5a-d show the percentage of runoff that can be retained for each development type, in each region, using either Basic or Full ARCD practices, in comparison with Standard 1 (retention of the 85th percentile, 24-hour precipitation event) and Standard 2 (retention of the 95th percentile, 24 hour event). Even where Standards 1 and 2 cannot be met in full, ARCD practices can still result in substantial compliance, and retention of significant runoff volume.

Figure 5b. Percentage of Runoff Retained Relative to Standards 1 (85th Percentile, 24-hour precipitation event) and 2 (95th Percentile event) for South Central Climate Region

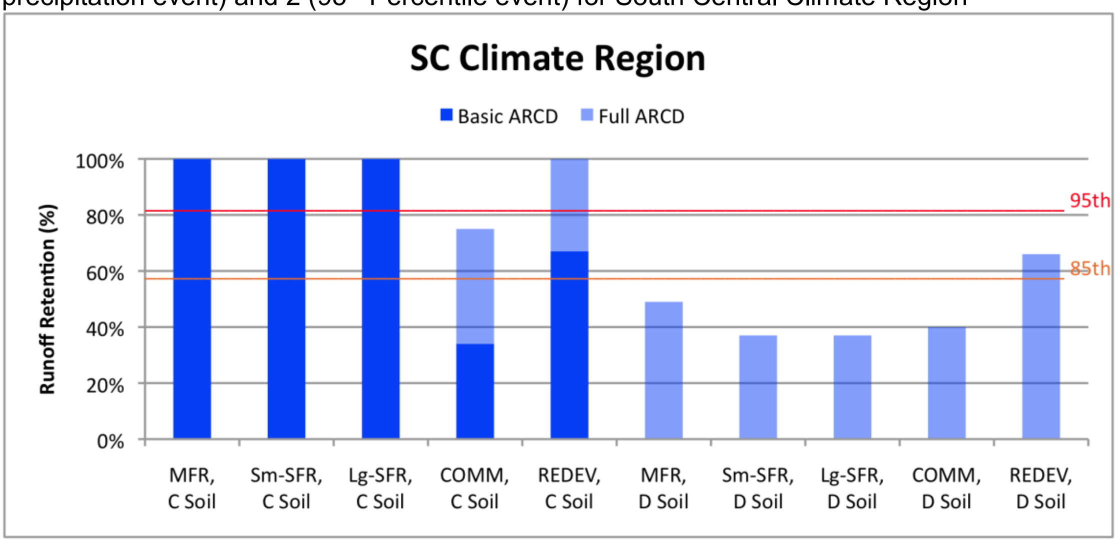


Figure 5c. Percentage of Runoff Retained Relative to Standards 1 (85^{th} Percentile, 24-hour precipitation event) and 2 (95^{th} Percentile event) for Northeast-Midwest Region

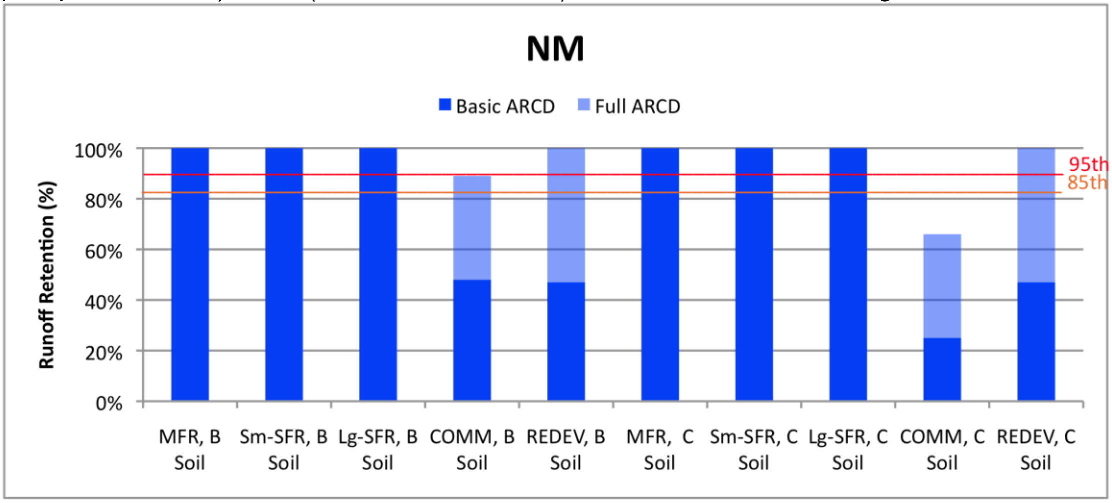
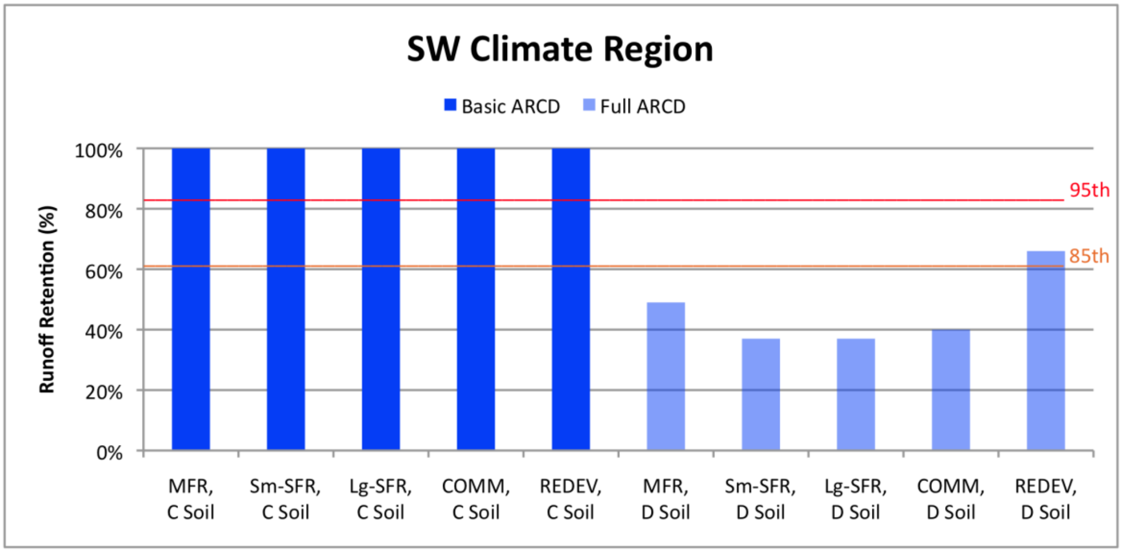


Figure 5d. Percentage of Runoff Retained Relative to Standards 1 (85^{th} Percentile, 24-hour precipitation event) and 2 (95^{th} Percentile event) for Southwest Region



Effectiveness of Standards in Environmental Protection

Standard 3 (retain 90 percent of the average annual post-development runoff volume) would be the most protective standard. Meeting or coming as close as possible to meeting, but not exceeding, this standard is estimated to lead to 66-90 percent runoff retention and pollutant loading reduction on B and C soils and 37-66 percent on D soil. Standard 2 (retain the runoff produced by the 95^{th} percentile, 24-hour precipitation event) would yield only slightly less protection with B and C soils and, with D soil, retention and loading reduction equivalent to standard 3.

Standards 4 and 5, based on the differential between pre- and post-development runoff volume, are highly inconsistent in retaining runoff and reducing pollutants, in that they are relatively protective where pre-development runoff is estimated to be very low relative to post-development flow, but result in progressively lower retention and pollutant loading reduction as pre- and post-development volumes converge, such as in several cases on D soils. Standard 5 is especially weak in this regard. The potentially low level of retention and pollutant loading reduction renders these standards based on the change in pre- versus post-development runoff volume poor candidates for national application, at least as formulated in these terms.

Fully meeting standard 1 (retain the runoff produced by the 85th percentile, 24-hour precipitation event) would yield runoff retention and pollutant mass reduction ranging from 58 to 81 percent, depending on climate region. This level of inconsistency decreases the utility of this standard for widespread use. Standard 2, based on the 95th percentile event, is much better in this respect, with variability in runoff retention and loading reduction across the nation in the much narrower 82-89 percent range. However, standard 1 remains more consistent across regions, and more protective of water quality for development on D soils than either standard 4 or 5, and is preferable to those standards in this regard.

In summary, standards 2 and 3 are clearly superior to the other three options. Standard 3 is entirely consistent from place to place in degree of environmental protection, and standard 2 does not deviate much. Analysis of the five development cases on two soil groups in each of four regions demonstrated the two standards are virtually identical in the runoff retention and pollutant loading reduction they would bring about.

Management or Runoff in Excess of Standards Requirements

All of the analysis reported above assumed that any remaining runoff after the application of ARCD and meeting, or coming as close as possible to meeting a standard, would discharge with no treatment. In fact, additional treatment could further decrease pollutant loadings. Treatment without further runoff retention could be accomplished by many conventional or ARCD methods designed to lower contaminant concentrations. The most effective of the alternatives is probably bioretention discharging non-retained runoff either on the surface or through an underdrain, assumed in the analysis conducted for this study according to the methods cited above. Treatment of all remaining runoff with underdrained bioretention cells where space remains but all infiltration capacity is used can raise the pollutant removals given in Table 16 to the levels in Table 17. These estimates apply to the four pollutants considered, TSS and total copper, zinc, and phosphorus. Space would most likely be available in the three MFR and SFR cases but not the COMM and REDEV scenarios.

While there is substantial variability in these results, they demonstrate that discharging effluent of relatively consistent, high quality can be accomplished with a comprehensive ARCD strategy. This strategy would embrace, first, retaining as much urban runoff as possible and then utilizing treatment based on soil and vegetative media to capture contaminants from the remainder.

Table 17. Estimated Pollutant Loading Reduction Benefits of Bioretention Treatment of Runoff Remaining After ARCD Implemented to Meet or Approach Standards

Range of Table 16 Values (%)	Approximate Pollutant Removal Increase (%)	Total Estimated Pollutant Removal Range (%)
35-45	30-45	65-90
45-55	25-35	70-90
55-65	20-30	75-95
65-75	15->20	80->95
75-85	10->15	85->95
>85	5->10	90->95

SUMMARY AND CONCLUSIONS

STUDY DESIGN

This study was performed to investigate the degree to which low-impact development ARCD practices can meet or exceed the requirements of various potential stormwater management facility design standards and the resulting environmental benefits. The investigation was performed by estimating the stormwater retention possible with full application of ARCD practices to five land use cases in four representative climatic regions in the United States on two prominent soil types in each region. Retention is defined as preventing the conversion of precipitation to surface runoff. Retaining runoff from impervious and pollutant generating pervious surfaces prevents the introduction of urban runoff pollutants to receiving waters as well as reduces runoff volume to prevent stream channel and habitat damage, flooding, and loss of groundwater recharge. Infiltrating bioretention was first applied in the analysis of each case, a strategy termed Basic ARCD. When Basic ARCD could not fully retain post-development runoff, a Full ARCD strategy was added, involving roof runoff harvesting in the most impervious development cases and roof water dispersion in those with substantial pervious area. Benefits were assessed with respect to reduction of the annual average surface runoff volume from the quantity estimated without any stormwater management practices, and associated maintenance of pre-development groundwater recharge and water quality improvement through preventing discharge to receiving waters of pollutants generated with developed land uses.

A number of conservative assumptions were built into the analysis to ensure that the capabilities and benefits of ARCD would not be over-estimated. In summary, these assumptions are:

- No retention credit for evapotranspiration in the Basic ARCD strategy, although generally a substantial amount would occur, and consideration of evapotranspiration only for roof runoff in the Full ARCD strategy;
- Letting aside many available ARCD practices and site design principles that could be employed to reduce the runoff quantity, and the pollutants it transports, by reducing impervious surface area or directing the runoff to bioretention, harvesting, and dispersion facilities;
- The assumption of no infiltration on hydrologic soil group D soils, although some infiltration occurs at finite rates even on clay;
- Application of a safety factor to estimated infiltration rates;
- Minimum bioretention cell depths, so that these facilities would not be disruptive to site design and could be put to other uses;
- Requiring a 48-hour drawdown time for bioretention, instead of the 72-hour maximum;
- An analysis to guard against groundwater mounding under bioretention cells, with conservative assumptions for horizontal and vertical hydraulic conductivity rates; and
- An analysis demonstrating that doubling topographic slope changes results by only a few percent.

CAPABILITIES OF FULL ARCD APPLICATION

Comparison of estimated runoff production in the pre- and post-development states demonstrated that the majority of the infiltration that would recharge groundwater in the undeveloped state would be lost to surface runoff after development with no stormwater management practices. These losses would approach 90 percent in the most impervious developments. These observations apply in in all climate regions and with the full range of soil conditions.

Basic ARCD could retain all post-development runoff and pre-existing groundwater recharge, as well as attenuate all pollutant transport, in the three residential cases on B soils in the two climate regions where these soils were analyzed. Bioretention cells to accomplish this retention would use from less than one-fourth to just over one-third of the available pervious area for infiltration. Taking all available pervious area for the more highly impervious COMM and REDEV cases, bioretention would retain about 45 percent of the runoff and pollutants generated and save about 40 percent of the pre-development recharge. Adding Full ARCD measures in these cases would approximately double retention and pollutant reduction for the retail commercial land use and raise it to 100 percent for the redevelopment. Groundwater recharge would not increase, however, because the additional retention is accomplished by harvesting or dispersion.

In the three regions having C soils, Basic ARCD can again retain all runoff and reduce urban runoff pollutant mass loading to zero for the MFR and Sm-SFR and Lg-SFR residential cases, although generally requiring more of the available pervious area to do so than in B soil cases. The effect of lower rainfall is evident in the South Central and, especially, the Southwest regions. In the latter location, not only the residential cases but also the COMM and REDEV scenarios can achieve full runoff and groundwater recharge retention and pollutant loading attenuation with Basic ARCD on C soil. Full ARCD can approximately double runoff retention and pollutant removal from the Basic ARCD level for the COMM case and extend these measures to 100 percent for the redevelopment.

For development on the D soils in all climate regions, use of roof runoff management techniques was estimated to increase runoff retention and pollutant reduction from zero to between about one-third to two-thirds of the post-development runoff generated, depending on the land use case. These strategies would offer little groundwater recharge benefit with this soil condition, but would still have the potential to significantly reduce runoff volume and pollutant loading.

Therefore, taking the greatest advantage of what ARCD offers is expected to retain the great majority of post-development runoff and pre-development groundwater recharge. This strategy would also prevent the addition to receiving waters of all or almost all pollutant mass that would otherwise discharge from a range of urban developments on B and C soils. With D soils, Full ARCD can accomplish runoff retention and loading reductions approaching or somewhat exceeding 50 percent, and opportunities to use ARCD practices or site design principles not modeled in this analysis can further increase runoff retention volume.

ABILITY TO MEET STANDARDS

ARCD methods were assessed for their ability to meet five potential regulatory standards, the first two pertaining to retention of the 85th and 95th percentile, 24-hour precipitation events, the third to retain 90 percent of the post-development runoff, and the last two to retain the difference between the post- and pre-development runoff, the final standard capped at the 85th percentile, 24-hour event. The projected ability to meet the five standards varies mostly in relation to soil type (B or C versus D) and the relative imperviousness of development, and much less across climate regions, except for the relatively arid Southwest.

The only standards that cannot be fully met on B and C soils by the ARCD methods considered are standards 2-4 for the COMM case. Of the 125 standards assessments, ARCD practices are projected to meet 113 (90.4 percent) with B and C soils. The ability to meet these standards is much reduced on D soils. Only standards 1 (85^{th} percentile, 24-hour precipitation event, and 4 and 5 (related to the difference between the post- and pre-development runoff) can be met occasionally and under limited conditions using Full ARCD methods. However, even on D soils, all cases for Standard 1 were able to retain greater than 50 percent of the required runoff volume.

Standard 3 (retain 90 percent of the average annual post-development runoff volume) would be the most environmentally protective standard. Meeting or coming as close as possible to meeting, but not exceeding, this standard was estimated to lead to 66-90 percent runoff retention and pollutant loading reduction on B and C soils and 37-66 percent on D soil. Standard 2 (retain the runoff produced by the 95^{th} percentile, 24-hour precipitation event) would yield equivalent protection on D soils and only slightly less protection with B and C soils.

Standards 4 and 5, based on the differential between pre- and post-development runoff volume, are very inconsistent in retaining runoff and reducing pollutants. They are highly protective where pre-development runoff is estimated to be very low relative to post-development flow, and then to result in progressively lower retention and loading reduction as pre- and post-development volumes converge. Standard 5 is especially weak in this regard. This inconsistency makes these standards poor candidates for national application, at least as formulated in these terms.

Fully meeting standard 1 (retain the runoff produced by the 85^{th} percentile, 24-hour precipitation event) would yield runoff retention and pollutant mass reduction ranging from 58 to 81 percent, depending on climate region. This level of inconsistency decreases the utility of this standard to some degree. Standard 2, based on the 95^{th} percentile event, is much better in this respect, with variability in runoff retention and loading reduction across the nation in the much narrower 82-89 percent range. However, standard 1 remains more consistent across regions, and more protective of water quality for development on D soils than either standard 4 or 5, and is preferable to those standards in this regard.

In summary, standards 2 and 3 are clearly superior to the other three options. Standard 3 is entirely consistent from place to place in degree of environmental protection, and standard 2 does not deviate much. Analysis of the five development cases on two soil groups in each of four regions demonstrated the two standards are virtually identical in the runoff retention and pollutant loading reduction they would bring about.

All five standards are based on some stipulated runoff retention. Pollutant mass loading reduction is at least equal to the amount of retention that occurs. It is possible to decrease loadings further by treating excess runoff. Analysis showed that subjecting that runoff to bioretention treatment before discharge could reduce loadings of TSS and total copper, zinc, and phosphorus by at least two-thirds and as much as over 95 percent. This conclusion applies to all climate regions and soil types for land use cases where space is available for the additional bioretention cells. The three residential cases are in this group but not the COMM or REDEV cases, where all pervious land would have already been used for retentive or roof water dispersion practices.

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ATTACHMENT A

POLLUTANT CONCENTRATIONS FOR URBAN SOURCE AREAS (HERRERA ENVIRONMENTAL CONSULTANTS, INC. UNDATED)

Source Area	Study	Location	Sample Size (n)	TSS (mg/L)	TCu (µg/L)	TPb (µg/L)	TZn (µg/L)	TP (mg/L)	Notes
Roofs									
Residential	Steuer, et al. 1997	MI	12	36	7	25	201	0.06	2
Residential	Bannerman, et al. 1993	WI	~48	27	15	21	149	0.15	3
Residential	Waschbusch, et al. 2000	WI	25	15	n.a.	n.a.	n.a.	0.07	3
Residential	FAR 2003	NY		*19*	*20*	*21*	*312*	*0.11*	4
Residential	Gromaire, et al. 2001	France		*29*	*37*	*493*	*3422*	*n.a.*	5
Representative Residential Roof Values				**25**	**13**	**22**	**159**	**0.11**	
Commercial	Steuer, et al. 1997	MI	12	24	20	48	215	0.09	2
Commercial	Bannerman, et al. 1993	WI	~16	15	9	9	330	0.20	3
Commercial	Waschbusch, et al. 2000	WI	25	18	n.a.	n.a.	n.a.	0.13	3
Representative Commercial Roof Values				**18**	**14**	**26**	**281**	**0.14**	
Parking Areas									
Res. Driveways	Steuer, et al. 1997	MI	12	157	34	52	148	0.35	2
Res. Driveways	Bannerman, et al. 1993	WI	~32	173	17	17	107	1.16	3
Res. Driveways	Waschbusch, et al. 2000	WI	25	34	n.a.	n.a.	n.a.	0.18	3
Driveway	FAR 2003	NY		*173*	*17*		*107*	*0.56*	4
Representative Residential Driveway Values				**120**	**22**	**27**	**118**	**0.66**	
Comm./ Inst. Park. Areas	Pitt, et al. 1995	AL	16	110	116	46	110	n.a.	1
Comm. Park. Areas	Steuer, et al. 1997	MI	12	110	22	40	178	0.2	2
Com. Park. Lot	Bannerman, et al. 1993	WI	5	58	15	22	178	0.19	3
Parking Lot	Waschbusch, et al. 2000	WI	25	51	n.a.	n.a.	n.a.	0.1	3
Parking Lot	Tiefenthaler, et al. 2001	CA	5	36	28	45	293	n.a.	6
Loading Docks	Pitt, et al. 1995	AL	3	40	22	55	55	n.a.	1
Highway Rest Areas	CalTrans 2003	CA	53	*63*	*16*	*8*	*142*	*0.47*	7

Park and Ride Facilities	CalTrans 2003	CA	179	*69*	*17*	*10*	*154*	*0.33*	7
Comm./ Res. Parking	FAR 2003	NY		*27*	*51*	*28*	*139*	*0.15*	4
Representative Parking Area/Lot Values				**75**	**36**	**26**	**97**	**0.14**	
Landscaping/Lawns									
Landscaped Areas	Pitt, et al. 1995	AL	6	33	81	24	230	n.a.	1
Landscaping	FAR 2003	NY		*37*	*94*	*29*	*263*	n.a.	4
Representative Landscaping Values				**33**	**81**	**24**	**230**	**n.a.**	
Lawns - Residential	Steuer, et al. 1997	MI	12	262	n.a.	n.a.	n.a.	2.33	2
Lawns - Residential	Bannerman, et al. 1993	WI	~30	397	13	n.a.	59	2.67	3
Lawns	Waschbusch, et al. 2000	WI	25	59	n.a.	n.a.	n.a.	0.79	3
Lawns	Waschbusch, et al. 2000	WI	25	122	n.a.	n.a.	n.a.	1.61	3
Lawns - Fertilized	USGS 2002	WI	58	n.a.	n.a.	n.a.	n.a.	2.57	3
Lawns - Non-P Fertilized	USGS 2002	WI	38	n.a.	n.a.	n.a.	n.a.	1.89	3
Lawns - Unfertilized	USGS 2002	WI	19	n.a.	n.a.	n.a.	n.a.	1.73	3
Lawns	FAR 2003	NY	3	*602*	*17*	*17*	*50*	*2.1*	4
Representative Lawn Values				**213**	**13**	**n.a.**	**59**	**2.04**	

Notes:

Representative values are weighted means of collected data. Italicized values were omitted from these calculations.

1 - Grab samples from residential, commercial/institutional, and industrial rooftops. Values represent mean of DETECTED concentrations

2 - Flow-weighted composite samples, geometric mean concentrations

3 - Geometric mean concentrations

4 - Citation appears to be erroneous - original source of data is unknown. Not used to calculate representative value

5 - Median concentrations. Not used to calculate representative values due to site location and variation from other values.

6 - Mean concentrations from simulated rainfall study

7 - Mean concentrations. Not used to calculate representative values due to transportation nature of land use.

Summary of Comments and Responses on the Orange County Municipal Storm Water Permit

11/10/08 Draft (Comments 1-173) ; 03/24/09 Draft (Comments 174-244) ; 04/10/09 Draft (Comments 245-260) ; Public Hearing (Comments 261-278) ; 05/01/09 Draft (Comments 279 – 315)

Comment No.	Commenting Parties	Section No.	Permit Requirement	Comment	Submitted Recommendations	Response
1	Lake Forest	General	N/A	The Draft Permit does not have a Table of Contents	Add a Table of Contents to allow easier navigation to various sections	Comment noted. Due to time constraints, the recommendation could not be implemented.
2	Irvine, County of Orange, Anaheim, Lake Forest,	Finding A5.c	The Permittees have the authority to levy service charges, fees or assessments to pay for compliance with this order.	Assessments to pay for compliance with this order must meet voter approval	Remove Section A.5c	Permit language has been revised to reflect the need for voter approval for some assessments.
3	County of Orange-Attachment B	General	Reference to Permittees	Reference to the Permittees is inconsistent throughout the permit.	Use the recommended language.	Permit language has been revised.
4	County of Orange-Attachment B	Finding A.3, Fact Sheet page 13	MEP definition	The definition of maximum extent practicable stated in the permit and the fact sheet are different and are not consistent with the case law.	Use recommended language.	Permit language has been revised.
5	Irvine	Finding C.8 and Section XVIII.B.3	This order is intended to regulate the discharge of pollutants…from anthropogenic…sources…not… background or naturally occurring pollutants	While this finding indicates an appropriate focus of the permit, Section XVIII, which addresses selenium in rising groundwater is not consistent with Finding C.8. Selenium should be addressed under the TMDL and NSMP programs.	Revise Section XVIII to make it consistent with Finding C.8.	Permit language has been revised to describe the co-operative process that is being used to address the selenium and nutrient impacted groundwater in the San Diego Creek Watershed.
6	Irvine	Finding C.10	Regional Board recognition that the permittees may lack jurisdiction over certain discharges	While this finding appropriately identifies the legal limitations of the co-permittees, Section XVIII requires co-permittees to address selenium in rising groundwater and copper in receiving waters when it's beyond their ability to eliminate those pollutants.	Revise Section XVIII to make it consistent with Finding C.10	Permit language has been revised to describe the co-operative process that is being used to address the selenium and nutrient impacted groundwater in the San Diego Creek Watershed. The sources of copper include controllable sources such as industrial sites.
7	Irvine	Finding 16.b, Finding K.56, Section	The 2007 DAMP includes all activities the permittees propose to undertake during the next permit	This finding references the Draft 2007 Drainage Area Management Plan, which has not been reviewed by the co-permittees.	Ensure that the co-permittees have had an opportunity to review and approve the entire 2007 DAMP prior to permit adoption.	The 2007 Draft Drainage Area Management Plan (DAMP) was submitted with the ROWD on July 21, 2006 by the principal permittee.

Summary of Comments and Responses on the Orange County Municipal Storm Water Permit						
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Comment No.	**Commenting Parties**	**Section No.**	**Permit Requirement**	**Comment**	**Submitted Recommendations**	**Response**
		II.B.2 and Section XIX.3	term.			
8	Irvine	Finding F.18	The County's storm water conveyance systems include an estimated 400 miles of storm drains	The 2002 MS4 permit stated that there were an estimated 400 miles of storm drains in the County and that number should have increased.	Revise estimate.	Finding has been updated to current conditions.
9	Irvine	Finding G.21	This order prohibits the construction of treatment BMPs within waters of the U.S.	This language is overly broad and appears to prohibit trash booms and Natural Treatment System facilities that are installed in retrofitted channels and basins.	Eliminate or narrow the prohibition against natural and structural treatment BMPs.	As stated in the current language of the draft permit, if discharge treatment sufficiently protects the beneficial uses of the receiving water, additional polishing within waters of the U.S. may be considered. Street sweeping, catch basin inserts/filters and catch basin cleanouts result in discharges that, for the most part, protect the beneficial uses of those receiving waters. The use of trash booms primarily protects the downstream beaches. Finding 21 indicates that treatment systems within waters of the U.S. could be considered on a case-by-case basis.
10	Irvine	Finding H.30	It is anticipated that many of the inspections required under this order can be carried out by inspectors currently conducting other types of inspections for the permittees.	It should not be assumed that additional duties added to current inspections do not lead to any additional workload or City resources.	Remove that language.	The permit language does not assume that no additional workload will result from these duties being carried out by inspectors currently conducting other types of inspections, but rather identifies possible workload savings using this strategy, rather than always sending out an additional inspector to address only storm water issues.

Summary of Comments and Responses on the Orange County Municipal Storm Water Permit

11/10/08 Draft (Comments 1-173) ; 03/24/09 Draft (Comments 174-244) ; 04/10/09 Draft (Comments 245-260) ; Public Hearing (Comments 261-278) ; 05/01/09 Draft (Comments 279 – 315)

Comment No.	Commenting Parties	Section No.	Permit Requirement	Comment	Submitted Recommendations	Response
11	Irvine	Finding I.38 and O.74	Theses findings discuss the use of debris booms within apparent waters of the U.S.	This statement would appear to violate the restriction identified in Finding G.21, prohibiting the implementation of treatment BMPs in waters of the U.S.	Please clarify.	See response to comment 9.
12	Irvine	Finding J.43	TMDLs have been established by the Regional Board for… the San Diego Creek / Newport Bay watershed.	It is the City's understanding that the San Diego Creek/Newport Bay watershed is referred to as the Newport Bay watershed.	Please clarify.	Permit language has been revised.
13	Irvine	Finding K.55	The permittees have adopted grading and erosion control ordinances, guidelines and BMPs for municipal, commercial, and industrial activities.	The co-permittees have not adopted BMPs but instead the DAMP and LIPs contain guidelines for the implementation of minimum BMPs	*Revise to read: The permittees have adopted grading and erosion control ordinances and guidelines for the implementation of minimum best management practices (BMPs) for municipal, commercial, and industrial activities.*	Permit language has been revised.
14	Irvine	Finding L and throughout	NEW DEVELOPMENT/ SIGNIFICANT REDEVELOPMENT – WQMP/LIP/LID	Throughout the draft order there should be a distinction between the model WQMP and the project WQMP.	Please differentiate between the project and model WQMPs	Permit language has been revised.
15	Irvine	Finding L.61	Finding identifies that the Southern California Coastal Water Research Project (SCCWRP) is developing a Low Impact Development Manual for Southern California.	It is our understanding that SCCWRP is not developing this manual.	Please clarify.	Permit language has been revised.
16	Irvine	Finding L.62	Finding identifies that USEPA has determined that by limiting the effective impervious area (EIA) of a site, downstream	USEPA has not determined that prescriptively limiting EIA to 5% or less is the best way to minimize receiving water impacts in all watersheds and for all physical conditions. With	Revise this finding to recognize other white papers and information submitted to the Regional Board and revise the New Development and Significant Redevelopment provisions to use a volume	Permit language has been revised.

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Comment No.	**Commenting Parties**	**Section No.**	**Permit Requirement**	**Comment**	**Submitted Recommendations**	**Response**
			impacts could be minimized. A limited study conducted by Dr. Richard Horner concluded that a 3% EIA standard for development in Ventura County is feasible.	regards to Dr. Horner's study, additional white papers produced in meetings regarding this Orange County permit indicate that a 3% EIA standard may be inappropriate for incorporation into this permit.	treatment performance standard for LID implementation, more specific exemption criteria for when LID may be undesirable, and establish timelines for the development of watershed plans and LID/hydromodification control standards.	
17	Irvine	Finding L.66	Finding states that if certain BMPs are not properly designed and maintained, they could become sources of groundwater pollution, nuisance, etc.	While the City supports the more stringent requirements for use of LID BMPs, if LID infiltration BMPs are used in inappropriate conditions, they may be sources of pollution or nuisance.	Revise findings to indicate technical and environmental constraints on LID infiltration BMPs.	Permit language has been revised.
18	Irvine	Finding L.67	Finding states that if the BMPs in Finding L.65 are not properly designed and maintained, they could become sources of nuisance and/or habitat for vectors.	If LID infiltration BMPs are not properly designed or maintained, they may become sources of nuisance and/or habitat for vectors.	Revise findings to indicate that LID infiltration BMPs may become sources of nuisance and/or habitat for vectors if not properly designed or maintained.	Permit language has been revised.
19	Irvine	Finding M.68	Finding discusses de minimus discharges and states that municipal de minimus discharges generally do not require separate coverage under the Regional Board's de minimus permit.	This finding can be interpreted to mean that all de minimus discharges are prohibited in the San Diego Creek/Newport Beach watershed.	The language should be clarified. Further, the City supports the County comment that all de minimus discharges should be allowed unless a finding is made that those discharges are a significant source of pollutants.	Permit language has been revised to clearly state that a separate de minimus permit is required for non-storm water discharges to the MS4 in the San Diego Creek/Newport Beach watershed.
20	Irvine	Finding M.69	Finding points out the high nitrate and/or selenium levels in the soils and/or groundwater in the San Diego Creek/Newport	LID infiltration BMPs can also potentially mobilize nitrogen and selenium.	The findings should recognize that fact.	While the comment is valid, it was not the intent of Regional Board staff to identify <u>all scenarios</u> that could lead to mobilization of nitrogen and selenium in Finding 69.

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Comment No.	**Commenting Parties**	**Section No.**	**Permit Requirement**	**Comment**	**Submitted Recommendations**	**Response**
			Bay watershed and that dewatering activities could mobilize these pollutants.			
21	Irvine	Finding N.71	The principal permittee in collaboration with the co-permittees is to develop guidelines for the competencies and training schedules for municipal storm water positions.	While training is necessary, the City wants the flexibility to design and conduct training as well as the methodology for assessing the competency of staff.	Revise this finding and add an option to enable individual co-permittees to provide in-house training using curriculum developed by the principal permittee in collaboration with the co-permittees.	Permit language has been revised.
22	Irvine	Finding O.76	The finding discusses the importance of cooperation by public agency organizations within Orange County that have an impact on storm water quality.	More needs to be done to secure the participation of some of the larger public agencies within the Newport Bay Watershed, such as UCI.	Encourage state institutions and other major dischargers in the watershed, such as UCI, to join the NSMP and other applicable watershed efforts.	Regional Board staff will continue to work with the stakeholders whose activities and/or discharge contributes to the selenium/nutrient impacts in the watershed.
23	Irvine	Finding R.83	The finding discusses the elimination of illegal discharges and illicit connections to the MS4.	The terms ‘illegal’ and ‘illicit’ should not be used interchangeably	Determine correct/consistent terminology and use throughout the permit.	Permit language has been revised.
24	County of Orange, Riverside County Flood Control	General comment	General comment	The proposed permit increases administrative burden.	Adjust the current reporting requirements rather than increasing the reporting requirements.	Draft permit amended to streamline reporting requirements.
25	Riverside County Flood Control	General comment	General Comment	The basis for the Riverside County MS4 Permit should be the 2002 Riverside County MS4 Permit, not the Draft OC MS4 permit	The basis for the Riverside County MS4 Permit should be the 2002 Riverside County MS4 Permit	Comment noted
26	San Bernardino Stormwater Program	I.B.12	Requires permittee to develop adequate guidelines for competency	This requires developing an entire training program to be placed upon the shoulders of the Principal Permittee	These competencies are in a large part already well-established by CASQA and other organizations. It would be appropriate for the	Although guidance documents have been created by various organizations, it is the

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			requirements for stormwater managers, inspectors etc.		Principal Permittee to coordinate only the training effort	responsibility of the Principal Permittee to collaborate with co-permittees to develop a competency program specific to the requirements within this permit.
27	Irvine	Section I.B.12	Develop guidelines for defining competencies of municipal managers and inspectors	The competency of staff and the outcome of any evaluation of competency are confidential	The permittee cannot commit to providing any competency evaluations or reporting on confidential documents that are part of an employees' performance.	The permit language has been revised, with the understanding that deficiencies in a permittee's program that are the result of either management or staff's lack of understanding of the program will result in enforcement actions.
28	Orange County-Attachment B, Riverside County Flood Control	III.3.	Discharge limitation/prohibition	Make the prohibitions consistent with the federal regulations.	Retain language from Order No. R8-2002-0010.	Language revised to be consistent with the federal regulations, 122.26(d)(2)(iv)(B)(1).
29	Orange County-Attachment B, Riverside County Flood Control	III.3.	Public education to reduce non-storm water discharges	Remove the requirements for public education and outreach to reduce non-storm water discharges.	Retain language from Order No. R8-2002-0010.	Reducing non-storm water discharges could possibly reduce the pollutant load to the MS4s.
30	Orange County-Attachment B, Riverside County Flood Control	III.3.	Categories of non-storm water	Irrigation water from agricultural sources.	Runoff from agricultural sources should be addressed through other programs.	Permit language has been revised.
31	Irvine	Section III.3.i	The discharges identified below need not be prohibited by the permittees if they have been determined	The wording reverses the presumption found in Federal regulations that these de minimus discharges are not significant sources unless a	No submitted recommendation was submitted for this comment.	Permit language has been revised.

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			not to be substantial contributors of pollutants to the MS4 and receiving waters.	finding is made to the contrary.		
32	Irvine	Section III.3.i.l	Discharges of potable water (i.e., fire hydrant flushing) would have to be addressed as a de minimus discharge.	Discharges from fire hydrant flushing would require capture, analysis and volumetrically and velocity controlled discharges.	Change III.3.i.l to existing de minimus permit requirements by cross-referencing that permit.	The proposed permit conditions for the discharge of fire hydrant flushing waters remain the same as the de minimus permit with regard to residual chlorine concentrations. The proposed language regarding volumetrically and velocity controlled to prevent resuspension of sediments has been revised to read "…prevent hydrologic conditions of concern in receiving waters."
33	Irvine	Section III.3.i.l and XXI.5	With regards to emergency fire fighting flows, where possible, when not interfering with health and safety issues, BMPs should be implemented.	BMPs should only be required during controlled fire exercises and/or training. BMPs should not be required, even as 'where possible' for emergency situations.	Delete sentence referring to implementation of BMPs during emergency fire fighting operations, as well as the requirement in XXI.5.	While the sensitivity of implementing BMPs during actual fire fighting activities is understood, it is not unreasonable to expect BMPs to be implemented where feasible to meet the Maximum Extent Practicable threshold for permittee action.
34	County of Orange-Attachment A, Riverside County Flood Control	III.3.i.c	Irrigation runoff from agricultural sources	Runoff from agricultural sources is exempt from NPDES requirements.	Agricultural sources should not be included in this category.	Permit language has been revised.
35	Irvine	Section III.3.i.c	Irrigation water from agricultural sources.	Agricultural sources are non-point source, are not subject to NPDES permits, and are not currently the subject of Waste	The category 'irrigation water from agricultural sources' should be amended to read 'irrigation water' and the category 'irrigation water	Permit language has been revised.

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				Discharge Requirements or a Conditional Waiver of WDRs. Federal regulations do not specify agricultural irrigation runoff as a de minimus discharge to MS4 systems.	from agricultural sources' should be addressed through other Regional Board regulatory mechanisms.	
36	SDGE	III.3	Prohibition of non-storm water discharges unless the following conditions are met:	As the permit is currently worded, there could be some misunderstanding that non-storm water discharges covered under a separate permit may be considered prohibited	Revise sentence to read: The permittees shall prohibit the following categories of non-stormwater discharges unless such discharges are authorized by a separate NPDES and/or the stated conditions below are met.	Permit language has been revised.
37	Cypress	III.3 (ii)a	Discharge Limitations/Prohibition: Discharges from potable water sources, including water line flushing, superchlorinated water line flushing, fire hydrant system flushing , and pipeline hydrostatic test water: Planned discharges shall be dechlorinated to a concentration of 0.1 ppm or less, pH adjusted if necessary , and volumetrically and velocity controlled to prevent resuspension of sediments.	The Orange County Stormwater program has developed BMP Fact Sheets FP-6 – Water and Sewer Utility Operation and Maintenance, FP-7 Fire Department Activities and IC-23 Fire Sprinkler Testing/Maintenance. In the absence of any Finding that existing control efforts are inadequate,	Specific requirements for the discharges identified in Section 3.ii.a should reference these Fact Sheets	Although the information contained within the Orange County Storm water program's Fact Sheets may be consistent with the requirements illustrated within this Section of the Draft Order and have been developed in order to comply with previous iterations of the Order, the Order itself sets the requirements for compliance. Fact Sheets have been prepared as a guidance tool to be used by co-permittees.
38	State Water Resources Control Board	III.3(ii)c	Dechlorinated swimming pool discharges: reduce volume and velocity to	Is the intent to prevent resuspension of sediments in the receiving water, the MS4 or the BMP?	Clarify information concerning comment and revise paragraph heading to read "Swimming Pool Discharge"	The proposed language regarding volumetrically and velocity controlled to prevent resuspension of sediments

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			prevent resuspension of sediments			has been revised to read "…prevent hydrologic conditions of concern in receiving waters." The paragraph heading as been revised.
39	Cypress	III.3(ii)c	Dechlorinated swimming pool discharges: reduce volume and velocity to prevent resuspension of sediments	Placing numeric limits for pool discharges affirms that the City is already doing by distributing the County's "Tips for Pool Maintenance" brochure.	The City wants to be certain the intent is not to make the City test each discharge or have the City require residents to obtain permits for such.	The criteria listed in this section should be used to establish municipal codes and enforcement procedures. In most cases, we do not anticipate the need for residual chlorine testing or permitting.
40	County of Orange	Section IV of the M&RP	Program Effectiveness Assessment	Use existing and newly generated data for program assessment in accordance with the CASQA Guidance.	Make program assessment requirements consistent with the recommendations in the ROWD.	The permit provides the permittees the option of using the CASQA Guidance or other technically sound methodology.
41	Orange County-Attachment B	Section VI	Reporting of State's General Permit violations.	Permittees do not enforce the State's General Permit.	Revise language as suggested.	Enforcement requirements have not changed from the 2002 permit; this approach avoids duplicative efforts and fosters cooperation among various regulatory/local agencies.
42	Irvine	Section VI.1,VI.3, VII.1	Such legal authority must address all illegal connections and illicit discharges into the MS4s, including those from all industrial and construction sites.	The legal authority documents (ordinances, etc.) give authority to the permittee to develop a program to control illicit discharges and illegal connections, but does not set forth the specific components of the program. Legal authority should not be confused with procedures and methods to accomplish compliance.	Revise the language of this requirement to indicate the role of the DAMP and LIPs in setting forth the program to address illegal connections and illicit discharges.	Permit language has been revised.

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43	Lake Forest	VI.2	The permittees shall progressively and decisively take enforcement actions against any violators of their Water Quality Ordinance	This language (progressively and decisively) creates ambiguity about what is actually required.	None offered	The language in question reflects the progressive enforcement actions as referenced in the permittee adopted Orange County Enforcement Consistency Guide.
44	Anaheim, Villa Park, Cypress	VI.2	The permittees' ordinance must include adequate legal authority to enter, inspect, gather evidence (pictures, videos, samples, documents, etc.) from industrial, construction and commercial establishments	Concern about search and seizure laws and the necessity to obtain a Court Order are being looked into, should the current iteration of the proposed permit language remain as is. Villa Park states: Proposed language may be viewed as a violation of 4th amendment	Therefore, in order to ensure inspections may be conducted as intended through legal authority via municipal codes, the permit language should be retooled to avoid unnecessary efforts	Permit language has been revised.
45	Irvine	Section VI.2	The permittee's ordinance must include adequate legal authority to enter, inspect and gather evidence from industrial, construction and commercial establishments.	The City agrees with the County comments that this provision could impose entry requirements on the co-permittees that violate the 4th Amendment rights of property owners	"The permittees shall carry out inspections, surveillance, and monitoring necessary to determine compliance with their ordinances and permits. The permittees' ordinance must include adequate legal authority, to the extent permitted by California and Federal Law and subject to the limitations on municipal action under the constitutions of California and the United States, to enter, inspect and gather evidence (pictures, videos, samples, documents, etc.) from industrial, construction and commercial establishments…"	Permit language has been revised.
46	Lake Forest	VI.3	"these penalties shall be issued in a decisive manner	The term *decisive* creates ambiguity about what is actually required	None offered	The term decisive was used to infer a directly definitive, results-oriented enforcement process.
47	Villa Park, Cypress, Laguna Hill	VI.6	Permittees are to provide quarterly notifications w/	Quarterly reporting of enforcement activity is an administratively burdensome	Maintain current enforcement activity reporting requirements	Reporting requirements have not changed with respect to the information to be

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			inspection results to RB, for all inspections conducted at sites covered under the Statewide General Industrial and Construction Permits.	requirement for medium and small cities with little to no staff resources.		submitted. However, the frequency has been changed. Historically, many permittees have submitted inspection information on a monthly basis or immediately following the inspection event.
48	Fullerton, Costa Mesa, Brea, Irvine	Various	Additional reporting requirements throughout various Sections	The draft Order requires additional reporting to the Regional Board staff. The City believes that adjusting the existing reporting processes rather than creating additional reporting requirements is the most effective approach to increasing transparency and accountability	None	Information collected during the (third term permit) MS4 audits, concluded that additional reporting requirements were warranted. In order to ensure compliance with data collection requirements within the permit, various reporting requirements have either been sustained or introduced accordingly
49	Orange County-Attachment B	Section VII.5	Trash Characterization	Each Permittee should not be required to characterize trash.	Principal Permittee should be responsible for this.	While trash sources may not significantly vary among municipalities, the relative quantities of trash type will vary between municipalities and even within municipalities. The purpose of this study is to focus municipal resources (education and enforcement) on the most prevalent trash sources within the municipality in an effort to avoid a possible, future trash TMDL.
50	Orange	VII.5	Permittees to review their trash control ordinance. To determine the need for	Is the intent of the Permit to have each permittee carry out this requirement? It makes no sense to have each permittee conduct a	Revise the paragraph to require the principal permittee instead of the co-permittees to conduct the county-wide study over the 5 year	Permit language has been revised. See response to Comment #49

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			any revisions/ determine sources and proper BMPs to control urban runoff. Include findings in the Annual Report	county-wide study, since trash sources do not vary significantly among municipalities	permit term to characterize trash sources	
51	Orange, Cypress, Riverside County Flood Control	VIII.2	Construction site inventory to include all sites, within each co-permittee's jurisdiction for which building or grading permits have been issued where activities at the site include …..	The first part of the paragraph requires the inventory list is limited to sites with issued building or grading permits that raise concerns regarding water quality, but later contradicts itself by stating "all sites". This would include plumbing, encroachment or other indoor permits.	Change language to make it not contradictory. Exclude the GIS requirement from construction projects within the public right of way as well.	Permit language has been revised. .
52	Irvine	VIII.2	Construction site inventory to be maintained and updated quarterly	This requirement will be burdensome and unnecessary as it will just be created to satisfy a draft tentative order. Since construction project timelines are not short enough to result in meaningful additions to the inventory within the period of three months.	Updates should only be required on a biannual basis (in September, preparatory for the rainy season and rainy season inspections).	Maintaining and updating the site inventory quarterly is to ensure that records remain current concerning the regular and constant oversight of construction activities within each permittee's jurisdiction.
53	Irvine	Section VIII.4	Each permittee shall conduct construction inspections for compliance with its ordinances (grading, Water Quality Management Plans, etc.), local permits (construction, grading, etc.), the Model Construction Program…	Water Quality Ordinances do not include a reference to project WQMPs, which are post-construction documents.	Remove parenthetical entries. "Each permittee shall conduct construction inspections for compliance with its ordinances, local permits, the Model Construction Program…"	Permit language has been revised.

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54	Riverside County Flood Control		Construction site inspection requirement to include review of the Erosion & Sediment Control Plan	In addition to requiring a significant increase in the level of training and expertise of construction site inspectors, this requirement will significantly increase the amount of time needed for each construction site inspection	Exclude requirement from the draft Riverside County MS4 permit	The current (2002) OC MS4 permit already requires, inspection staff to have sufficient expertise in construction inspection processes as they relate to water quality and storm water related issues.
55	Lake Forest	VIII.6	"[e]ach permittee shall respond to complaints received by a third party in a *timely* manner to ensure that the construction sites are not a source of pollutants in the MS4s and the receiving waters	The term "timely" creates ambiguity about what is actually required	None offered	Response to complaints must be handled in order of severity, with respect to the sites' potential to act as a pollutant source to the MS4. Therefore, the term "timely manner" was listed with the understanding that municipal staff receiving the complaint would be properly trained and equipped to determine how potentially grievous the pollutant threat could be and address it accordingly. The setting of an arbitrary time limit (e.g., within 1 business day) could put permittees in violation of the permit by not addressing very low priority complaints in that time limit.
56	County of Orange – Attachment A	Sections VIII, IX and X	Inspection requirements	The inspection requirements are well beyond federal law.	Make requirements in the permit consistent with the federal laws and regulations.	The inspection requirements are consistent with the federal laws and regulations. See 40CFR112.26(d)(2)(F) and the MEP provisions in Clean Water Act at Section 402(p)(3)(B)(iii).
57	County of Orange – Attachment A	Sections VIII, IX and X	Inspection requirements	Requirements beyond the federal requirements tantamount to unfunded mandate.	Unfunded mandates should not be part of this permit.	The permit requirements are consistent with the federal laws and regulations and,

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						therefore, are not unfunded mandates.
58	County of Orange – Attachment A	Sections VIII, IX and X	Inspection requirements	The inspection requirements violate the fourth amendment.	Make changes to the inspection requirements consistent with the state and federal laws and regulations.	Permit language amended.
59	San Bernardino Stormwater Program	VIII,IX,X	Inspection requirements	Requirement within these sections have new specific actions, such as electronic database, to check if sites have filed NOI, photos that need to be taken and included in the database, requirements for on-site enforcement actions.	We suggest that the permittees be allowed to prioritize and take enforcement actions based on their own criteria.	While the permittees have the ability to prioritize enforcement activities based on their own criteria to a certain extent, the Regional Board still has the obligation to set a minimum standard in the permit to ensure a level of consistency amongst the permittees.
60	Orange	IX.2	Facilities Covered under the General Industrial Permit are automatically considered as High Priority and therefore are required to be inspected.	History has shown that once a facility has been inspected at least once, there is an increased awareness of water quality impacts and facilities will implement BMPs to minimize storm water and non storm water discharges.	Allow redesignation of mandatory high priority facilities based on the suite of factors in the DAMP used to rank a facility.	The criteria by which facilities are identified for coverage under the General Industrial Permit are based on either their industry's potential to pollute and/or the actual exposure of materials, wastes, or processes to storm water. This criteria alone is sufficient for a mandatory 'high' priority.
61	Irvine	Section IX.3	Industrial inspections shall include a review of material and waste handling and storage practices, written documentation of pollutant control BMP implementation and	The written documentation, in the form of storm water pollution prevention plan, is only required for facilities with industrial storm water permits. The burden of SWPPP review for compliance with the State's General Industrial permit should remain	Please clarify the intent of the industrial facility document inspections consistent with the City's comments.	Permit language has been revised to clarify that the '… written documentation of pollutant control BMP implementation and maintenance procedures …', refers to one of the four items required to be in a permittee-

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			maintenance procedures and digital photographic documentation for any water quality violations, as well as, evidence of past or present unauthorized, non-storm water discharges and enforcement actions issued at the time of inspection.	with the Regional Board staff. The City's inspections should continue to assure no ICs/IDs and compliance of facilities with City water quality ordinances and requirements		prepared inspection report. Those four items include: a written review of material/waste storage procedures; the written documentation of BMP implementation; photographic documentation of evidence of discharges; and, a listing of enforcement actions resulting from the inspection.
62	Westminster	IX.6 & X.5	Electronic inspection database submittal requirement in each annual report for Industrial and Commercial inspection programs	Clarify if permittees should submit only inspection inventory or the entire inspection database for these categories.	None. Request for clarification only	Permit language has been revised to allow the submittal of all inspection documentation/information in hardcopy form if a municipality's database uses a proprietary program (not Access or Excel compatible)
63	County of Orange	Section X	Commercial inspections	The permit extends the regulatory reach of local jurisdictions without technical justification.	Unjustified inspections should not be required.	Quantifiable inspection requirements are included to ensure an equitable level of effort across all permittees.
64	Irvine	Section X.1	Each permittee shall continue to maintain and quarterly update an inventory of the types of commercial businesses listed below.	Section X.1 requires 11 new, additional categories to be added to the commercial facilities inventory. It does not make sense to increase the commercial facility inspection burden so significantly in the time of budget constraint. Further, there's no indication in the ROWD that commercial facilities are currently such significant sources of pollutants to warrant this increase in inspections.	The new categories should be deleted until such a time that these types of facilities have been determined to contribute a significant pollutant load to the MS4.	The Fact Sheet and the findings have been revised. The revised permit language requires the Principal Permittee to prioritize these new categories based on potential threat to water quality.

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65	Orange County-Attachment B	Section X.1	Municipal inspections of commercial facilities.	There are 11 new categories included in the draft permit with out any technical justification.	These resource intensive inspection requirements should be deleted.	The Fact Sheet and the findings have been revised. The revised permit language requires the Principal Permittee to prioritize these new categories based on potential threat to water quality.
66	Orange County-Attachment B	Section X.1	Commercial inspection frequencies	Some of the facilities listed under the commercial inspection program should be under the industrial program.	Move industrial type of facilities under the industrial program.	Permit language has been revised.
67	Orange County-Attachment B	Section X.2	Commercial inspection frequencies	The permit arbitrarily assigns priorities for inspections.	The Permittees should be allowed to develop a prioritization system.	Audits conducted by Regional Board staff indicated that some Permittees were ranking all their commercial facilities as "low" even though similar facilities were ranked as "high" by other Permittees.
68	Orange County-Attachment B	Section X.8	Mobile businesses	No technical basis. Difficulty in regulating mobile businesses.	Principal Permittee to develop a pilot program.	A uniform prioritization criteria and inspection requirements are acceptable alternatives. Permit language has been changed.
69	Villa Park, Yorba Linda, Tustin	X.1	Permittees to maintain and update commercial facility inventories quarterly, in a computer-based database system with all third term permit inventory criteria, as well as information on ownership, size, location, GIS w/ Lat/Longitude	Quarterly updating of the commercial facilities database and the implementation of GIS tracking of commercial fixed facilities is a burdensome requirement that for medium to small cities with little to no staff resources is not viable	Maintain current commercial facility tracking requirements	Third term permit recommended annual updating of commercial inventories with GIS tracking capabilities. During the 3rd term permit, MS4 Audits conducted by Regional Board staff indicated the need for more regimented oversight regarding commercial inventory management. Therefore this recommendation transitioned into a requirement within the fourth term permit.

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70	Laguna Hills	X.1	Permittees to maintain and quarterly update an inventory of commercial facilities within its jurisdiction.	This section should be modified to allow the permittees to update the commercial inventory annually and submit it with the annual NPDES report	The requirements within this section should not be changed from the current 3rd term permit.	The purpose of maintaining an updated inventory list is to ensure that adequate oversight controls are in place. During the 3rd term permit, MS4 Audits conducted by Regional Board staff indicated the need for more regimented oversight regarding commercial inventory management.
71	Irvine	Section X.2 and X.3	Commercial facility inspection criteria	The mandate that 10%, 40% and 50% of commercial facilities be ranked high, medium and low is not based on technical data or on demonstrated risk posed by commercial facilities.	The DAMP and LIP provisions should instead be reviewed and revised to assure that the criteria result in adequate oversight. Secondly, high ranked sites should be inspected once per permit cycle rather than once a year and medium and low site inspections be dropped.	During the third permit term, the permittees were given the opportunity to design a commercial facility ranking system based on a number of criteria including type/size of activity, potential for pollutant discharge and history of pollutant discharges. Despite this opportunity, in the most recent annual report, some permittees are reporting few or no high priority commercial sites out of hundreds to thousands of sites that met one or more of the 11 categories listed in the third term permit. The 10/40/50 breakdown should be used to ensure that the 10% of commercial facilities with the highest potential for pollutant discharge be ranked ‘high’ and be inspected annually, similarly for the medium and low priority rankings.

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72	OC Public Works, Huntington Beach, Costa Mesa, Orange, Brea, Westminster, Villa Park, Lake Forest, Cypress, Laguna Hills, Yorba Linda, Tustin	X.2	10% of all commercial sites (excluding restaurants) shall be ranked "high" , 40% ranked medium and the remaining 50% ranked low	This new requirement will increase the annual inspection requirements to a point where resources are incapable of complying with the requirements. The inventory should be determined solely on a risk-based instead of a mandatory curve-based criterion.	Each permittee conduct inspections of its commercial facilities as indicated below. To establish priorities for inspection, the perrmittees shall continue to prioritize commercial facilities/businesses within their jurisdiction as a high, medium or low threat to water quality based on such factors as the type, magnitude and location of the commercial activity, potential for discharges, proximity and sensitivity of receiving waters, material used and wastes generated at he site. Within 6 mos. Of the adoption of this order, the Permittees shall review their existing prioritization system, criteria and results based on the inspections and determine if any modifications are necessary. The modifications shall be completed within 6 months of the determination and reported on in the annual report.	During the 3rd term permit, MS4 Audits conducted by Regional Board staff indicated the need for more regimented oversight regarding commercial inventory management and inspections within this section. The percentages indicated within this section were developed following extensive review of inspection information within PEAs submitted by co-permittees during the 3rd term permit.
73	Irvine, Westminster	Section X.3 and X.5	Commercial facility inspection documentation	The commercial inspection section that requires photographic documentation for all aspects of the inspection is too onerous.	Photographic evidence should only be required in the case of water quality ordinance violations and only in manner consistent with local, state and federal ordinance, regulations and laws.	Photographic evidence of all aspects of commercial inspections will assist permittees in supporting the appropriate enforcement action and will provide evidence during Regional Board audits that site conditions during inspections by municipal staff, are receiving the appropriate enforcement actions, if any.

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74	County of Orange	Section X.8	Mobile businesses	A new regulatory oversight is prescribed for mobile businesses.	The permittees have already developed BMPs for these businesses; additional requirements are not warranted.	Complaints received in the Regional Board office and Board staff's field observations indicate that these discharges have not been fully eliminated and additional measures are needed to control discharges from mobile businesses.
75	Villa Park, Cypress, Laguna Hills	X.8	Mobile businesses shall implement appropriate control measures within 3 months of being notified by permittees	It's unrealistic to expect that over any period of time it would be possible for the principal permittee to notify all mobile businesses operating within the County, of minimum source controls and pollution prevention measures that they must develop and implement.	…modify the requirement to read that "…the principal permittee shall utilize all reasonable resources to notify mobile businesses…"	Permit language has been revised.
76	ProntoWash	X.8	Mobile businesses shall implement appropriate control measures within 3 months of being notified by permittees	Require mobile operators to be inspected and trained in water quality control measures during the business licensing process.	During the licensing process, the mobile operations should be inspected and the operators should be trained on water quality protection procedures.	Many municipalities currently do not issue business licenses. Listed within Section X.8, are requirements for the permittee to distribute educational materials to businesses as well as a training program requirement.
77	Lake Forest	X.8	Mobile businesses shall implement appropriate control measures within 3 months of being notified by permittees	The regular, effective practice of unannounced inspections is difficult to impossible to implement. Identifying mobile businesses is difficult because they are often not permitted or licensed. Mobile businesses are transient in nature, advertise a mobile phone number as the only means of contact and may have geographic scope of several cities or the entire region.	Remove the mobile business requirements from the draft permit and instead, require the permittees to develop their own program for implementation during the next permit cycle.	Permit language has been revised.

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Comment No.	**Commenting Parties**	**Section No.**	**Permit Requirement**	**Comment**	**Submitted Recommendations**	**Response**
78	County of Orange, Villa Park, San Bernardino Stormwater Program	Section XI	Each permittee shall develop and implement a residential program to reduce the discharge of pollutants from residential facilities to the MS4 to MEP…	No technical justification for the residential program. Remove the Residential Program from the Order completely	Recognize the fact that the current public education programs are working. Remove the Residential Program from the Order completely.	Despite implementation of public education programs, residential areas continue to be a significant source of pesticides, herbicides, nutrients and nuisance flows. Additional actions are necessary to further address these problems.
79	Irvine	Section XI.2	Identification of residential areas and activities that are potential pollution sources and requiring residents to implement pollution prevention BMPs.	Many aspects of this proposed requirement are already covered by Public Education activities. Further it may require passage of new ordinances forcing residents to implement specific minimum BMPs and those types of ordinances are unpopular.	Retain the residential program as part of the Public Education section and revise the key provision in the draft permit to : "The permittees shall ~~require~~ *encourage* residents to implement pollution prevention measures via the public education and outreach Program …".	Despite implementation of public education programs, residential areas continue to be significant sources of pesticides, herbicides, nutrients and nuisance flows. Additional programs are needed to address these problems. Some changes made to the provisions.
80	Orange County-Attachment B,	Section XI.2	Residential program	The requirement for a residential program is duplicative of existing public education and outreach activities.	Avoid duplicative requirements.	Permit language has been amended.
81	Anaheim, Fullerton, Costa Mesa, Brea, Cypress, Laguna Hills, Yorba Linda, Tustin	XI.2	The permittees shall require residents to implement pollution prevention measures	Requiring residents to implement best management practices is problematic	Change the wording to state: "The permittees shall *encourage* residents to implement pollution prevention measures*."*	Permit language has been revised.
82	Cypress	XI.3	The permittees, collectively or individually, shall facilitate the proper collection and management of used oil, toxic and hazardous materials, and other household wastes.	The city is concerned with the funding for conducting collection events.	The current County of Orange Household Hazardous Waste Collection Program has been working well since its implementation and agencies continue to do a good job making residents aware of this service. Change language from "shall" to "…***should** facilitate the proper collection and management*."	Requirements within this section have not changed essentially from requirements within Section I.4 of the 3rd term permit.

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Comment No.	**Commenting Parties**	**Section No.**	**Permit Requirement**	**Comment**	**Submitted Recommendations**	**Response**
83	Irvine	Section XI.4	Control measure requirements for common interest areas and areas managed by Home Owner Associations.	A limited pilot HOA program has been initiated by the City to educate certain property managers on the economic and water quality benefits of improved irrigation and landscaping practices. But the draft tentative order as currently written mandates that co-permittees must develop and implement new BMPs for common interest areas, including, we presume, structural treatment control BMPs as well as source control BMPs.	Revise the first sentence of this section as follows: "The permittees shall develop ~~and implement~~ a public education and outreach component to encourage owners …".	The tentative order requires the permittees to develop and implement a public education and outreach component to encourage HOAs to implement BMPs. Nothing in that section requires permittees to build or maintain BMPs on private property.
84	Cypress, Irvine	Section XII.A.2	Inclusion of LID requirements in WQMPs.	The 6-month time frame for this requirement is too aggressive and does not allow time to collect info on watershed characteristics, stakeholder participation and the time required for adoption of the revisions by local governments.	A more reasonable time frame should be established.	Much of the groundwork for this requirement has been completed through a series of meetings between permittees, environmental NGOs and development representatives. It should be noted that this deadline refers to the default plan. Watershed specific plans can be delivered after that date. Some changes have been made to the new development section of the permit.
85	Irvine	Section XII.A.4	The first annual report following adoption of this permit must include a review of the inclusion of LID principals in the General Plan and other city documents.	This requirement is out of sync with the actual requirements for updating the DAMP, LIPs and model WQMPs.	Revise the requirements so that a single, integrated update of these documents is implemented.	Permit language has been revised.

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Comment No.	**Commenting Parties**	**Section No.**	**Permit Requirement**	**Comment**	**Submitted Recommendations**	**Response**
86	Irvine	Section XII.B.2	The list of priority development projects requiring a WQMP	Items f and g of this section would require treatment control BMPs for single-family homes, if they were large enough. This would be too much of a burden on homeowners and on City staff required to review and inspect these BMPs.	Do not require WQMPs or treatment control BMPs for single-family homes.	This permit requirement will only affect projects on hillsides with a natural slope of 25 percent or more and projects that are within 200 feet of an Area of Biological Significance (ASBS). As such these projects need the extra level of protection afforded by the development of a WQMP and implementation of appropriate control measures.
87	Irvine	XII.B.2.c	Priority Development Projects would include commercial/industrial developments greater than 10,000 square feet.	The threshold has been lowered in this permit from 100,000 square feet to 10,000 square feet.	The fact sheet should explain the basis for lowering the threshold criterion.	Fact sheet has been revised to provide basis.
88	Irvine	XII.B.2.i	Priority Development Projects would include streets, roads, highways and freeways of 5,000 square feet or more.	Road projects as small as 5,000 do not and cannot properly involve changes to the drainage facilities. Further it is not feasible to implement a 5%EIA or LID BMPs for the 85^{th} percentile design treatment volume.	Reconsider this requirement.	The permit will be revised including the incorporation of the concepts presented in “Managing Wet Weather with Green Infrastructure: Green Streets” (U.S. EPA, 2008)
89	Irvine	XII.B.5.a	Use of structural infiltration treatment BMPs shall not cause or contribute to groundwater water quality objective exceedances.	In the Newport Bay Watershed, there are areas where the use of any infiltration BMPs will result in mobilization of nitrogen and/or selenium.	Explicitly preclude the use of LID BMPs and exempt projects from LID implementation and hydromodification control performance standards in areas with shallow groundwater, polluted groundwater, inappropriate geotechnical conditions or rising groundwater.	The current Draft Permit language already contains sufficient warnings regarding the use of infiltration BMPs, including LID-type BMPs, without having to specifically add this language.
90	NAIOP	Section XII.C	Treatment and Low Impact Development (LID) BMPs.	It appears that the permit is biased against the use of a watershed-based or regional type solutions.	Allow as much flexibility as possible in order to achieve the permit’s goals across the jurisdiction regulated by the permit.	Comment noted. The permit provides sufficient flexibility for regional and sub-regional type solutions.

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91	Irvine	XII.C.1	Requirements that LID site design principals be implemented to reduce runoff to the maximum extent practicable.	The list of site design BMPs provided is a confusing mix of goals, tasks and work products that don't provide a clear basis for compliance.	Separate the provisions to distinguish between recommended site design BMPs and other goals for the new development and redevelopment program.	Permit language has been revised.
92	Irvine	XII.C.2	Requirements for source control BMP implementation.	It is not clear why the major discussion of LID also includes prescribed source control BMPs.	Section XII.C.2 should be deleted from the current section and proposed as a separate section.	While the primary focus of Section C is on LID BMP implementation, source control BMPs, particularly when they're implemented through proper site design, play a play a role in LID.
93	Irvine	XII.C.4	Conditions for the substitution of treatment control BMPs for LID measures.	One of the conditions is for EIA to be 5% or less. How does one achieve an EIA of 5% or less without implementing LID?	Delete this section.	Permit language has been revised.
94	Irvine	XII.D	Hydromodification	It is not clear how the 5% or less hydrologic impact standard would be measured and does the standard allow for dense infill and transit oriented development as required by SB 375?	Revise and clarify section.	Permit language has been revised.
95	Irvine	XII.E.2	Structural treatment control BMP requirement met by regional treatment systems.	No mention of obtaining Executive Officer determination on regional treatment systems.	Please revise to clarify the need for Executive Officer approval of common project BMPs.	Permit language has been revised.
96	Irvine	XII.G.3	Prior to occupancy, permittees shall verify through visual observation that the BMPs are operational.	It will be impossible to ascertain the operation of BMPs prior to occupancy unless it rains between construction and occupancy	Revise to verification that BMPs are built according to approved plans prior to occupancy.	Permit language has been revised.
97	Irvine	XII.H	Change of ownership and recordation	The City already has a non-recorded mechanism that tracks the transfer of long-term maintenance and operation responsibilities from a developer to an appropriate operator upon completion of	Delete reference of recording any documents and explicitly allow other methods of tracking ownership and responsibility.	Permit language has been revised.

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				development. The recordation requirement should be left to the discretion of the permittees.		
98	ConTech	Section XII	5% Effective Impervious Area (EIA)	Reliance on a 5% EIA standard is inappropriate. The water quality benefits of applying a 5% EIA standard on a site-by-site basis are unknown.	Support the approach outlined in the January 2009[1] white paper. Use delta volume (post minus pre-development) from the water quality design storm event.	Permit language has been revised based on the water quality design storm event.
99	ConTech	Section XII	Treatment and Low Impact Development (LID) BMPs.	Treatment and LID BMPs inspection and maintenance requirements are not well defined.	All water quality and/or water quantity control BMPs should have maintenance and inspection requirements.	Permit language has been revised.
100	ConTech	Section XII	Post-construction	There is no standard for selection of post-construction BMPs	Provide standards for selection of post-construction BMPs.	There are a number of handbooks (e.g., CASQA[2] BMP handbooks) available for this purpose.
101	ConTech	General	Potential pollutants of concern	Match potential pollutants with control BMPs.	The permit should require that pollutants be controlled by matching with appropriate BMPs.	There are a number of handbooks (e.g., CASQA[3] BMP handbooks) available for this purpose.
102	NRDC/OCC[4]	Section XII	Need for LID metrics	To ensure compliance with the Clean Water Act, quantifiable measures must be included.	Support the use of an EIA limitation in the permit; a 3% EIA limitation is recommended.	Comment noted. The 5% EIA metric in the permit has been replaced with a volume capture metric.
103	NRDC/OCCCI CWQ	Section XII	EIA definition	Change the EIA definition to include full onsite retention of a design storm event. EIA is not clearly defined.	The design storm should not be the delta volume from a 2-year storm event; it should be the full volume. Include a design storm volume.	The draft permit has been amended to incorporate appropriate design storm criteria.
104	NRDC/OCC	Section XII	EIA definition	The tern "percolate" is not defined.	Revise the permit such that BMPs are required to have the capacity to "infiltrate, harvest for reuse, or evapotranspire".	Permit language has been changed.

[1] January 2009 white paper=
[2] CASQA=California Stormwater Quality Association
[3] CASQA=California Stormwater Quality Association
[4] OCC=Orange County Coastkeeper

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Comment No.	**Commenting Parties**	**Section No.**	**Permit Requirement**	**Comment**	**Submitted Recommendations**	**Response**
105	NRDC/OCC	Section XII	Waiver Provisions	Existing waiver provisions are very broad. The permit's waiver provisions should include a floor for all projects to meet.	The permit should include a provision to implement all feasible LID BMPs and must include a provision for offsite mitigation of storm water not retained onsite. The permit should define technical infeasibility. Rewrite the waiver provisions to include establishment of an "urban runoff fund". Include time limitations for the expenditure of funds.	Permit language has been revised to provide clarification.
106	NRDC/OCC	Section XII	Waiver provisions	The permit must impose limits on water quality credit system to ensure equivalent benefits within the watershed.	Having a cap of something like 50% or less of the volumetric requirement should be considered.	Waiver provisions have been revised.
107	NRDC/OCC	Section XII	Prioritize LID BMPs	A hierarchy of BMPs should be included.	Include a preferred approach of BMPs.	Permit language has been revised.
108	NRDC/OCC	Section XII	Treatment Control BMPs	LID should not be a substitute for treatment control BMPs.	Any project exercising this option should be required to provide 1:1.5 mitigation offsite.	Permit language has been revised to provide clarification.
109	NRDC/OCC	Section XII	Hydrologic conditions of concern	No waiver should be provided for discharges to engineered hardened conveyance channels.	Do not allow this waiver provision.	The waiver provision has been revised.
110	NRDC/OCC	Section XII	Priority projects	Support the inclusion of projects with a threshold of 5,000 sq ft impervious area.	Add clarifying language to Section XII.B.2.(a)	Permit language has been revised.
111	NRDC/OCC	Section XII	Groundwater Protection	The 10' separation requirement may be overly restrictive.	A 5' separation requirement may be appropriate.	The 10' separation is a conservative approach; there is an option for a case-by-case consideration of other options.
112	NRDC/OCC	Section XII	LID Metrics	A critique[5] of the January 2009 white paper (see footnote 1).	The critique provides some arguments in support of a 3-5% EIA metric and provides an analysis of some of the other findings of the January 2009 white paper (see footnote 1).	The January 2009 white paper and its critique have been considered in the revision of some of the LID provisions in the permit.

[5] Critique of Certain Elements of "Low Impact Development Metrics in Stormwater Permitting" by Dr. Richard Horner.

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113	CICWQ[6]	Section XII	LID/Regional BMPs LID BMPs should be preferred	Support LID; regional BMPs and off-site solutions should be considered.	Both provisions are in the current draft.	Comments noted.
114	CICWQ	Section XII	LID design storm	A 2-year, 24-hour design storm is not appropriate.	Consider a design storm as specified in the DAMP.	Permit language has been revised.
115	CICWQ	Section XII	LID	LID BMPs should be the preferred approach.	LID BMPs should be required of all projects.	Permit language revised.
116	CICWQ	Section XII	HCOC	HCOC should be considered on a watershed specific basis.	A technically sound hydromodification plan should be permitted.	Permit language has been revised.
117	CICWQ	Section XII	Watershed Master Plan	Support such a plan.	Include a provision in the permit to require development of a watershed master plan or plans.	Permit language has been revised and a new section has been added.
118	NAIOP	Section XII	Watershed Master Plan	The entire issue surrounding hydromodificaton, infiltration and addressing water quality is very complex. The draft permit seems to want to approach it with a focus on a project by project basis.	Watershed Master Plans can be developed such that water resource goals can be integrated to address water quality, hydromodification, water supply and habitat issues.	Comment noted. Some changes have been made to the new/re-development section of the permit.
119	CICWQ	Section XII	Capture volume	Permit should not require make up of capture volume off site or require a fee.	Delete all requirements for off site mitigation.	The preferred option is 100% LID implementation on site. Off site mitigation is one option where full on site implementation of LID BMPS are not feasible.
120	CICWQ	Section XII	LID feasibility	Permittee should decide whether LID is feasible.	Permittees should have the option to require conventional or LID BMPs on a site-specific basis.	LID BMPs are cost effective and provides water quality and quantity benefits. As such, LID should be the preferred option. Permit does provide other options.
121	CICWQ	Section XII	LID guidance	Additional time is needed to develop LID guidance	Provide 12 months to develop LID guidance and revise WQMP.	Much of the required information is already in the WQMP and six months should be enough to consolidate readily available information.

[6] CICWQ=Construction Industry Coalition on Water Quality

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122	CICWQ	Section XII	WQMP Contents	Revise the requirements specified in the draft permit for revising the WQMP.	Delete Section XII.B.3(a) of the permit.	While some revisions to the permit have been incorporated, Section XII.b.3(a) is still applicable.
123	CICWQ	Section XII	Design volume	Capture volume should be SUSMP volume.	Delete references to 5% EIA and include a capture volume design based on the SUSMP design criteria.	The design volume has been changed to SUSMP criteria.
124	CICWQ	Section XII	HCOC	Hydromodification control strategies should be those recommended in the GeoSyntec white papers[7].	Use control strategies as defined in Attachment 4 (see footnote 7).	Some changes have been made to the permit based on this white paper and other discussions at the stakeholder meetings.
125	CICWQ, NAIPO	Section XII	Areas of agreement	1) EIA or other metrics may be used for LID. 2) Capture volume design may be based on WQMP criteria. 3) LID BMPs should be prioritized. 4) Offsite mitigation needed if on site treatment is not provided		Comments noted and agreed upon items are reflected in the revised draft.
126	County of Orange	Section XII.G	Field verification of BMPs	The requirement to inspect treatment control BMPs is burdensome.	Allow self certification and/or third party verification.	An option is added for self-certification and/or third party verification.
127	County of Orange	Section XII	LID/HCOC	The Model Water Quality Management Plan addresses LID and HCOC; additional mandates and metrics need careful consideration.	Areas of agreement: A performance standard other than the 5% EIA. Water quality design volume at 85th percentile. Prioritize LID BMPs.	LID and HCOC sections have been amended to reflect areas of agreement and to provide clarity.
128	County of Orange-Attachment A	Section XII	Land use authority/LID	The permit intrudes upon local land use authority.	Requirements, such as the 5% EIA requirement, are in contravention to the separation of powers.	As an agency of the State of California, the Regional Water Board has full legal authority

[7] Orange County MS4 Permit Stakeholder Sub-Group Examining LID BMP and Hydormodification Control Sizing Alternatives, prepared by Geosyntec for the January 27, 2009 Sub-Group meeting.

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						to implement LID requirement in this permit, including the 5% EIA requirement. Furthermore, the 5% EIA requirement was one of the options provided as a quantifiable measure for determining compliance with the LID/HCOC provisions of the permit. Other options were also provided in the permit. Providing several tools for compliance determination does not intrude into local land use authority. (The 5% EIA requirement has been amended.)
129	County of Orange-Attachment A	Section XII	Land use authority/LID	Prescribing a method of compliance is a violation of Section 13360 of the Water Code.	Do not specify a method of compliance.	As indicated above, the 5% EIA was one of the tools for compliance determination. Further, the Regional Board is well within its legal authority to determine what is included in the MEP standard.
130	Orange County-Attachment B	Section XII	New Development/re-development	Revisions to proposed land development provisions are needed.	Revise "grandfathering" provision.	Permit language has been revised.
131	Orange County-Attachment B	Section XII.A.2	WQMP guidance	Revisions should be in the LIP.	Modify permit language.	Permit language has been revised.
132	Orange County Attachment B	Section XIIA.6	CEQA review	Annual review of CEQA process is unnecessary.	Modify permit language.	Permit language has been revised.
133	Orange County Attachment B	Section XII.B.2	Commercial/industrial development	The threshold has been changed w/o technical justification.	Provide justification for changing it from 100,000 to 10,000 square feet.	Fact Sheet has been revised.
134	Orange County Attachment B	Section XII.B.2.(c)	Streets, roads and highways	The LID provision is difficult to implement.	Make it consistent with the U.S. EPA requirements.	Permit language has been revised.

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135	Orange County Attachment B	Section XII.B.2.(j)	Retail gasoline outlets	The DAMP includes BMPs for these types of facilities.	Avoid duplicative efforts.	The BMPs in the DAMP, along with LID and other requirements, should be considered for these types of facilities.
136	Orange County Attachment B	Section XII.B.3.	WQMP goals	Goals are written as specific requirements.	Revise permit language.	Permit language has been revised.
137	Orange County Attachment B	Section XII.B.5	Structural infiltration BMPs	No technical basis for the 10 feet separation for infiltration systems, light industrial category and for high vehicular traffic.	Consider the proposed regulations developed by State Board for onsite wastewater treatment systems.	Permit language provides for other options on a case-by-case basis.
138	Orange County Attachment B	Section XII.B.7	WQMP for non-priority projects	Certain non-priority projects may not require a WQMP.	A WQMP should not be required of all projects.	The permit language provides other options.
139	Orange County Attachment B	Section XII.C.1	LID design principals	The design BMPs is a confusing mix of goals, tasks and work products.	Revise the list.	Permit language has been revised.
140	Orange County Attachment B	Section XII.C.2	LID site design	Source control BMPs should not a part of this discussion.	Should delete this section.	Permit language has been revised.
141	Orange County Attachment B	Section XII.C.3	LID/EIA	5% EIA is not appropriate.	Use other LID metric.	Permit language has been revised.
142	Orange County Attachment B	Section XII.C.4	Substitution of LID/treatment controls	This provision, as written, does not appear to be correct.	Provide clarification.	Permit language has been revised.
143	Orange County Attachment B	Section XII. D.1	HCOC	An assessment of a project's impact on the hydrologic regime should not be required for all projects.	For some projects, there may not be a hydrologic condition of concern.	Permit language has been revised.
144	Orange County Attachment B	Section XII.D.2	HCOC	5% EIA should not be the metric for hydrologic conditions of concern.	Express the metric in terms of runoff volume.	The metric for hydrologic condition of concern has been changed.
145	Orange County Attachment B	Section XII.D	HCOC	An additional provision should be added to this section to include HCOC mapping as an option.	Add an interim provision till development of an appropriate LID metric.	Permit language has been revised.

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146	Irvine	XIII.J.1	The LID and hydrologic conditions of concern provisions are not applicable to projects that have an approved WQMP as of the date of adoption of this order.	Under the DAMP and LIPs, project WQMPs are prepared at a conceptual level to be used as planning documents and at a project level, to implement the concept project WQMP planning document. It is unclear whether the conceptual level WQMPs will be grandfathered in as were the land use approvals in the 2002 permit.	Revise to specify land use approvals that will determine development projects that are grandfathered and those that are not.	Permit language has been revised to further identify the level of approval/stage of planning where the requirements of this permit do not apply.
147	Irvine	XIII.3	Public education requirements include making 10 million impressions per year.	There must be a clear definition for an impression. Currently an impression can consist of anything from driving past a pollution prevention banner to and extended face-to-face interaction with a member of the public.	Consider a more effective way of evaluating the effectiveness of a public education program rather than relying on impressions. If impressions must be used, develop a standardized method of determining what qualifies as an impression.	While it is agreed that a more precise method of measuring the impacts of each and every public education interaction would be advantageous, trying to evaluate the effectiveness of City bus placards (depends on the route of the bus), City bill mailing inserts (determining percentage of inserts dumped without seeing, glanced at or actually read), etc., may be more tedious.
148	County of Orange- Attachment B	Section XIII.4	Public Education and Outreach	Requirements for annual business-related workshops may not be very useful.	Suggest modifying the language to include chamber of commerce or other outreach efforts.	Permit language has been revised.
149	County of Orange- Attachment B	Section XIV	Municipal facilities	Annual inspection requirement should be only for open channel systems.	Change annual inspection requirements to open channels only.	Permit language has been revised.
150	Irvine	XIV.7	Report on the effectiveness of debris boom	Do debris booms violate the restriction on treatment BMPs being employed in waters of the U.S.?	Clarify the Regional Board's position.	No violation exists (see Comment 9).
151	Irvine	XIV.10	Permittees shall examine opportunities to retrofit existing	A 2005 retrofit study performed by RBF Consultants has not been adopted or approved by the	The 2005 RBF Retrofit Study should not be mandated as the basis for co-permittee retrofit	The permit requires that a retrofit study be performed and a report on the study be

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			storm water conveyance systems and parks with water quality protection measures and report within 12 months of permit adoption	principal permittee, is still in draft form and co-permittees have not had the opportunity to review the draft.	programs until the co-permittees have had an opportunity to review, comment, and approve the final draft, as required in the current MS4 permit for any program developed by the principal permittee.	submitted within a year of permit adoption. If the 2005 study is still current/valid, that study could be submitted after review, and if not then a new study would have to be initiated.
152	County of Orange-Attachment B	Section XVI	Training program	Revise annual training requirement to be consistent with the County program (2 year frequency).Permittees should be given an option to have their own training programs.	Change training frequency requirements.	Permit language has been revised.
153	Irvine	XVI.2	Water quality training program curriculum	Permittees should be able to tailor their training programs. Non-management staff should not be responsible for knowing the whole storm water program, just their discrete tasks.	Revise order to allow greater flexibility in tailoring course curriculum to be appropriate to an employee's area of responsibility.	Permit language has been revised.
154	Irvine	XVI.3	Training modules should include an outline of the curriculum, a training procedure at the end and Certificate of Completion.	Mandatory training and practical application workshops should provide an alternative to a Certificate of Completion, which raises employment and labor issues.	Delete reference to testing requirements, certifications and Certificates of Completion.	Permit language has been revised.
155	Irvine	XVI.4, XVI.5 and XVI.6	At least on an annual basis, the principal permittee shall provide training to staff on Fixed Facility Model Maintenance procedures, Field Program Model Training, etc.	While this section explicitly states that the principal permittee shall provide training, where city management is competent in the storm water program, they should be allowed to provide that training in-house. Cities with a demonstrated or perceived deficiency may benefit from training provided by the principal permittee.	Revise the tentative order to allow individual cities to provide in-house training rather than participate in training administered by the principal permittee or by their consultants.	Permit language has been revised with the understanding that deficiencies in a permittee's program that are the result of either management or staff's lack of understanding about the program could result in enforcement actions.
156	Irvine	XVI.7	The principal permittee shall notify Regional Board staff at least 30	This notification requirement should not be applied to the initial training given to new	Revise the tentative order to allow documentation of training summary information in the annual report	By notifying Regional Board staff, by email, prior to conducting training, it gives

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			days prior to conducting training sessions.	employees, but only to the annual training given to all appropriate staff. Further, providing a summary training in the annual report be used in lieu of contacting Regional Board staff.	rather than notifying Regional Board staff of it's occurrence, but at minimum clarify that new employee training sessions do not require Regional Board notification.	Regional Board staff the opportunity to sit in on the training to ensure that the quality of the training meets the requirements of the permit. The Regional Board is also interested in the initial training for new storm water program employees
157	Irvine	XVI.8	Permittee shall adequately train staff within 60 days of being assigned duties related to the storm water permit.	It would be impractical for the principal permittee or their consultant to provide training within 60 days of every new co-permittee hire. If co-permittees are responsible for this training then it makes sense for co-permittees to be responsible for training existing staff.	Add an option to enable individual co-permittees to provide in-house training for new hires using curriculum developed by the principal permittee in collaboration with the co-permittees.	Permit language has been revised.
158	Irvine	XIV	None	Sections are misnumbered	No recommendation submitted.	Section numbers corrected.
159	U.S. EPA	XVIII.B.2	TMDL applicability	Although 2007 TMDL listed in this section have been adopted by the Regional Board, they have not been submitted to the State Board for approval. Until the State Board, OAL and the EPA have approved these TMDLs, they are not applicable.	Continue to implement the currently approved 2002 TMDLs until the 2007 TMDLs have been approved by the State Board, OAL and EPA	Permit language has been revised to include both 2002 and 2007 TMDLs.
160	U.S. EPA	XVIII Tables 1A/B		These tables do not accurately reflect the WLA's for urban runoff in EPA's 2002 TMDLs. Additionally, the table should clarify that the WLAs are intended to be enforceable effluent limits.	Compliance with WLAs could be required in accordance with the time frame envisioned by the Board's implementation plan, since this would be consistent with the intent of the EPA TMDLs.	Tables have been revised
161	County of Orange-Attachment A	Sections III.3.i and XVIII.B.3	Selenium in rising groundwater	The source of selenium in the rising groundwater should be considered as a non-point source	Since selenium is from a non-point source, it should not be regulated under the NPDES permit.	The release of selenium has been caused, in part, due to anthropogenic

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				and should not be subject to the NPDES permit.		hydromodification of the watershed. 40 CFR 122.26 requires the prevention of illicit discharges, which includes selenium contained in rising groundwater, into the MS4 system.
162	County of Orange-Attachment B, U.S. EPA	Section XVIII.B.3	Selenium and nutrient TMDL	Make the collaborative language more explicit.	Use suggested changes.	Permit language has been revised to describe the co-operative process that is being used to address the selenium and nutrient impacted groundwater in the San Diego Creek Watershed.
163	County of Orange-Attachment B, U.S. EPA	Section XVIII.E	Numeric effluent limits	The reference to numeric effluent limit is not accurate.	Recognize these as wasteload/load allocations.	Permit language has been revised.
164	County of Orange-Attachment A	Section XVIII.B.4	San Gabriel River metals TMDL	The permit inappropriately implements TMDLs developed by the U.S.EPA.	The requirements in the permit are for Coyote Creek; the upper reach of Coyote Creek is not listed as an impaired waterbody and therefore this requirement is inappropriate.	While the San Gabriel River metals TMDL lists the portion of Coyote Creek that lies within the Los Angeles Region, the upstream portion of Coyote Creek that lies within Orange County is one of the sources of pollutants responsible for the exceedances in the lower Coyote Creek, San Gabriel River and San Gabriel Estuary. The San Gabriel River metals TMDL contains a specific Waste Load Allocation of the MS4 discharge to the upper Coyote Creek. Moreover, the Coyote Creek TMDL was

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						promulgated by USEPA, and pursuant to 40 CFR 122.44, the Regional Board is required to incorporate this TMDL into the NPDES permit. The Regional Board does not have the authority to revisit and revise a USEPA promulgated TMDL.
165	County of Orange-Attachment A	Section XVIII.B.4	San Gabriel River metals TMDL	Since the Santa Ana Regional Board's Basin Plan does not include an implementation plan for Coyote Creek TMDL, this requirement is not consistent with the Clean Water Act and the TMDL requirements. For San Gabriel River.	This TMDL's requirements are outside the scope of authority given to the Regional Board by the Clean Water Act's NPDES program.	These TMDLs where promulgated by US EPA and notification and the opportunity to comment was given to the entities that discharge to these impacted waters. There is no state or federal law requirement that the Regional Board adopt the USEPA promulgated TMDL into the basin plan (and develop an associated implementation plan), prior to incorporating the TMDL into the NPDES permit pursuant to 40 CFR 122.26.
166	U.S. EPA	XVIII.C Tables 5a & 5b	Tables illustrating future Fecal Coliform TMDL's	These tables contain errors in that the first two rows of each table both include "TMDL for Fecal Coliform". It appears that one of these rows should present the WLA for urban runoff.	Make necessary changes in tables as deemed appropriate. Additionally, clarification language should be added to reflect that urban runoff WLA's are intended to be permit effluent limits	Tables corrected and clarification added.
167	U.S. EPA	XVIII.D.1	Diazinon and chlorpyriphos TMDLs for San Diego Creek and Newport Bay	The permit does not explicitly state that diazinon and chlorpyriphos WLAs are intended to be permit effluent limits and that the permittees shall comply with the wasteload allocations in	Add language in this section that states "The permittees shall comply with the following wasteload allocations in tables 6a and 6b." Additionally, the Fact Sheet should discuss the current compliance	Permit language has been revised.

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				tables 6a and 6b.	status of the permittees with the WLAs; given the phase-out of these pesticides within urban areas.	
168	U.S. EPA	XVIII.D.4	Sediment load allocations for Newport Bay and San Diego Creek	The permit should include firm dates for the submittal of monitoring data presenting the 10-year running averages.	The permit should include firm dates for the submittal of monitoring data presenting the 10-year running averages.	Permit language has been changed.
169	U.S. EPA	XVIII.E.2	Compliance with TMDLs	Language should be clarified for consistency with the rest of section XVIII.	Recommend revising language to read: “Based on the TMDLs, numeric effluent limits have been specified to ensure consistency with the wasteload allocations.”	Permit language has been revised.
170	Irvine	XIX.B.4	“The Management Committee shall meet at least six times a year to discuss issues related to permit…”	Has the Permittee Committee’s name been changed to the Management Committee?	Please clarify.	Permit language has been revised.
171	County of Orange-Attachment C	Monitoring and Reporting	Bioassessment	Integrate this requirement with the regional bioassessment programs.	Integrate monitoring programs.	Permit language has been revised.
172	County of Orange	Monitoring and Reporting	Land use correlation	This information has already been collected.	Eliminate the land use correlation element.	Permit language has been revised.
173	County of Orange	Monitoring and Reporting	Bacteriological monitoring	Intense bacteriological monitoring has been conducted for the last four years.	Reduce bacteriological monitoring requirements.	Permit language has been revised.

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174	NRDC	ROWD MRP IV.2.b	Permit renewal application	The permit renewal application is incomplete as it did not include an assessment of controls.	ROWD should have included an assessment of control measures and their effectiveness in removing pollutants.	The ROWD was posted for public comments. No comments were received and we accepted it as complete after providing 30 days of public notice and review period. We believe that the requirement in the Monitoring and Reporting Section of the draft order for program effectiveness analysis is an appropriate requirement to address this issue.
175	Orange	Fact Sheet	Section IX	Fact sheet still refers to 5% EIA	Delete this reference.	Fact sheet language has been amended.
176	BIA	General	Maximum extent practicable (MEP)	Some stakeholders misrepresent the meaning of MEP.	MEP is "hortatory" (i.e., merely encouraging or exhorting) and permit requirements should be based on the real meaning of MEP.	This comment appears to take issue with characterizations of the term MEP made by other stakeholders. Thus, the comment is noted, but no substantive response is given as the Regional Board cannot speak for other stakeholders.
177	Cypress			Please give further consideration to previously submitted recommendations.		Comment noted.
178	Contech Stormwater Solutions	Finding 66 and 67	Requires proper design of BMPs	Vortex systems, filters, and catch basin inlets have no connection to groundwater and cannot therefore cause groundwater pollution.	Remove these BMPs from this finding.	The finding also references these BMPs becoming a nuisance and/or cause surface water pollution. Improper maintenance of the aforementioned BMPs can result in these problems.
179	County of Orange	Various	Reporting requirements	The County believes that the refining of existing reporting	Revise reporting requirements.	The permit has been revised giving the permittees the

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				mechanisms is the most effective approach to increasing transparency and accountability		opportunity to propose alternative reporting methodologies contingent on the approval of the Executive Officer.
180	County of Orange, Irvine, Lake Forest	Various	Deliverables and submittal dates	Compliance submittals within 6 months or with the first annual report may not provide enough time to budget and complete work.	With the exception of the hydrologic conditions of concern mapping, revise compliance dates to at least one year after permit approval.	For the majority of these deadlines, the compliance dates have been revised.
181	NRDC	III	Non-storm water discharges	Prohibit non-storm water discharges.	Include a prohibition on non-storm water discharges.	The permit provisions are consistent with the Clean Water Act and the federal regulations (40 CFR 122.26(d)(2)(iv)(B). The federal regulations state that certain types of de minimus discharges need not be prohibited from the MS4s unless they are identified by the permittees as a significant source of pollutants.. Section III.1 of the draft order prohibits all other types of non-storm water discharges.
182	Golden State Water Company	III.3	De minimus discharge requirements	Does section III.3.ii refers to discharges from all entities or just municipal permittees?	Clarify requirement.	Permit language has been amended to clarify that this section only applies to discharges from municipal permittee owned/operated facilities and activities.
183	Laguna Hills	VI.6	Construction and industrial inspections	The new requirement that cities notify the Regional Board regarding violations at sites that are State General Permittees is unwarranted	Remove this requirement.	This requirement was in previous permit (Order R8-2002-0010 – Section VI.5). Further, coordinated enforcement actions will enhance water quality and meets the MEP threshold for this MS4 permit.

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184	County of Orange	IX.10 and X.11	Coordination of inspections with Regional Board staff	The current limited resources available to both the Regional Board and permittees to conduct inspections makes coordination of these activities a priority. It is recommended that a formal framework for inspection responsibilities be established.	Revise permit accordingly.	Permit language has been added identifying this goal.
185	Laguna Hills	X.1	Quarterly update of commercial facility inventory	The City already updates it's commercial inventory on a continuous basis.	Allow permittees to constantly track facilities.	The permit has been revised to give the permittees an opportunity to devise an alternate updating methodology that's approved by the Executive Officer.
186	Huntington Beach	X.2	Prioritizing commercial sites.	Requirement will increase number of inspections 10-fold.	Allow self-inspections of commercial sites 4 of 5 years and have cities inspect once per permit term.	While analysis of the permittee's commercial site database revealed numerous commercial businesses not listed in X.1.a-s, which could probably be dropped from their inspection database without threat to water quality, the permit has been revised to lower the Medium priority percentage to 20%. In the April 10, 2009 draft, Section XII.2 provides an option for the permittees to develop a scheme for prioritization and inspection of commercial sites.
187	Laguna Hills	X.2	Prioritizing commercial sites	The assignment of arbitrary percentages for high, medium and low priority sites means if a City has already assigned 100% commercial sites a High priority, it will have to downgrade at least 40% to meet the requirement.	Permittees should be given the flexibility as to designating its facilities without being restricted by the Regional Board.	During the 3rd term permit, MS4 Audits conducted by Regional Board staff indicated the need for more regimented oversight regarding commercial inventory management and inspections

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						within this section. If the example cited by the commenter arises, certainly, having 100% High priority ranked sites would be going beyond the minimum standards set by the permit and would not be viewed as a violation. Section XII.2 provides an option to develop a scheme for prioritization and inspection of commercial sites.
188	Irvine	X.2 and 3	Inspections of commercial sites	The new 10/40/50 High/Medium/ Low commercial breakdown will require that the City perform an additional 985 inspections per year resulting in an additional annual cost of $279,700.	Make use of the 10% High priority, but only require inspections of High priority sites.	While communication with the permittee has revealed some problems with their estimates, revisions to the permit have lowered the Medium priority percentage to 20%. In addition, Section XII.2 provides an option to develop a scheme for prioritization and inspection of commercial sites.
189	County of Orange	X.2 and 3	Commercial facility inspections	The permit should provide an opportunity to develop a risk-based scheme as an alternative to current permit language.	Revise permit accordingly.	Section X.2 now provides the permittees an opportunity to develop a prioritization scheme for inspections. The commercial inspection program was introduced in the 2002 permit cycle. The permit requirements prescribed a minimum of the program's structure. As a result of permittee's implementation of the program, further prescription of a minimum program was warranted.

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						Through implementation of the program proposed in the current draft permit, a more efficient program should evolve for the next permit cycle.
190	Huntington Beach, Irvine	X.3 and X.5	Photographic documentation of commercial sites	Permit requires photos of waste & material handling BMPs which is beyond the requirement for industrial sites.	Require photos only to document violations.	Photographic documentation of waste and material handling practices will ensure that sufficiently substandard storage is appropriately documented as a violation by the permittees and will allow Regional Board staff to more accurately evaluate permittee inspection/enforcement activities during audits.
191	Orange	X.3	Commercial inspections	The proposed 10/40/50 (high/medium/low) priority breakdown will require an additional 900 inspections per permit cycle for the City.	Either maintain current flexibility or introduce the 10% mandatory 'High' priority and inspect remaining 90% as needed.	While the 900 additional inspections/permit cycle works out to 4 additional inspections a week, the priority breakdown has been adjusted to a minimum 10/20/70.
192	BIA	Section XII	CEQA	Integrate MS4 permit requirements into the CEQA documents.	Use CEQA to integrate LID principles into the project at an early stage.	We agree; there are a number of requirements in the draft permit requiring such integration (e.g., see Section XII.A.4 and 6)
193	NRDC	XII	New Development	This section should be revised to require meeting MEP standard.	Include clarifications to ensure that Permittees meet MEP standard.	Clarifications added.
194	NRDC	XII	Documents submitted for review and approval	The public should have an opportunity to review and comment on the documents submitted for approval.	Revise permit language.	Permit language revised (See Footnote 55).
195	Irvine	XII.A.7	Project approval process requirement	None	Clarify that the update of the project approval process is the same as for the DAMP finalization.	Permit language has been revised.

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196	Lake Forest	XII.B and C	Implementation of LID	Implementation of LID and hydromodification requirements will not always be feasible, in particular there is concern about implementing the USEPA's 'Green Streets' guidance document.	None	The permit addresses situations where requirements may not be feasible and provides suitable alternatives in these situations (See Section XII.E).
197	NRDC	XII.B.2	List of priority projects	Revise the list to make it clear.	Revise the list to make it clear.	List revised.
198	Orange	XII.B.2.b	New Development	By revising permit language to include subdivisions with less than 10 units, if there's a combined 10,000 sq. ft. of imperviousness, the permit may now require single family homes to be priority development projects.	Retain the language exempting subdivisions of less than 10 units.	If the threshold of 10,000 sq. ft. of impervious surface is exceeded there is the potential for a similar level of pollutant load and alteration of the hydrologic regime, whether that area is divided between 10 residential units or less than 10.
199	Orange	XII.B.2.c and j	Priority Development Project classification	It is unclear whether the 10,000 square feet refers to land area or building area.	Clarify	Permit language has been amended to indicate that 10,000 sq. ft. refers to impervious area.
200	Orange County Business Council	XII.B.2.h	WQMPs for streets	The requirement for adherence to US EPA's 'Green Infrastructure" for public streets will increase costs and may not be possible.	Remove this requirement.	The incorporation of the US. EPA guidance document was at the suggestion of some of the stakeholders. Further, XII.B.2.h only requires the incorporation of the US EPA guidance document to the Maximum Extent Practicable.
201	NRDC	XII.B.5	Infiltration systems	The specified separation needed for infiltration systems to groundwater of 10' should be revised.	Make the separation 5'.	Permit language revised.
202	Irvine	XII.B.5(a)	Structural infiltration BMPs	Structural infiltration BMPs should meet minimum requirements that they not increase seepage or exfiltration of contaminated groundwater	Clarify language.	Permit language states that infiltration systems shall not cause or contribute to groundwater water quality exceedances (Section XII.B.5.a).

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203	Orange County Water District	XII.b.5.f	LID – Infiltration requirements	Footnote 50 restricts infiltration in sites known to have soil 'and' groundwater contamination. The word 'and' should be replaced with the word 'or.'	Revise permit language.	The footnote (54 in 3rd draft) has been revised.
204	Orange County Water District	XII.B.5.f	LID – Infiltration requirements	There are some land uses that should be restricted from infiltration whether or not there is current contamination (e.g., gas stations).	Include restrictions on infiltration for sites that have a high threat to water quality	The tentative order includes restrictions on infiltration systems in high vehicular traffic areas. We believe that this restriction along with the underground storage tank regulations should provide the needed groundwater protection from infiltration systems.
205	Contech Stormwater Solutions	XII.B.5.f	Structural infiltration BMPs	In high traffic areas, infiltration BMPs should have a minimum 75 gallon spill retention capability for diesel/hydraulic fluid spills.	Add requirement.	Rather than risking groundwater contamination by spills greater than the design volume of a proposed BMP, it is more prudent to prohibit infiltration BMPs in the situations presented in XII.B.5.f.
206	Orange County Water District	XII.C	LID – Infiltration requirements	OCWD would encourage the creation of a comprehensive map of Orange County identifying areas suitable for infiltration.	Require data to be collected and a map to be prepared.	The permittees are encouraged to prepare a Watershed Master Plan (see Section XII.D.5) to address LID infiltration and hydrologic conditions of concern in a comprehensive manner. Also Section XII.E.1 of the order requires the permittees to develop feasibility criteria for implementing LID BMPs.
207	Orange County Water District	XII.C	LID – Infiltration requirements	From a management and monitoring standpoint, grouping or clustering infiltration systems on a regional basis would make sense.	Consider the grouping of infiltration systems.	Sections XII.D.5 and XII.E of the order provides an opportunity for the permittees to develop LID infiltration systems on a regional or sub-regional basis.

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208	Orange County Water District	XII.C	LID – Infiltration requirements	Data needs to be collected in Orange County to assess the potential impacts to groundwater quality due to dry wells, infiltration galleries and poorly maintained infiltrations systems.	Revise permit language.	A requirement for developing a monitoring program for the infiltration systems has been added to the tentative order (see Section XII.B.5.g).
209	Orange County Water District	XII.C	LID – Infiltration requirements	An anti-degradation analysis in terms of groundwater quality should be provided in the Order.	Revise permit language.	We do not believe that any further anti-degradation analysis is needed as the infiltration systems are required to be designed to mimic pre-development hydrologic conditions with proper controls for pollutant sources.
210	Orange	XII.C	LID requirements	Redevelopment and in-fill projects may not be able to meet the LID requirements.	Exempt redevelopment and in-fill projects from LID requirements where sites drain to hardened or engineered channels.	While permit language in the 3rd draft, acknowledges that sites for which all receiving waters are hardened do not need to meet hydrology modification requirements, LID implementation also addresses pollutant transport by reducing the runoff responsible for the transport. So were possible, LID BMPs should be implemented.
211	Irvine	XII.C	LID requirements	It should be made clear that “LID requirements do not apply to development of conceptual or project WQMPs approved prior to 12 months after permit adoption…”	Clarify language.	XII.J clearly states that the only fully grandfathered projects are those that already have an approved WQMP. For all projects for which conceptual or project WQMPs are approved after the adoption of the permit and prior 90 days after approval of the revised model WQMP must implement the provisions in Section XII of the permit to the maximum extent practicable.

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212	Irvine	XII.C	Hydrologic conditions of concern requirements	It should be made clear that "hydromodification control requirements do not apply to development of conceptual or project WQMPs approved prior to 12 months after permit adoption…"	Clarify language.	XII.J clearly states that the only fully grandfathered projects are those that already have an approved WQMP. For all projects for which conceptual or project WQMPs are approved after the adoption of the permit and prior 90 days after approval of the revised model WQMP must implement the provisions in Section XII of the permit to the maximum extent practicable.
213	Orange County Business Council	XII.C	LID requirements	The permit should make clear that capture and infiltration is not required where infeasible or impractical.	Clarify permit.	The permit already makes this clear. See Section XII.E.1.
214	CICWQ	Section XII.C.	Conventional treatment control BMPs	Conventional treatment control BMPs should be considered only as a last resort.	Require structural treatment controls only if LID BMPs are infeasible.	We agree.
215	CICWQ	Section XII.C	LID BMPs	NGOs references to more restrictive volume controls for MS4 permits are not relevant.	Most references are from guidance documents and are not included in the adopted MS4 permits.	We agree that most references are not from adopted MS4 permits. Nevertheless, some of these are useful guidance documents for implementing LID.
216	BIA	Section XII.C	LID BMPs	The Board should include filtration as an acceptable LID BMP.	Include "filtration" as an LID BMP.	We have no objection to considering filtration as a second-tier LID BMP. This should be done on a case-by-case basis.
217	BIA	Section XII.C	LID BMPs	100% on-site retention should not be mandated. Reject any "universal retention doctrine".	Allow for "natural flow doctrine".	The draft permit does not require 100% on-site retention.
218	NRDC	XII.C	LID	LID provisions should be clearly articulated with performance standards.	Revise daft permit language.	Permit language has been revised.

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219	NRDC	XII.C	LID	LID BMPs must meet the MEP standard.	Provide clarification.	Permit language revised.
220	County of Orange	XII.C.1 and 2	LID requirements	Clarifying text change recommendations were provided for these sections.	Revise permit accordingly.	Permit language has been revised to include some of the recommended changes.
221	Contech Stormwater Solutions	XII.C.2.b	LID BMPs	Permit should not limit permeable paving alternatives.	Allow alternatives to permeable concrete or porous asphalt.	Permit language has been amended.
222	Contech Stormwater Solutions	XII.C.2.b	LI D BMPs	The phrase “minimize pipes, culverts and engineered systems…” should be replaced.	Replace statement with a more general “minimize changes to the time of concentration on site.”	Recommended language has been incorporated into the permit.
223	Orange	XII.C.3	Infiltration BMPs	Dry wells are listed as an allowable BMP, but may result in groundwater contamination	Require consultation with local water district prior to approval of dry wells.	Permit language has been revised.
224	Contech Stormwater Solutions	XII.C.4	LID BMP design requirements	While the goal of LID BMPs might be capturing the 85th percentile event, it shouldn’t be a design requirement	Delete this section.	The permit already provides options for sites where conditions rule out treating the 85th percentile event through LID BMPs.
225	Contech Stormwater Solutions	XII.C.5	Treatment BMP requirements	This section does not specify any level of treatment that is required by BMPs.	Specify the treatment control BMPs must be designed to have medium or high effectiveness based on full-scale, in-field testing.	The current Model WQMP has a similar requirement and it will be carried over in the Model WQMP approved for this permit.
226	CICWQ	Section XII.C. 5 & 7	LID BMPs	The current language in provisions 5 and 7 restricts the application of all available LID BMPs. These provisions include a universal mandate to infiltrate.	Include a second tier option for biofiltration, bioretention, filter strips, etc.	We believe that the most effective LID BMPs are those that infiltrate or harvest and re-use storm water onsite. The bio-treatment types of BMPs should be considered on a case-by-case basis.
227	Contech Stormwater Solutions	XII.C.7.a-b	LID BMPs	It is overly prescriptive to dictate where BMPs should be implemented.	Delete these sections.	The intent of this permit language is to encourage mimicking natural conditions where localized detention areas address the majority of storm events.

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Comment No.	Commenting Parties	Section No.	Permit Requirement	Comment	Submitted Recommendations	Response
228	Orange County Business Council	XII.D	Hydrologic modifications	The permit should recognize that most, if not all, in-fill projects are incapable of mimicking the pre-development hydrologic regime.	Clarify permit	The permit already acknowledges that not all sites will be able to meet this requirement on-site and provides suitable alternative compliance mechanisms.
229	Orange, County of Orange	XII.D.2.b	Hydrologic Conditions of Concern (HCOC)	Second draft of the permit has added that HCOC may exist for downstream hardened channels if those channels are Waters of the U.S. In the City's experience, all conveyance channels have been considered Waters of the U.S. by the Army Corps of Engineers.	Delete the added statement.	Permit language has been revised.
230	Irvine	XII.D.2(b)	Hydrologic conditions of concern exemptions	The permit language that currently exempts hardened channels from requiring hydrologic controls should be expanded to include stabilized channels	Clarify language.	If channels are engineered and regularly maintained to ensure design flow capacity, they do not have a hydrologic condition of concern per the third draft permit language.
231	CICWQ	Section XII.D.2.(b)	HCOC	The addition of the last sentence eliminates any waivers for HCOC.	Delete the last sentence.	The last sentence has been deleted.
232	NRDC	XII.E	Alternatives and in-lieu programs	The alternatives should be better integrated.	Revise permit language.	We did not see the need for any additional changes.
233	County of Orange	XII.E.1	Alternative and In-lieu programs	Clarifying text change recommendations were provided for this section.	Revise permit accordingly.	It's the judgment of Regional Board staff that the language currently in the draft permit more accurately portrays staff's intent.
234	Irvine	XII.H	Structural treatment BMP tracking	This section requires permittees to establish a mechanism to track structural BMPs and ensure that proper easements are recorded and conveyed to new owners.	There are already procedures in place at the County Recorder's office and through permittee's WQMP approval processes that address these requirements.	If the permittees can ensure that the requirements set forth in XII.H are being addressed then XII.H is satisfied.

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Comment No.	**Commenting Parties**	**Section No.**	**Permit Requirement**	**Comment**	**Submitted Recommendations**	**Response**
235	Laguna Hills	XII.H.1	Ensure that structural treatment control information is tracked with ownership change.	Recorded information is already transferred to new owner and City should not be held responsible for keeping track of this.	Delete requirement.	If the permittees can ensure that the requirements set forth in XII.H are being addressed then XII.H is satisfied.
236	Lake Forest	XII.I.3	Structural treatment BMP database	It appears that the requirement is that all BMPs installed to date would have to be included.	Limit database to only newly constructed BMPs.	Permit language has been revised.
237	Irvine	XII.I.5	Structural treatment BMP inspections	Current permit language limits inspection of these BMPs to the dry season. Further, because the number of these BMPs will increase every year we request that the number inspected be dropped from 50% to 25%.	Revise permit	The need to ensure that the BMPs are functional during the wet season requires inspection prior to the wet season. However, the inspection quantities have been reduced to 25% per year with 100% coverage during every 4 year cycle.
238	Lake Forest	XII.I.5	Structural treatment BMP inspections	The number of these BMPs will be increasing every year, becoming burdensome.	The permit should allow self inspections or use a representative sampling	Permit language has been revised.
239	Laguna Hills	XIII.4	Commercial business training	Business owners will not attend training during the work day.	Rely on education during site visits.	Because site visits for some facilities may not occur until the end of the permit cycle, site visit education can only be one part of an overall business education system.
240	Orange	XVI.3 and 4	Permittee employee training	The requirement for testing and Certificates of Completion infringes on the City's right to set employee class specifications.	Allow attendance sheets or other proof that training has been completed in place of Certificates of Completion and allow other procedures to substitute for testing to verify an employee's understanding of the curriculum.	Section XVI.3 has been amended to include other methods of course completion.
241	NRDC	XVIII	TMDL	Specify that the wasteload allocations (WLA) are enforceable permit limits.	Make WLAs enforceable permit limits.	Permit language revised.

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Comment No.	**Commenting Parties**	**Section No.**	**Permit Requirement**	**Comment**	**Submitted Recommendations**	**Response**
242	NRDC	XVIII	TMDL	Prohibit new sources and new dischargers from discharging into 303(d) listed waters.	Include a prohibition on new sources and new dischargers into impaired waters.	First, while new development or redevelopment in an urban area may change the characteristics of the discharge entering the MS4 and hence the receiving water, each new development or redeveloped area does not constitute a new source or discharge. Further, the intent of the current MS4 permit is to address pollutant loads through an iterative BMP process. Moreover, the case primarily relied on in this comment, *Friends of Pinto Creek v. USEPA*, 504 F.3d 1007, did not involve an MS4 permit. Rather, it involved an individual NPDES permit for an individual discharger discharging directly into a water of the United States. Here, NRDC asks that the Regional Board expand the holding of that case to prohibit discharges into an MS4 system. These are two very different contexts, as the regulatory scheme/NPDES permitting requirements for an MS4 system are distinct from that of an individual discharger discharging directly into federal waters. Thus, to the extent that *Friends of Pinto Creek* is factually, distinguishable from the current situation, the holding is not applicable to this permit.

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Comment No.	**Commenting Parties**	**Section No.**	**Permit Requirement**	**Comment**	**Submitted Recommendations**	**Response**
243	County of Orange, Lake Forest	XVIII.B.10	Coyote Creek TMDL	TMDLs adopted by another Regional Board should not be applied outside their jurisdiction. Regulated entities should have the opportunity to participate and dispute the adoption of a TMDL.	The Coyote Creek TMDLs should not be included in this permit.	This TMDL was promulgated by USEPA. While the San Gabriel River metals TMDL lists the portion of Coyote Creek that lies within the Los Angeles Region, the upstream portion of Coyote Creek that lies within Orange County is one of the sources of pollutants responsible for the exceedances in the lower Coyote Creek, San Gabriel River and San Gabriel Estuary. Further, the San Gabriel River metals TMDL contains a specific Waste Load Allocation of the MS4 discharge to the upper Coyote Creek. We also note that the permittees that discharge to the listed waters were notified during the TMDL stakeholder process and commented on the TMDL at that time. See also response to comment numbers 164 and 165.
244	Lake Forest	Distribution list	None	Saddleback Valley School District was not included.	Include the school district.	The school district has been added to the list of other entities with the potential to discharge pollutants to the Orange County storm water system.

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Comment No.	Commenting Parties	Section No.	Permit Requirement	Comment	Submitted Recommendations	Response
	COMMENTS RECEIVED ON THE APRIL 10, 2009 DRAFT					
245	NRDC	XII	The permittees shall incorporate LID site design principles to reduce runoff to MEP.	The language in this Section of the tentative order requires a feasibility analysis before any LID BMP is required, as opposed to providing an "out" in situations of true infeasibility. This would mean that you would have to prove feasibility in each situation which is very problematic for many reasons and cuts against the common agreement by all that LID is generally feasible at some scale.	Modify Permit language.	During the public hearing on April 24, 2009, staff proposed a change to address this issue. This change is reflected in the 4th draft of the permit. Further changes may be made to Sections XII.C.1 & 2 based on comments on the 4th draft and any revisions will be addressed at the May 22, 2009 Regional Board meeting..
246	NRDC	XII	LID design criteria	The permit language does not require retaining the water on site from the design capture storm unless Infeasible. Rather, it says to capture and if you cannot you can use LID and conventional treatment BMPs. This doesn't seem to provide any requirement to retain the design storm when it can be done.	Change language to include a clear measurable performance standard that requires landscape-based treatment, on-site retention, and/or storage for re-use. These should be written in order to incorporate clear, enforceable LID requirements. Qualifier language such as: 'to the extent feasible' and 'as practicable' should not be used.	During the public hearing on April 24, 2009, staff proposed a change to address this issue. This change is reflected in the 4th draft of the permit. Further changes may be made to Sections XII.C.1 & 2 based on comments on the 4th draft and any revisions will be addressed at the May 22, 2009 Regional Board meeting.
247	EPA	XII.C.1	LID BMPs	The Tentative Order states that projects that "meet the feasibility criteria" shall implement the permit's specific LID provisions. The feasibility criteria are prepared as a separate deliverable by the permittees (under section XII.E), and require EO approval. With this language, LID requirements will not apply until the permittees prepare an approvable feasibility criteria.	Modify Permit language.	This issue is under review and any revisions will be addressed at the May 22, 2009 Regional Board meeting.

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248	EPA	XII.C.2	LID criteria	As it is currently written, the tentative Ooder opens the door to allow the use of conventional treatment controls in-lieu of LID BMPs.	LID BMPs should be considered for each priority development project.	This issue is under review and any revisions will be addressed at the May 22, 2009 Regional Board meeting.
249	Orange County Water District	XII.B.5(d)	The vertical distance from the bottom of the infiltration system to the seasonal high groundwater must be at least 5 feet.	The Water District was concerned about the uncertainty factor in determining historic high groundwater and recommended a minimum 10 feet separation.	It would be prudent to specify a 10 feet vertical separation in the permit.	Permit language was modified in the 4th draft permit.
250	County of Orange	Finding J.52		Reference to 40 CFR citation is wrong.	Modify Permit language.	Permit language was modified in the 4th draft permit.
251	County of Orange	XVIII		Technical TMDLs (TMDLs with no implementation plans) should not be included in the permit	Delete technical TMDLs from the permit.	40 CFR 122.44(d)(1)(vii)(B) requires that this MS4 permit be consistent with the applicable waste load allocations in TMDLs and does not exempt those without implementation plans.
252	Riverside County Flood Control	Various	`	Commenter references numerous findings and permit requirements and requests that either they not be included in the Riverside County permit or be included with changes.	None	Comment noted.
253	Latham & Watkins, CICWQ,	XII.C.2 and 7	LID Implementation	Approved LID BMPs should include bio-treatment.	Modify Permit language.	Bio-filtration has been added to XII.C.2 in the 4th draft permit and may need to be added elsewhere within the permit to achieve consistency.
254	County of Orange, OC Coastkeeper, CICWQ	XII	Watershed Master Planning	Commenters support the inclusion of Watershed Master Planning and want it to be mandatory.	CICWQ supports the use of Watershed Master Plans. The County of Orange and OC Coastkeeper jointly submitted language making Watershed Master Plans mandatory.	The permit language proposed by the commenters was incorporated in Section XII.D.5
255	Prontowash	X.8	Mobile Commercial Source Program	Permit should require mobile car detailer to contain all discharge.	Revise permit language	The permit currently prohibits mobile car wash discharge as a non-storm water discharge and requires municipalities to prohibit this discharge.

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Comment No.	**Commenting Parties**	**Section No.**	**Permit Requirement**	**Comment**	**Submitted Recommendations**	**Response**
256	CICWQ	XII.C.2	LID	Provide clarification for the word "capture"; does it include bio-treatment.	Make the definition of LID consistent with the USEPA definition to include bio-treatment.	The 4th draft of the permit addresses this issue.
257	CICWQ	XII.C.3	Design "strategy"	Request replacing the word "strategy" with the word "preference"	Modify permit language.	This issue is under review and any revisions will be addressed at the May 22, 2009 Regional Board meeting.
258	Geosyntec, County of Orange	General	Assessment of Pollutant Reductions	Response to NRDC comments	Response to NRDC comments	Comments noted.
259	Geosyntec, County of Orange	General, LID	LID Metrics	A response to Dr. Horner's critical comments on "LID Metrics in Storm Water Permitting".	Response to critical comments.	Comments noted.
260	Latham& Watkins	General, New Discharges	"New "discharges to impaired waters	A response to NRDC's comments regarding the applicability of Friends of Pinto Creek v. U.S. EPA.	Latham & Watkins analysis concludes that this case is not applicable to the Orange County MS4 permit.	Comments noted.
	ORAL COMMENTS RECEIVED AT THE APRIL 24, 2009 PUBLIC HEARING (Extracted From Audio Records, May Be Supplemented Based On Transcripts, When Available.) (Comments Reflected In Written Correspondence Not Duplicated.)					
261	City of Lake Forest	Various		Keep in mind financial considerations and maximize the flexibility of permit requirements.		Comment noted.
262	County of Riverside	Various		The County wants the opportunity to base their new permit on their old permit.		Comment noted.
263	County of Orange	XII.C.1	LID Implementation	Recommends phasing in the LID requirements over an 18-month period instead of immediately, as reflected in the U.S. EPA proposed language.	Revise implementation date to 18 months.	This issue is under review and any revisions will be addressed at the May 22, 2009 Regional Board meeting.
264	County of Orange	XII.C.2	LID Implementation	If LID is required prior to the establishment of the feasibility criteria, as proposed in the U.S. EPA language, how do the permittees determine if LID is in fact infeasible at a site?		This issue is under review and any revisions will be addressed at the May 22, 2009 Regional Board meeting.

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Comment No.	**Commenting Parties**	**Section No.**	**Permit Requirement**	**Comment**	**Submitted Recommendations**	**Response**
265	County of Orange	XVIII.B.9	Coyote Creek TMDLs	The Los Angeles Regional Board should identify the load for dischargers in the Santa Ana Region. The Santa Ana Region should then determine impairment, list the impaired waters and develop TMDLs for those impaired waters. Only Santa Ana Board adopted TMDLs should be in the Santa Ana permit.	Modify Permit language.	The San Gabriel River TMDLs (including Coyote Creek) and the waste load allocations associated with those TMDLs were promulgated by the U.S. EPA and therefore this Permit must be consistent with those TMDLs as provided in 40 CFR section 122.26. Please see responses to comments number 164 and 165.
266	CICWQ	XII.C.1	LID Implementation	Put back the portion of XII.C.1, deleted in the proposed U.S. EPA language.	Modify Permit language.	This issue is under review and any revisions will be addressed at the May 22, 2009 Regional Board meeting.
267	CICWQ, City of Irvine, County of Orange	XII.C.2	LID Implementation	Strike the language added in the U.S. EPA changes in XII.C.2.	Modify Permit language.	This issue is under review and any revisions will be addressed at the May 22, 2009 Regional Board meeting.
268	CICWQ, Michael Recupero	XII.C	LID Implementation	Clarify that bio-filtration is consistent with U.S. EPA definition of LID	Modify Permit language.	Bio-filtration has been added to XII.C.2 in the 4th draft permit and may need to be added elsewhere within the permit to achieve consistency.
269	CICWQ	XII.C.3	LID Implementation	Replace the word ‘strategy’ with the word ‘preference’.	Modify Permit language.	The word “strategy” may be replaced with the word “goal” as discussed at the April 24, 2009 public hearing.
270	GeoSyntec	XII.C	LID Implementation	Keeping the design storm volume on site will not always work, in many cases evapotranspiration is the key transport mechanism and replacing that with infiltration may have unintended consequences.	None	Comment noted.
271	OC Coastkeeper	XII.C	LID Implementation	This permit should have a three-pronged approach with Watershed Master Plans and an internet based information	None	Comment noted.

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Comment No.	**Commenting Parties**	**Section No.**	**Permit Requirement**	**Comment**	**Submitted Recommendations**	**Response**
				system with hydrologic data for builders and planners.		
272	City of Irvine	XII.C	LID Implementation	It should be made clear that if the design storm volume is addressed through bio-treatment and there is subsequent discharge to the MS4, no further treatment or offset is required.	Modify Permit language.	This issue is under review and any revisions will be addressed at the May 22, 2009 Regional Board meeting.
273	City of Orange	XII.J.1	Pre-Approved Projects	The permit language may not include all projects that have already received approval by the municipalities.	Ensure that permit language includes all projects approved by municipalities.	The current permit language recognizes this and requires implementation of LID BMPs consistent with the MEP standard.
274	Lennar Homes	XII.C.7	Regional Treatment	Regional treatment should be allowed without a waiver requirement and without additional treatment or offset.	Modify Permit language.	The draft permit includes provisions for regional treatment. The Watershed Master Plan, Section XII.D.5, should be used as another tool to incorporate regional treatment systems.
275	Michael Recupero	XII.C.1	Feasibility criteria	Does the language proposed by U.S. EPA strike the feasibility analysis?	None	While the feasibility analysis is not eliminated, the timing of LID implementation and the approval of a model WQMP (including feasibility criteria) are under review and any revisions will be addressed at the May 22, 2009 Regional Board meeting.
276	Michael Recupero	XII.C	Feasibility criteria	What will be the threshold for infeasibility and who decides it and does every project not implementing LID for the full 85^{th} percentile 24-hour storm require a Regional Board granted waiver?	None	These issues are under review and any revisions will be addressed at the May 22, 2009 Regional Board meeting.
277	Michael Recupero	XII.B.5(d)	The vertical distance from the bottom of the infiltration system to	Supports a 10' vertical separation.	Modify Permit language.	The 4^{th} draft permit specifies a 10-foot vertical separation.

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			the seasonal high groundwater must be at least 5 feet.			
278	San Bernardino County Flood Control District, Storm Water Program	General	Various	Commenter requests that the Orange County Permit should not be used as a template for the San Bernardino County Permit. .	None	Comments noted.
	COMMENTS RECEIVED ON THE MAY 1, 2009 DRAFT					
279	U.S. EPA	XII.C.2	LID	Language should be added to clarify that compliance with XII.C.& or XII.E meets the permit's LID requirements.	Insert "Compliance with the permit's LID requirements may also be achieved by implementation of the alternatives specified in section XII.C.7 or by implementation of an approved waiver under section XII.E" at the end of XII.C.2.	With other changes made to subsections XII.C.1 and 2, insertion of the submitted language would not have clarified the intent of this permit requirement. It is thought that the other changes made to this section have sufficiently clarified these requirements.
280	U.S. EPA	XII.C.2	LID	The meaning of the term 'bio-filter' is unclear and the use may not be necessary.	Criteria for the design and operation of these systems should be specified in the permit or should be part of the feasibility criteria required pursuant to Section XII.E.	The term 'bio-filter' has been replaced by 'bio-treatment' and the requirement that design, operation, and maintenance criteria be developed as part of the model WQMP has been added.
281	U.S. EPA	XII.C.7	LID	The term 'treat' is used repeatedly in Section XII.C.7, which sets up an inconsistency with other permit requirements.	Either 'treat' should be deleted or with Board approval, changed to 'bio-treat'.	The references to 'treat' in Section XII.C.7 have been changed to 'bio-treat' or 'bio-treatment'.
282	U.S. EPA	XII.E	Waiver Approval	With regards to project-specific waivers generated by Section XII.E, commenter believes that the number of waivers will be small. While supporting the 4th	None made.	While waiver approval per Section XII.E remains the same, if the feasibility criteria required by that section is not approved within 12 months of

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				draft permit language, the commenter would be open to revisions that do not require EO approval for waivers.		permit adoption, the resulting case-by-case feasibility determination by the municipalities on proposed projects will not require EO approval, but will be submitted for Regional Board staff review 30 days prior to municipal approval.
283	Paul Singarella, Latham & Watkins	Findings	None	A Finding should be added stating that the Regional Board does not expect on-site retention of 100% of the design capture volume to be feasible in all cases and that implementation of bio-treatment will still satisfy legal requirements and provide a significant advance on the previous Order.	Insert provided Finding.	The existing Findings clearly indicate that LID itself, much less LID with 100% on-site retention may not be feasible at all sites.
284	Larry McKenny, RBF Consulting	XII.C	LID	Commenter supports the CICWQ comments and notes that the MEP standard does not dictate full retention of a design storm volume on site.	None	Comment noted.
285	County of Orange	None	None	The County notes involvement in the development of their comments by the Cities of Anaheim, Buena Park, Cypress, Fountain Valley, Irvine, La Palma, Laguna Hills, Lake Forest, Newport Beach, Orange, Placentia, Tustin, Villa Park and Westminster , as well as their concurrence with the submitted comments.	None	Comment noted.
286	County of Orange	XII.C.1	LID	While the change in Section XII.C.1 made at the Public Hearing and further in the fourth	Language was submitted by the commenter for Section XII.C.1.	Many of the changes in language, proposed by the commenter were incorporated

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				draft were made to address the possibility that approval of the feasibility criteria may drag on, it has the possible effect of excessive administrative burden and project delays.		in the permit and are reflected in the Errata Sheet.
287	County of Orange	XII.C.2	LID	The consequence of changes to Section XII.C.2 in the fourth draft result in the need for a waiver and EO approval for any project not addressing 100% of the design storm volume through on-site LID BMPs.	Language was submitted by the commenter for Section XII.C.2.	Many of the changes in language, proposed by the commenter were incorporated in the permit and are reflected in the Errata Sheet.
288	County of Orange	XII.C.2	LID	The term ‘bio-filter’ was used instead of ‘bio-treat’. Further, the language in footnote 56 identifies that bio-treatment can only be used if infiltration, harvest/reuse and evapotranspiration are infeasible.	Language was submitted by the commenter for Section XII.C.2 and footnote 56/57.	The term ‘bio-filtration’ has been used throughout Section XII.C. While much of the permit language suggested by the commenter has been used, the permit continues to require that the use of ‘on-site’ retention LID BMPs be implemented (where feasible) prior to the use of ‘treat and release’ lid BMPs.
289	NRDC/ Coastkeeper	General Comment and Section XII.C	LID	The language in the draft permit is not based on any consensus agreement among the stakeholders. There are key disagreements on certain issues.	NRDC and Coastkeeper believe that law requires a standard that retains on site the design storm whenever possible.	The draft permit language includes on site retention as the highest priority LID BMP.
290	NRDC/ Coastkeeper	Section XII.C	LID	Infiltration and reuse implements MEP requirements and is a wise policy.	Require infiltration and reuse.	Infiltration and reuse are the highest priority LID BMPs included in the draft permit.
291	NRDC/ Coastkeeper	Section XII.C.2	LID	Clarify permit language.	Use suggested permit language.	Draft permit language now includes the requested change.
292	NRDC/ Coastkeeper	Sections XII.C. 1 & 2	LID	Disagree with the inclusion of bio-filtration to meet the basic LID standard.	Remove references to bio-filtration	Permit language has been modified; it still includes bio-treatment as the lowest priority LID BMP.

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Comment No.	**Commenting Parties**	**Section No.**	**Permit Requirement**	**Comment**	**Submitted Recommendations**	**Response**
293	NRDC/ Coastkeeper	Footnotes 56 and 57	LID	Include a design standard for bi-filtration systems.	Use suggested language to modify the footnotes.	The footnotes have been revised and the permittees are now required to include specific design criteria in the WQMP for bio-treatment systems.
294	NRDC/ Coastkeeper	Section XII.C	LID	Other sections of the permit have references to “treatment”. It should be replaced with bio-treatment.	Replace references to treatment with bio-treatment.	Permit language changed.
295	City of Cypress	XII.C	LID	Consideration should be given to leaving the language in Section XII.C as existed in the third draft.	Revise permit language to reflect that proposed in the third draft.	The changes proposed in the Errata sheet for the May 22, 2009 Regional Board meeting represent an effort to allow maximum flexibility in the implementation of post-construction BMPs while maintaining a set of minimum requirements designed to insure compliance.
296	City of Irvine			Support comments made by County of Orange and CICWQ	Refer to County of Orange and CICWQ	Comment noted.
297	CONTECH	XII.C.3	LID criteria	The word “bio-filter “ should be replaced with “filter” The addition of the term bio-filter appears to be excluding non-vegetative media filters, which in some cases, may prove more effective.	Replace the term Bio-filter with filter.	Wording has been changed in this case by using the term “bio-treat” or “bio-treatment”
298	City of Orange	XI.C.1	LID implementation schedule	By deleting the phrase “that meet the feasibility criteria established pursuant to Section XII.E1” within this Section, this could be interpreted as making the Permittees begin immediate implementation of LID following permit adoption.	Maintain the existing language in Section XII.C.1 in order to maintain clarity	Permit language has been revised to address this issue within this Section
299	City of Orange	XII.C.2		The proposed language change to this paragraph can be interpreted to read that projects that cannot fully infiltrate,	Delete second sentence in Section XII.C.2 “Projects that do not comply with this requirement shall meet requirements established in	Permit language has been revised.

Summary of Comments and Responses on the Orange County Municipal Storm Water Permit

11/10/08 Draft (Comments 1-173) ; 03/24/09 Draft (Comments 174-244) ; 04/10/09 Draft (Comments 245-260) ; Public Hearing (Comments 261-278) ; 05/01/09 Draft (Comments 279 – 315)

Comment No.	Commenting Parties	Section No.	Permit Requirement	Comment	Submitted Recommendations	Response
				harvest, reuse or evapotranspire or capture will need to meet in-lieu programs and still require treatment by conventional BMPs.	Section XII.E for alternative and in-lieu compliance. Alternatively, adopt the County of Orange recommended language.	
300	City of Orange	(general) LID Systems		Concern has been raised about allowing only BMPs that capture the 85th percentile storm. This requirement will not allow the use of systems such as grass swales or vegetated strips. Use of these systems, under the new criteria will not be allowed, as they will be deemed only as "infiltration systems"	Comment only	Comment noted
301	CICWQ	Section XII.C	LID	Provided a marked up copy of Section XII.C	Make changes as per the marked up copy.	See revised permit language.
302	San Bernardino County Storm Water Program	Section XII	LID	Section XII lacks clarity.	Provide clarifying language or a flow chart.	Permit language amended to clarify some of the requirements.
303	San Bernardino County Storm Water Program	Section XII.B.4	Design capture volume	Does the design capture volume include all the options under Section XII.B.4?	Provide clarification.	The design capture volume only provides two of these options, "runoff produced from a 24-hour, 85th percentile storm event", as indicated in XII.B.4.A.1 and 2.
304	San Bernardino County Storm Water Program	Section XII.B.5.f	Infiltration	Is a feasibility analysis required for infiltration systems in industrial areas?	Provide clarification.	A feasibility analysis is not required for infiltration systems for the type of facilities listed under Section XII.B. 5.f.
305	San Bernardino County Storm Water Program	Section XII.C.2 And XII.E	Feasibility Criteria	Section XII.E requires the principal permittee to develop a "technically-based" feasibility criteria.	The MEP standard should be applicable here.	The co-permittees are governed by the MEP standard.
306	San Bernardino County Storm Water Program	Sections XII.C.1 & 2	Full retention	There is an overemphasis on full retention BMPs.	Consider other equally effective LID BMPs. A broader concept of LID BMPs should be included.	The permit language includes a hierarchy of LID BMPs mostly based on their effectiveness in protecting water quality and quantity.

Summary of Comments and Responses on the Orange County Municipal Storm Water Permit						
11/10/08 Draft (Comments 1-173) ; 03/24/09 Draft (Comments 174-244) ; 04/10/09 Draft (Comments 245-260) ; Public Hearing (Comments 261-278) ; 05/01/09 Draft (Comments 279 – 315)						
Comment No.	**Commenting Parties**	**Section No.**	**Permit Requirement**	**Comment**	**Submitted Recommendations**	**Response**
307	Riverside County Water Flood Control and Water Conservation District	Section XII.C.2	On site retention	Avoid infiltration centric definition of LID.	Provide flexibility to implement proactive, effective, and economical LID BMPs.	Please note that the permit does provide other options, including bio-treatment.
308	Riverside County Water Flood Control and Water Conservation District	Section XII.C.2	On site infiltration	The permit does not allow properly designed filtration systems.	Include filtration as an option for implementing LID BMPs.	Bio-filtration is generally considered as an LID BMP and is included in the draft permit.
309	Riverside County Water Flood Control and Water Conservation District	Section XII.C.2	LID	The permit focuses on micro-scale LID	Allow broader implementation of LID BMPs.	Section XII.C.7 provides for sub-regional and regional LID implementation techniques.
310	Riverside County Water Flood Control and Water Conservation District	Section XII.C	LID	The goal should be to mimic pre-development hydrology.	Revise Section XII.C.	Section XII.C.3 notes that the design goal is to replicate pre-development hydrologic regime.
311	Riverside County Water Flood Control and Water Conservation District	Section XII.C	LID	Allow filtration and detention.	Revise Footnotes 56 and 57.	Minor changes have been made to Footnotes 56 & 57.
312	Riverside County Water Flood Control and Water Conservation District	Section XII.C	LID	The District's qualifications for submitting comments on LID	The District developed criteria for the use of LID BMPs.	Comments noted.

OC MS4 Tentative Order No. R8-2008-0030 (R8-2009-0030)
Comments/Responses

Summary of Comments and Responses on the Orange County Municipal Storm Water Permit						
11/10/08 Draft (Comments 1-173) ; 03/24/09 Draft (Comments 174-244) ; 04/10/09 Draft (Comments 245-260) ; Public Hearing (Comments 261-278) ; 05/01/09 Draft (Comments 279 – 315)						
Comment No.	**Commenting Parties**	**Section No.**	**Permit Requirement**	**Comment**	**Submitted Recommendations**	**Response**
313	Riverside County Water Flood Control and Water Conservation District	Section XII.C	LID	USEPA's guide includes filtration as an LID BMP.	Allow properly engineered filtration systems as an LID BMP.	Even though filtration per se is not included, bio-filtration is recognized as an LID BMP.
314	Riverside County Water Flood Control and Water Conservation District	Section XII.C	LID BMPs	On site vs. regional	Regional systems have many advantages, including ease of public maintenance, municipal inspections and nuisance reduction.	The permit language has provisions for regional and sub-regional systems (see Section XII.C. 7).

To Paula Vutzle	From Bruce Fujimoto
Co.	Co.
Dept.	Phone #
Fax #	Fax #

JAN - 9 1991

OFFICE OF GENERAL COUNSEL

MEMORANDUM

SUBJECT: Compliance with Water Quality Standards in NPDES Permits Issued To Municipal Separate Storm Sewer Systems

FROM: E. Donald Elliott ED Elliott
Assistant Administrator and
General Counsel (LE-130)

TO: Nancy J. Marvel
Regional Counsel
Region IX

In your memorandum of August 9, 1990, you have asked for our views on the following two issues:

ISSUES

1) Must NPDES permits for municipal separate storm sewer systems ("MS4s") issued under Section 402(p)(3)(B) of the Clean Water Act (CWA) include requirements necessary to achieve water quality standards (WQS), as generally required by Section 301(b)(1)(C) for all NPDES permits?

2) If permits issued to MS4s must comply with WQS, by what date must the permit ensure compliance?

SHORT ANSWERS

1) The better reading of Sections 402(p)(3)(B) and 301(b)(1)(C) is that all permits for MS4s must include any requirements necessary to achieve compliance with WQS.

2) Sections 402(p)(4)(A) and (p)(4)(B) give "large" and "medium" MS4s three years to comply with permit conditions from the date of permit issuance. This three year compliance date also applies to WQS-based permit requirements.

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DISCUSSION

1. Statutory Background

Section 402(a)(1) requires that all NPDES permits comply with the applicable provisions of section 301. This includes compliance with appropriate technology-based standards and effluent limits (sections 301(b)(1)(B), 301(b)(2)). Permits must include "any more stringent limitation" necessary to meet WQS. Section 301(b)(1)(C). In addition, Section 401 requires that any applicant for a federal permit (including NPDES permits issued by EPA) must provide the permitting agency a certification from the State in which the discharge originates that the discharge will comply with the State's WQS.

As part of the 1987 amendments to the Clean Water Act, Congress added Section 402(p) to the Act, related to storm water discharges. Congress exempted some storm water discharges from the requirement to obtain an NPDES permit until after October 1, 1992. Section 402(p)(1). For certain specific categories of storm water discharges, this permit "moratorium" is not in effect, including discharges "associated with industrial activity," discharges from large and medium municipal separate storm sewer systems (i.e., systems serving a population over 250,000 or systems serving a population between 100,000 and 250,000, respectively). Section 402(p)(2).

For industrial and municipal storm water discharges, EPA was instructed to promulgate new regulations specifying permit application requirements. Congress mandated EPA to issue permits no later than February 4, 1991 (for industrial and large municipal discharges) or February 4, 1993 (for medium municipal discharges). Section 402(p)(4). These permits shall provide for compliance "as expeditiously as practicable, but in no event later than 3 years after the date of issuance of such permit." Id.

Section 402(p) also specified the levels of control to be incorporated into storm water permits. Permits for discharges associated with industrial activity are to require compliance with all applicable provisions of Sections 301 and 402 of the CWA, i.e., all technology-based and water quality-based requirements. Section 402(p)(3)(A). By contrast, permits for discharges from municipal separate storm sewers "shall require controls to reduce the discharge of pollutants to the maximum extent practicable" ("MEP"). Section 402(p)(3)(B)(iii).

2. Analysis

A. WQ-based Requirements in Municipal Storm Water Permits

The relationship of Section 402(p)(3)(B)(iii) to Section 301(b)(1)(C) is not clear, either on the face of the statute or in legislative history. Section 402(p)(3) is clearly intended to draw a distinction between the requirements on industrial and municipal storm water discharges. Section 402(p)(3)(A) states that industrial discharges shall comply with the applicable provisions of section 301, i.e., BAT/BCT technology-based requirements as well as any more stringent WQ-based requirements pursuant to 301(b)(1)(C). In the next sub-paragraph, Congress requires municipalities to control storm water to the MEP standard; no mention is made of section 301. The juxtaposition of (p)(3)(A) and (p)(3)(B) gives rise to the argument that Congress may have intended to waive all section 301 requirements for municipal discharges in favor of the MEP standard. On the other hand, one could read (p)(3)(B)(iii) as modifying only technology-based requirements for municipal storm water (i.e., MEP substitutes for BAT/BCT); any WQ-based requirements would still be necessary in a municipal permit, even if those requirements are more stringent than "practicable." The legislative history of Section 402(p) provides no guidance as to how Congress intended the MEP standard to operate.

Where Congressional intent behind a statutory provision is ambiguous in light of the language or legislative history, the Agency charged with administering that statute may adopt any reasonable interpretation consistent with the goals and purposes of the statute. Chevron, U.S.A. v. NRDC, 467 U.S. 837 (1984). Therefore, EPA has a large degree of discretion to choose how it will interpret the applicability of WQS to municipal storm water discharges. The only interpretation by EPA to date, contained in its proposed rulemaking, has been that WQS would continue to apply to permits for municipal storm water discharges. See, e.g., 53 Fed. Reg. 49,457 (Dec. 7, 1988) (priorities for controls in municipal storm water management programs will be developed to ensure achievement of water quality standards and the CWA).[1] There has been no intervening interpretation expressed by EPA on this issue. It is the opinion of the Office of General Counsel that the interpretation adopted by the Agency in the proposal is a reasonable one, for the following reasons.

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[1] EPA's intent to apply WQS to municipal storm water discharges can also be inferred by the fact that the 1988 proposal did not propose to alter 40 CFR 122.44(d), which provides that all NPDES permits must contain water quality-based requirements more stringent than technology-based requirements, where necessary to achieve WQS.

First, to support the opposite reading (i.e., that WQ-based requirements do not apply to municipal storm water permits), one would have to assert that Congress implicitly waived section 301(b)(1)(C) requirements for municipal storm water. One would further have to assume that Congress impliedly exempted municipal storm water permits from the Section 401 certification requirements. Implied repeals of statutory provisions are generally disfavored. Morton v. Mancari, 417 U.S. 535, 549 (1974). A court generally will find a statute impliedly repealed only if the later enacted provision is in "irreconcilable conflict" with the earlier provision. Kremer v. Chemical Construction Corp., 456 U.S. 461, 468 (1982) (citations omitted). In this case, the statutory provisions are not in irreconcilable conflict; rather, as discussed above, one may read Section 301(b)(1)(C) as requiring "any more stringent limitation" necessary to meet a WQS in every NPDES permit, including permits for discharges from municipal separate storm sewers which are subject to the MEP standard. Such a reading would harmonize the two provisions and give effect to the policy behind Sections 301(b)(1)(C) and 401, i.e., to ensure that WQS are met, regardless of practical considerations (such as the availability of treatment technology or the "practicability" of MS4 permit requirements).

To read Section 402(p)(3)(B) as overriding 301(b)(1)(C) requirements would also cause a conflict between Section 402(p) and the general focus of the provisions in the 1987 Amendments, many of which reflect a Congressional desire to improve compliance with the WQ-based requirements of the Act. The amendments to/additions of sections 303(c)(2)(B), 304(l), 319, 320, 402(o) all reflect Congressional concern with the improvement of water quality through the NPDES and other CWA programs. It would be particularly difficult to argue that the storm water provisions, a major part of the 1987 Amendments, were intended to create an exemption from the general rule regarding WQ-based requirements without an explicit acknowledgment of that result. We think the approach taken in the proposed rule is preferable.

B. Compliance Date for WQ-Based Limits in Municipal Storm Water Permits

In contrast to the issue of whether WQ-based requirements apply at all to MS4s, Congress had indeed spoken to the compliance date issue. Section 402(p)(4) requires compliance with all permit conditions no later than three years from the date of issuance. In light of the express language, we believe the Agency may reasonably interpret the three-year compliance provisions in Section 402(p)(4) to apply to all permit conditions, including those imposed under 301(b)(1)(C).[2]

There are arguments which support the reasonableness of this interpretation. First, EPA has issued few, if any storm water permits to MS4s to date. Many of these systems will face NPDES permit conditions for the first time, and I understand immediate compliance for these systems is likely to be unrealistic. The compliance date in Section 402(p)(4) apparently reflects a Congressional realization of that reality. Second, EPA has already construed another very similar provision of the 1987 Amendments in the same manner. Section 304(l) establishes an identical three-year compliance date for achieving water quality standards in Individual Control Strategies issued under that section. EPA has interpreted that provision, while not repealing Section 301(b)(1)(C), to allow for three-year compliance with new effluent limits established to meet WQS on 304(l)-identified streams. 54 Fed. Reg. 23,889 (Jun. 2, 1989). Given that 304(l) deals directly with WQ-based standards and permit requirements, a consistent interpretation with respect to 402(p)(3) and (p)(4) (which, as we have seen, is silent on the role of WQ-based requirements for MS4s) is certainly reasonable.[3]

If you have any questions regarding this memorandum, please contact Randy Hill of my staff, FTS 382-7700.

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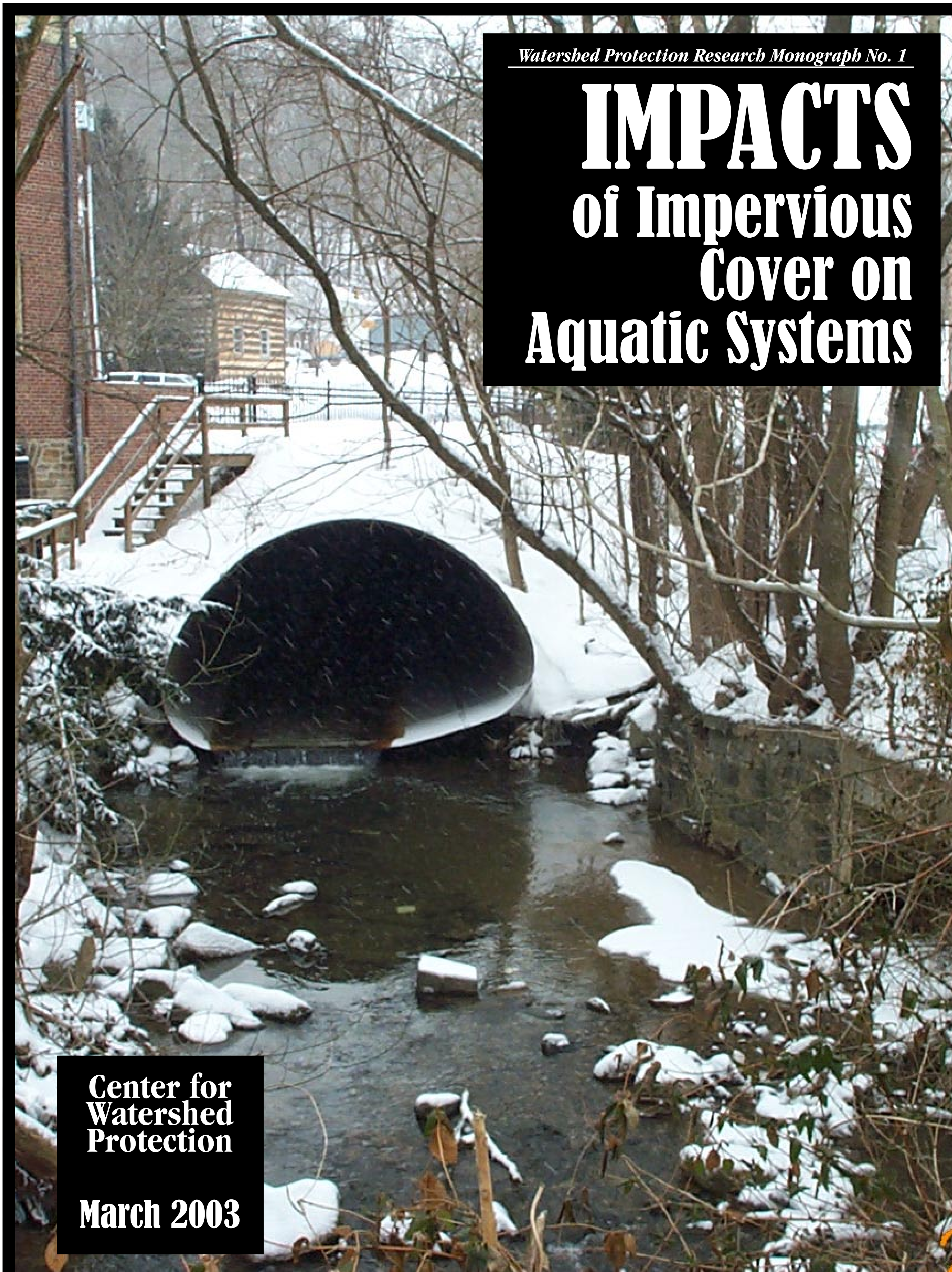
[2]. There may be some municipal separate storm sewer systems which are unable to meet even the three-year compliance date in their permits. The Agency retains the discretion to issue an administrative order fixing a schedule for compliance if compliance is not achieved in that three-year period.

[3] The decision of the Administrator in the Star-Kist permit appeal does not affect this analysis. Indeed, the decision itself supports the reading that compliance schedules under Section 304(l) (and, by extension, schedules under Section 402(p)(4)) are unaffected by the holding in that decision. Cf. Order on Petition for Reconsideration, In the Matter of Star-Kist Caribe, Inc., NPDES Appeal No. 88-5, (Apr. 17, 1990), at 6 n.5 (because decision does not prevent all post-1977 compliance schedules, arguments regarding 304(l) are not pertinent); (order stayed Sept. 4 1990).

April 10 and 11, 2013
Item No. 8
Supporting Document No. 5



Watershed Protection Research Monograph No. 1

IMPACTS of Impervious Cover on Aquatic Systems

Center for Watershed Protection

March 2003

Cover photograph Ellicott City, Maryland 2003.
Courtesy Anne Kitchell, Center for Watershed Protection.

April 10 and 11, 2013
Item No. 8
Supporting Document No. 5

Watershed Protection Research Monograph No. 1

Impacts of Impervious Cover on Aquatic Systems

March 2003

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April 10 and 11, 2013
Item No. 8
Supporting Document No. 5

Foreword

We are extremely pleased to launch the first edition of a new series called *Watershed Protection Research Monographs*. Each monograph will synthesize emerging research within a major topical area in the practice of watershed protection. The series of periodic monographs will replace our journal *Watershed Protection Techniques,* which lapsed in 2002. We hope this new format will provide watershed managers with the science and perspectives they need to better protect and restore their local watersheds.

This monograph was written to respond to many inquiries from watershed managers and policy makers seeking to understand the scientific basis behind the relationship between impervious cover and the health of aquatic ecosystems. It reviews more than 225 research studies that have explored the impact of impervious cover and other indicators of urbanization on aquatic systems. This report comprehensively reviews the available scientific data on how urbanization influences hydrologic, physical, water quality, and biological indicators of aquatic health, as of late 2002.

Our intention was to organize the available scientific data in a manner that was accessible to watershed leaders, policy-makers and agency staff. In addition, the research itself, which spans dozens of different academic departments and disciplines, was conducted in many different eco-regions, climatic zones, and stream types. In order to communicate across such a wide audience, we have resorted to some simplifications, avoided some important particulars, refrained from some jargon, and tried, wherever possible, to use consistent terminology. Thus, the interpretations and conclusions contained in this document are ours alone, and our readers are encouraged to consult the original sources when in doubt.

We would also like to note that the Center for Watershed Protection and the University of Alabama are currently developing a major national database on stormwater quality. The database will contain nearly 4,000 station-storm events collected by municipalities as part of the U.S. EPA's National Pollutant Discharge Elimination System (NPDES) Phase I Stormwater Permit Program. We anticipate releasing a data report in late 2003 that will provide a much needed update of stormwater event mean concentrations (EMCs).

As of this writing, many research efforts are underway that will further test and refine these relationships (most notably, the U.S. Geological Survey gradients initiative, but also many other local, state and academic efforts). We hope that this report provides a useful summary of the existing science, suggests some directions for new research, and stimulates greater discussion of this important topic in watershed management. We also feel it is time for a major conference or symposium, where this diverse community can join together to discuss methods, findings and the important policy implications of their research.

Foreword

Acknowledgments

Putting this first research monograph together took a lot of energy, editing and analysis, and many Center staff devoted their time and energy over the last two years to get it done. The project team consisted of Karen Cappiella, Deb Caraco, Samantha Corbin, Heather Holland, Anne Kitchell, Stephanie Linebaugh, Paul Sturm, and Chris Swann. Special thanks are extended to Tiffany Wright, who worked tirelessly to assemble, edit and otherwise polish the final draft.

I am also grateful to Michael Paul of Tetratech, Inc., who graciously provided us with an extensive literature review from his PhD days at the University of Georgia that contained many obscure and hard to find citations. Portions of this monograph were developed as part of a literature review conducted as part of a work assignment for the U.S. EPA Office of Wastewater Management in 2001, which proved indispensable in our efforts. Lastly, I would like to thank the hundreds of scientists who have contributed their time and data to explore and test the relationships between urbanization and aquatic health.

Tom Schueler
Center for Watershed Protection

Acknowledgments

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Acronyms and Abbreviations

B-IBI	Benthic Index of Biotic Integrity
BOD	Biological Oxygen Demand
BSD	Better Site Design
C-IBI	Combined Index of Biotic Integrity
cfs	cubic feet per second
COD	Chemical Oxygen Demand
CSO	Combined Sewer Overflow
Cu	Copper
DOC	Dissolved Organic Carbon
du/ac	dwelling units per acre
EMC	Event Mean Concentration
EPT	Ephemeroptera, Plecoptera and Trichoptera
FC	Forest Cover
GIS	Geographic Information Systems
IBI	Index of Biotic Integrity
IC	Impervious Cover
ICM	Impervious Cover Model
lbs/ac	pounds per acre
LWD	Large Woody Debris
mg/kg	milligrams per kilogram
mg/l	milligrams per liter (equal to ppm)
MPN	Most Probable Number
MTBE	Methyl Tertiary-Butyl Ether
N	Number of Studies
N/R	data not reported
NO_2	Nitrite
NO_3	Nitrate
NO_x	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
NTU	Nephelometric Turbidity Unit
NURP	National Urban Runoff Program
PAH	Polycylic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyl
ppb	Parts per billion (equal to ug/l)
ppm	Parts per million (equal to mg/l)
RBP	Rapid Bioassessment Protocol
SLAMM	Source Loading Assessment/ Management Model
SPMD	Semi-Permeable Membrane Device
SSO	Sanitary Sewer Overflow
STP	Stormwater Treatment Practice
TC	Turf Cover
TDS	Total Dissolved Solids
TKN	Total Kjeldhal Nitrogen
TMDL	Total Maximum Daily Load
Total N	Total Nitrogen
Total P	Total Phosphorous
TOC	Total Organic Carbon
TSS	Total Suspended Solids
ug/l	micrograms per liter (equal to ppb)
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compound
WLF	Water Level Fluctuation
WTP	Wastewater Treatment Plant

Chapter 1: Introduction

This research monograph comprehensively reviews the available scientific data on the impacts of urbanization on small streams and receiving waters. These impacts are generally classified according to one of four broad categories: changes in hydrologic, physical, water quality or biological indicators. More than 225 research studies have documented the adverse impact of urbanization on one or more of these key indicators. In general, most research has focused on smaller watersheds, with drainage areas ranging from a few hundred acres up to ten square miles.

Streams vs. Downstream Receiving Waters

Urban watershed research has traditionally pursued two core themes. One theme has evaluated the direct impact of urbanization on small streams, whereas the second theme has explored the more indirect impact of urbanization on downstream receiving waters, such as rivers, lakes, reservoirs, estuaries and coastal areas. This report is organized to profile recent research progress in both thematic areas and to discuss the implications each poses for urban watershed managers.

When evaluating the direct impact of urbanization on streams, researchers have emphasized hydrologic, physical and biological indicators to define urban stream quality. In recent years, impervious cover (IC) has emerged as a key paradigm to explain and sometimes predict how severely these stream quality indicators change in response to different levels of watershed development. The Center for Watershed Protection has integrated these research findings into a general watershed planning model, known as the impervious cover model (ICM). The ICM predicts that most stream quality indicators decline when watershed IC exceeds 10%, with severe degradation expected beyond 25% IC. In the first part of this review, we critically analyze the scientific basis for the ICM and explore some of its more interesting technical implications.

While many researchers have monitored the quality of stormwater runoff from small watersheds, few have directly linked these pollutants to specific water quality problems within streams (e.g., toxicity, biofouling, eutrophication). Instead, the prevailing view is that stormwater pollutants are a downstream export. That is, they primarily influence downstream receiving water quality. Therefore, researchers have focused on how to estimate stormwater pollutant loads and then determine the water quality response of the rivers, lakes and estuaries that receive them. To be sure, there is an increasing recognition that runoff volume can influence physical and biological indicators within some receiving waters, but only a handful of studies have explored this area. In the second part of this review, we review the impacts of urbanization on downstream receiving waters, primarily from the standpoint of stormwater quality. We also evaluate whether the ICM can be extended to predict water quality in rivers, lakes and estuaries.

This chapter is organized as follows:

1.1 A Review of Recent Urban Stream Research and the ICM
1.2 Impacts of Urbanization on Downstream Receiving Waters
1.3 Implications of the ICM for Watershed Managers

1.1 A Review of Recent Urban Stream Research and the ICM

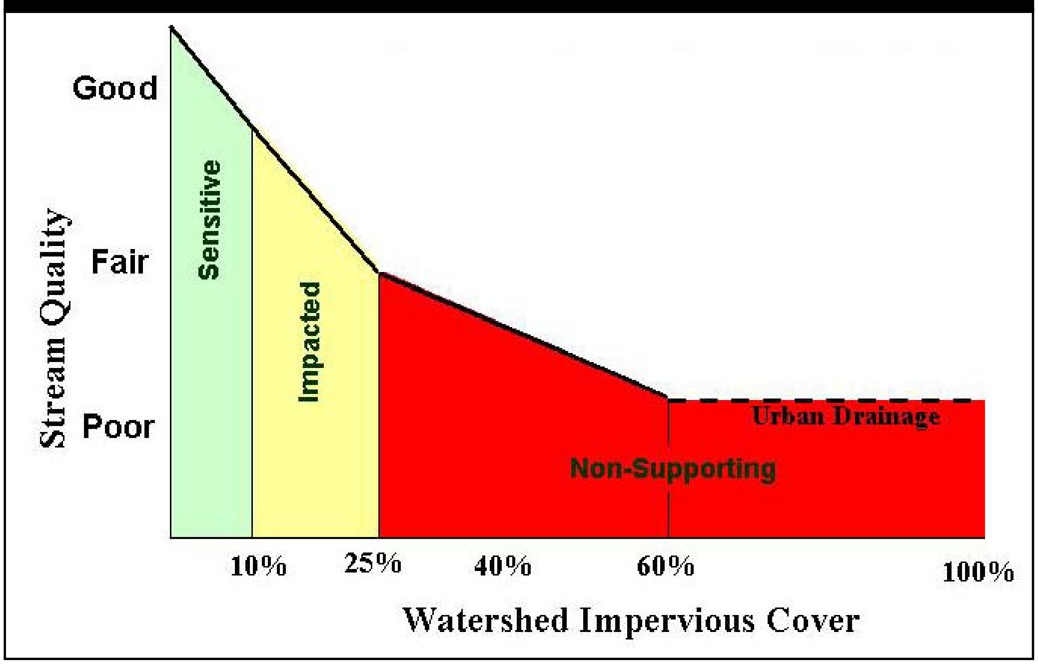
In 1994, the Center published "The Importance of Imperviousness," which outlined the scientific evidence for the relationship between IC and stream quality. At that time, about two dozen research studies documented a reasonably strong relationship between watershed IC and various indicators of stream quality. The research findings were subsequently integrated into the ICM (Schueler, 1994a and CWP, 1998). A brief summary of the basic assumptions of the ICM can be found in Figure 1. The ICM has had a major influence in watershed planning, stream classification and land use regulation in many communities. The ICM is a deceptively simple model that raises extremely complex and profound policy implications for watershed managers.

The ICM has been widely applied in many urban watershed settings for the purposes of small watershed planning, stream classification, and supporting restrictive development regulations and watershed zoning. As such, the ICM has stimulated intense debate among the planning, engineering and scientific communities. This debate is likely to soon spill over into the realm of politics and the courtroom, given its potential implications for local land use and environmental regulation. It is no wonder that the specter of scientific uncertainty is frequently invoked in the ICM debate, given the land use policy issues at stake. In this light, it is helpful to review the current strength of the evidence for and against the ICM.

The ICM is based on the following assumptions and caveats:

- Applies only to 1st, 2nd and 3rd order streams.
- Requires accurate estimates of percent IC, which is defined as the total amount of impervious cover over a subwatershed area.
- Predicts <u>potential</u> rather than <u>actual</u> stream quality. It can and should be expected that some streams will depart from the predictions of the model. For example, monitoring indicators may reveal poor water quality in a stream classified as "sensitive" or a surprisingly high biological diversity

Figure 1: Impervious Cover Model



score in a "non-supporting" one. Consequently, while IC can be used to initially diagnose stream quality, supplemental field monitoring is recommended to actually confirm it.

- Does not predict the precise score of an individual stream quality indicator but rather predicts the average behavior of a group of indicators over a range of IC. Extreme care should be exercised if the ICM is used to predict the fate of individual species (e.g., trout, salmon, mussels).

- "Thresholds" defined as 10 and 25% IC are not sharp "breakpoints," but instead reflect the expected transition of a composite of individual indicators in that range of IC. Thus, it is virtually impossible to distinguish real differences in stream quality indicators within a few percentage points of watershed IC (e.g., 9.9 vs. 10.1%).

- Should only be applied within the ecoregions where it has been tested, including the mid-Atlantic, Northeast, Southeast, Upper Midwest, and Pacific Northwest.

- Has not yet been validated for non-stream conditions (e.g., lakes, reservoirs, aquifers and estuaries).

- Does not currently predict the impact of watershed treatment.

In this section, we review available stream research to answer four questions about the ICM:

1. Does recent stream research still support the basic ICM?
2. What, if any, modifications need to be made to the ICM?
3. To what extent can watershed practices shift the predictions of the ICM?
4. What additional research is needed to test the ICM?

1.1.1 Strength of the Evidence for the ICM

Many researchers have investigated the IC/stream quality relationship in recent years. The Center recently undertook a comprehensive analysis of the literature to assess the scientific basis for the ICM. As of the end of 2002, we discovered more than 225 research studies that measured 26 different urban stream indicators within many regions of North America. We classified the research studies into three basic groups.

The first and most important group consists of studies that directly test the IC/stream quality indicator relationship by monitoring a large population of small watersheds. The second and largest group encompasses secondary studies that indirectly support the ICM by showing significant differences in stream quality indicators between urban and non-urban watersheds. The third and last group of studies includes widely accepted engineering models that explicitly use IC to directly predict stream quality indicators. Examples include engineering models that predict peak discharge or stormwater pollutant loads as a direct function of IC. In most cases, these relationships were derived from prior empirical research.

Table 1 provides a condensed summary of recent urban stream research, which shows the impressive growth in our understanding of urban streams and the watershed factors that influence them. A negative relationship between watershed development and nearly all of the 26 stream quality indicators has been established over many regions and scientific disciplines. About 50 primary studies have tested the IC/stream quality indicator relationship, with the largest number looking at biological indicators of stream health, such as the diversity of aquatic insects or fish. Another 150 or so secondary studies provide evidence that stream quality indicators are significantly different between urban and non-urban watersheds, which lends at least indirect support for the ICM and suggests that additional research to directly test the IC/stream quality indicator

**Table 1: The Strength of Evidence:
A Review of the Current Research on Urban Stream Indicators**

Stream Quality Indicator	#	IC	UN	EM	RV	Notes
Increased Runoff Volume	2	Y	Y	Y	N	extensive national data
Increased Peak Discharge	7	Y	Y	Y	Y	type of drainage system key
Increased Frequency of Bankfull Flow	2	?	Y	N	N	hard to measure
Diminished Baseflow	8	?	Y	N	Y	inconclusive data
Stream Channel Enlargement	8	Y	Y	N	Y	stream type important
Increased Channel Modification	4	Y	Y	N	?	stream enclosure
Loss of Riparian Continuity	4	Y	Y	N	?	can be affected by buffer
Reduced Large Woody Debris	4	Y	Y	N	?	Pacific NW studies
Decline in Stream Habitat Quality	11	Y	Y	N	?	
Changes in Pool Riffle/Structure	4	Y	Y	N	?	
Reduced Channel Sinuosity	1	?	Y	N	?	straighter channels
Decline in Streambed Quality	2	Y	Y	N	?	embeddedness
Increased Stream Temperature	5	Y	Y	N	?	buffers and ponds also a factor
Increased Road Crossings	3	?	Y	N	?	create fish barriers
Increased Nutrient Load	30+	?	Y	Y	N	higher stormwater EMCs
Increased Sediment Load	30+	?	Y	N	Y	higher EMCs in arid regions
Increased Metals & Hydrocarbons	20+	?	Y	Y	N	related to traffic/VMT
Increased Pesticide Levels	7	?	Y	N	Y	may be related to turf cover
Increased Chloride Levels	5	?	Y	N	Y	related to road density
Violations of Bacteria Standards	9	Y	Y	N	Y	indirect association
Decline in Aquatic Insect Diversity	33	Y	Y	N	N	IBI and EPT
Decline in Fish Diversity	19	Y	Y	N	N	regional IBI differences
Loss of Coldwater Fish Species	6	Y	Y	N	N	trout and salmon
Reduced Fish Spawning	3	Y	Y	N	?	
Decline in Wetland Plant Diversity	2	N	Y	N	?	water level fluctuation
Decline in Amphibian Community	5	Y	Y	N	?	few studies

#: *total number of all studies that evaluated the indicator for urban watersheds*
IC: *does balance of studies indicate a progressive change in the indicator as IC increases? Answers: Yes, No or No data (?)*
UN: *If the answer to IC is no, does the balance of the studies show a change in the indicator from non-urban to urban watersheds? Yes or No*
EM *Is the IC/stream quality indicator relationship implicitly assumed within the framework of widely accepted engineering models? Yes, No or No models yet exist (?)*
RV: *If the relationship has been tested in more than one eco-region, does it generally show major differences between ecoregions? Answers: Yes, No, or insufficient data (?)*

relationship is warranted. In some cases, the IC/stream quality indicator relationship is considered so strongly established by historical research that it has been directly incorporated into accepted engineering models. This has been particularly true for hydrological and water quality indicators.

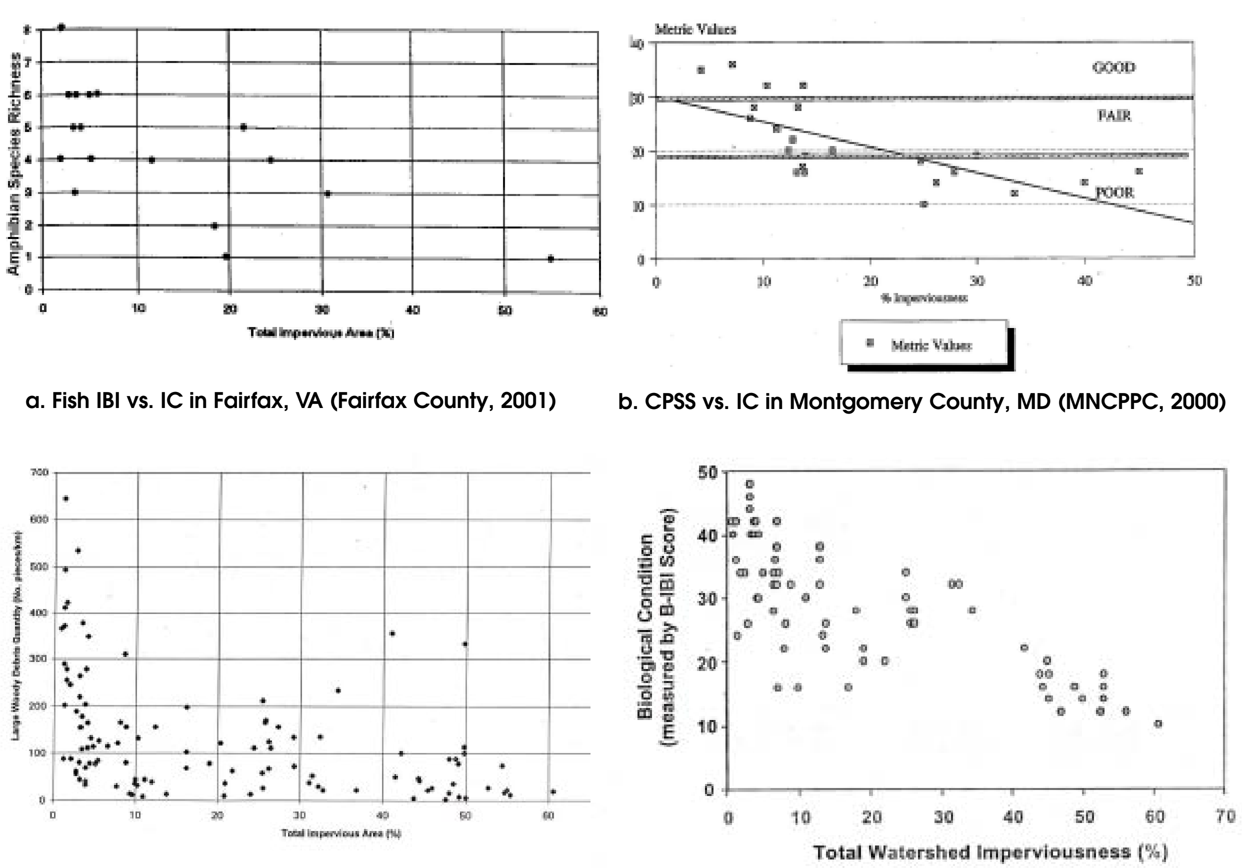
1.1.2 Reinterpretation of the ICM

Although the balance of recent stream research generally supports the ICM, it also offers several important insights for interpreting and applying the ICM, which are discussed next.

Statistical Variability

Scatter is a common characteristic of most IC/stream quality indicator relationships. In most cases, the overall trend for the indicator is down, but considerable variation exists along the trend line. Often, linear regression equations between IC and individual stream quality indicators produce relatively modest correlation coefficients (reported r^2 of 0.3 to 0.7 are often considered quite strong).

Figure 2 shows typical examples of the IC/stream quality indicator relationship that illustrate the pattern of statistical variability. Variation is always encountered when dealing with urban stream data (particularly so for biological indicators), but several patterns exist that have important implications for watershed managers.



a. Fish IBI vs. IC in Fairfax, VA (Fairfax County, 2001)

b. CPSS vs. IC in Montgomery County, MD (MNCPPC, 2000)

c. Large Woody Debris vs. IC (Booth *et al.*, 1997)

d. Biological Condition vs. Total Watershed IC (Booth, 2000)

Figure 2: Typical Scatter Found in IC/Stream Quality Indicator Research

The first pattern to note is that the greatest scatter in stream quality indicator scores is frequently seen in the range of one to 10% IC. These streams, which are classified as "sensitive" according to the ICM, often exhibit low, moderate or high stream quality indicator scores, as shown in Figure 2. The key interpretation is that sensitive streams have the potential to attain high stream quality indicator scores, but may not always realize this potential.

Quite simply, the influence of IC in the one to 10% range is relatively weak compared to other potential watershed factors, such as percent forest cover, riparian continuity, historical land use, soils, agriculture, acid mine drainage or a host of other stressors. Consequently, watershed managers should never rely on IC alone to classify and manage streams in watersheds with less than 10% IC. Rather, they should evaluate a range of supplemental watershed variables to measure or predict actual stream quality within these lightly developed watersheds.

The second important pattern is that variability in stream quality indicator data is usually dampened when IC exceeds 10%, which presumably reflects the stronger influence of stormwater runoff on stream quality indicators. In particular, the chance that a stream quality indicator will attain a high quality score is sharply diminished at higher IC levels. This trend becomes pronounced within the 10 to 25% IC range and almost inevitable when watershed IC exceeds 25%. Once again, this pattern suggests that IC is a more robust and reliable indicator of overall stream quality beyond the 10% IC threshold.

Other Watershed Variables and the ICM
Several other watershed variables can potentially be included in the ICM. They include forest cover, riparian forest continuity and turf cover.

Forest cover (FC) is clearly the main rival to IC as a useful predictor of stream quality in urban watersheds, at least for humid regions of North America. In some regions, FC is simply the reciprocal of IC. For example, Horner and May (1999) have demonstrated a strong interrelationship between IC and FC for subwatersheds in the Puget Sound region (Figure 3). In other regions, however, "pre-

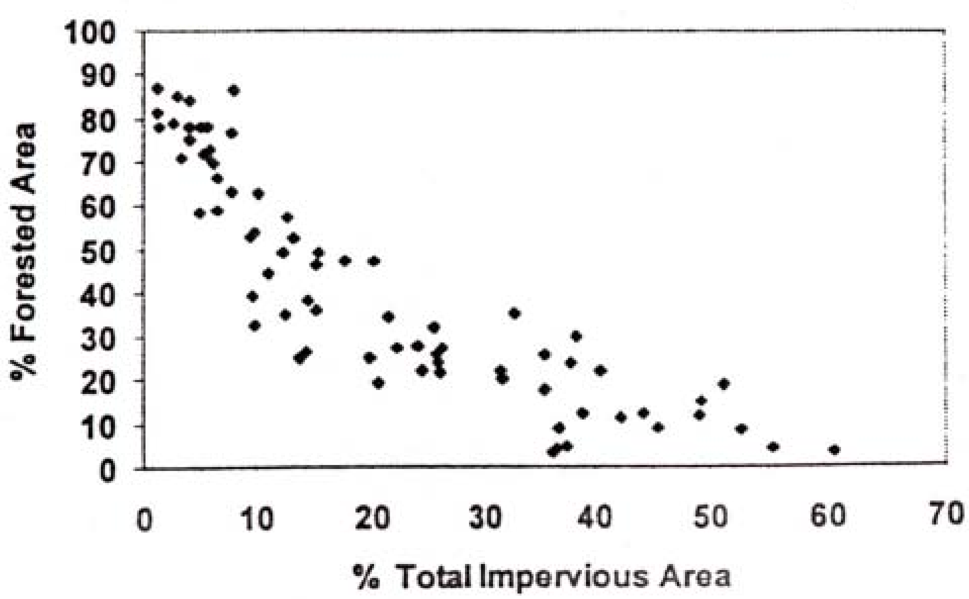


Figure 3: Relationship of IC and FC in Puget Sound Subwatersheds (Horner and May, 1999)

development" land use represents a complex mosaic of crop land, pasture and forest. Therefore, an inverse relationship between FC and IC may not be universal for subwatersheds that have witnessed many cycles of deforestation and cultivation.

It should come as little surprise that the progressive loss of FC has been linked to declining stream quality indicators, given that forested watersheds are often routinely used to define natural reference conditions for streams (Booth, 2000 and Horner *et al.*, 2001). Mature forest is considered to be the main benchmark for defining pre-development hydrology within a subwatershed, as well. Consequently, FC is perhaps the most powerful indicator to predict the quality of streams within the "sensitive" category (zero to 10% IC).

To use an extreme example, one would expect that stream quality indicators would respond quite differently in a subwatershed that had 90% FC compared to one that had 90% crop cover. Indeed, Booth (1991) suggests that stream quality can only be maintained when IC is limited to less than 10% <u>and</u> at least 65% FC is retained within a subwatershed. The key management implication then is that stream health is best managed by simultaneously minimizing the creation of IC and maximizing the preservation of native FC.

FC has also been shown to be useful in predicting the quality of terrestrial variables in a subwatershed. For example, the Mid-Atlantic Integrated Assessment (USEPA, 2000) has documented that watershed FC can reliably predict the diversity of bird, reptile and amphibian communities in the mid-Atlantic region. Moreover, the emerging discipline of landscape ecology provides watershed managers with a strong scientific foundation for deciding where FC should be conserved in a watershed. Conservation plans that protect and connect large forest fragments have been shown to be effective in conserving terrestrial species.

Riparian forest continuity has also shown considerable promise in predicting at least some indicators of stream quality for urban watersheds. Researchers have yet to come up with a standard definition of riparian continuity, but it is usually defined as the proportion of the perennial stream network in a subwatershed that has a fixed width of mature streamside forest. A series of studies indicates that aquatic insect and fish diversity are associated with high levels of riparian continuity (Horner *et al.,* 2001; May *et al.*, 1997; MNCPPC, 2000; Roth *et al.,* 1998). On the other hand, not much evidence has been presented to support the notion that riparian continuity has a strong influence on hydrology or water quality indicators.

One watershed variable that received little attention is the fraction of watershed area maintained in turf cover (TC). Grass often comprises the largest fraction of land area within low-density residential development and could play a significant role in streams that fall within the "impacted" category (10 to 25% IC). Although lawns are pervious, they have sharply different properties than the forests and farmlands they replace (i.e., irrigation, compacted soils, greater runoff, and much higher input of fertilizers and pesticides, etc.). It is interesting to speculate whether the combined area of IC and TC might provide better predictions about stream health than IC area alone, particularly within impacted subwatersheds.

Several other watershed variables might have at least supplemental value in predicting stream quality. They include the presence of extensive wetlands and/or beaverdam complexes in a subwatershed; the dominant form of drainage present in the watershed (tile drains, ditches, swales, curb and gutters, storm drain pipes); the average age of development; and the proximity of sewer lines to the stream. As far as we could discover, none of these variables has been systematically tested in a controlled population of small watersheds. We have observed that these factors could be important in our field investigations and often measure them to provide greater insight into subwatershed behavior.

Lastly, several watershed variables that are closely related to IC have been proposed to predict stream quality. These include population, percent urban land, housing density, road density and other indices of watershed development. As might be expected, they generally track the same trend as IC, but each has some significant technical limitations and/or difficulties in actual planning applications (Brown, 2000).

Individual vs. Multiple Indicators

The ICM does not predict the precise score of individual stream quality indicators, but rather predicts the average behavior of a group of indicators over a range of IC. Extreme care should be exercised if the ICM is used to predict the fate of individual indicators and/or species. This is particularly true for sensitive aquatic species, such as trout, salmon, and freshwater mussels. When researchers have examined the relationship between IC and individual species, they have often discovered lower thresholds for harm. For example, Boward *et al.* (1999) found that brook trout were not found in subwatersheds that had more than 4% IC in Maryland, whereas Horner and May (1999) asserted an 8% threshold for sustaining salmon in Puget Sound streams.

The key point is that if watershed managers want to maintain an individual species, they should be very cautious about adopting the 10% IC threshold. The essential habitat requirements for many sensitive or endangered species are probably determined by the *most sensitive* stream quality indicators, rather than the *average behavior* of all stream quality indicators.

Direct Causality vs. Association

A strong relationship between IC and declining stream quality indicators does not always mean that the IC is directly responsible for the decline. In some cases, however, causality can be demonstrated. For example, increased stormwater runoff volumes are directly caused by the percentage of IC in a subwatershed, although other factors such as conveyance, slope and soils may play a role.

In other cases, the link is much more indirect. For these indicators, IC is merely an index of the cumulative amount of watershed development, and more IC simply means that a greater number of known or unknown pollutant sources or stressors are present. In yet other cases, a causal link appears likely but has not yet been scientifically demonstrated. A good example is the more than 50 studies that have explored how fish or aquatic insect diversity changes in response to IC. While the majority of these studies consistently shows a very strong negative association between IC and biodiversity, they do not really establish which stressor or combination of stressors contributes most to the decline. The widely accepted theory is that IC changes stream hydrology, which degrades stream habitat, and in turn leads to reduced stream biodiversity.

Regional Differences

Currently, the ICM has been largely confirmed within the following regions of North America: the mid-Atlantic, the Northeast, the Southeast, the upper Midwest and the Pacific Northwest. Limited testing in Northern California, the lower Midwest and Central Texas generally agrees with the ICM. The ICM has not been tested in Florida, the Rocky Mountain West, and the Southwest. For a number of reasons, it is not certain if the ICM accurately predicts biological indicators in arid and semiarid climates (Maxted, 1999).

Measuring Impervious Cover

Most researchers have relied on total impervious cover as the basic unit to measure IC at the subwatershed level. The case has repeatedly been made that effective impervious cover is probably a superior metric (e.g., only counting IC that is hydraulically connected to the drainage system). Notwithstanding, most researchers have continued to measure total IC because it is generally quicker and does not require extensive (and often subjective) engineering judgement as to whether it is connected or not. Researchers have used a wide variety of techniques to estimate subwatershed IC, including satellite imagery, analysis of aerial photographs, and derivation from GIS land use layers. Table 2 presents some standard land use/IC relationships that were developed for suburban regions of the Chesapeake Bay.

Table 2: Land Use/IC Relationships for Suburban Areas of the Chesapeake Bay
(Cappiella and Brown, 2001)

Land Use Category	Sample Number (N)	Mean IC (SE)	Land Use Category	Sample Number (N)	Mean IC (SE)
Agriculture	8	**1.9** – 0.3	Institutional	30	**34.4** – 3.45
Open Urban Land	11	**8.6** – 1.64	Light	20	**53.4** – 2.8
2 Acre Lot Residential	12	**10.6** – 0.65	Commercia	23	**72.2** – 2.0
1 Acre Lot Residential	23	**14.3** – 0.53	Churches	8	**39.9** – 7.8 1
1/2 Acre Lot Residential	20	**21.2** – 0.78	Schools	13	**30.3** – 4.8
1/4 Acre Lot Residential	23	**27.8** – 0.60	Municipals	9	**35.4** – 6.3
1/8 Acre Lot Residential	10	**32.6** – 1.6	Golf	4	**5.0** – 1.7
Townhome Residential	20	**40.9** – 1.39	Cemeteries	3	**8.3** – 3.5
Multifamily Residential	18	**44.4** – 2.0	Parks	4	**12.5** – 0.7

Three points are worth noting. First, it is fair to say that most researchers have spent more quality control effort on their stream quality indicator measurements than on their subwatershed IC estimates. At the current time, no standard protocol exists to estimate subwatershed IC, although Cappiella and Brown (2001) presented a useful method. At best, the different methods used to measure IC make it difficult to compare results from different studies, and at worst, it can introduce an error term of perhaps +/- 10% from the true value within an individual subwatershed. Second, it is important to keep in mind that IC is not constant over time; indeed, major changes in subwatershed IC have been observed within as few as two years. Consequently, it is sound practice to obtain subwatershed IC estimates from the most recent possible mapping data, to ensure that it coincides with stream quality indicator measurements. Lastly, it is important to keep in mind that most suburban and even rural zoning categories exceed 10% IC (see Table 2). Therefore, from a management standpoint, planners should try to project future IC, in order to determine the future stream classification for individual subwatersheds.

1.1.3 Influence of Watershed Treatment Practices on the ICM

The most hotly debated question about the ICM is whether widespread application of watershed practices such as stream buffers or stormwater management can mitigate the impact of IC, thereby allowing greater development density for a given watershed. At this point in time, there are fewer than 10 studies that directly bear on this critical question. Before these are reviewed, it is instructive to look at the difficult technical and scientific issues involved in detecting the effect of watershed treatment, given its enormous implications for land use control and watershed management.

The first tough issue is how to detect the effect of watershed treatment, given the inherent scatter seen in the IC/stream quality indicator relationship. Figure 4 illustrates the “double scatter” problem, based on three different urban stream research studies in Delaware, Maryland and Washington. A quick inspection of the three plots shows how intrinsically hard it is to distinguish the watershed treatment effect. As can be seen, stream quality indicators in subwatersheds with treatment tend to

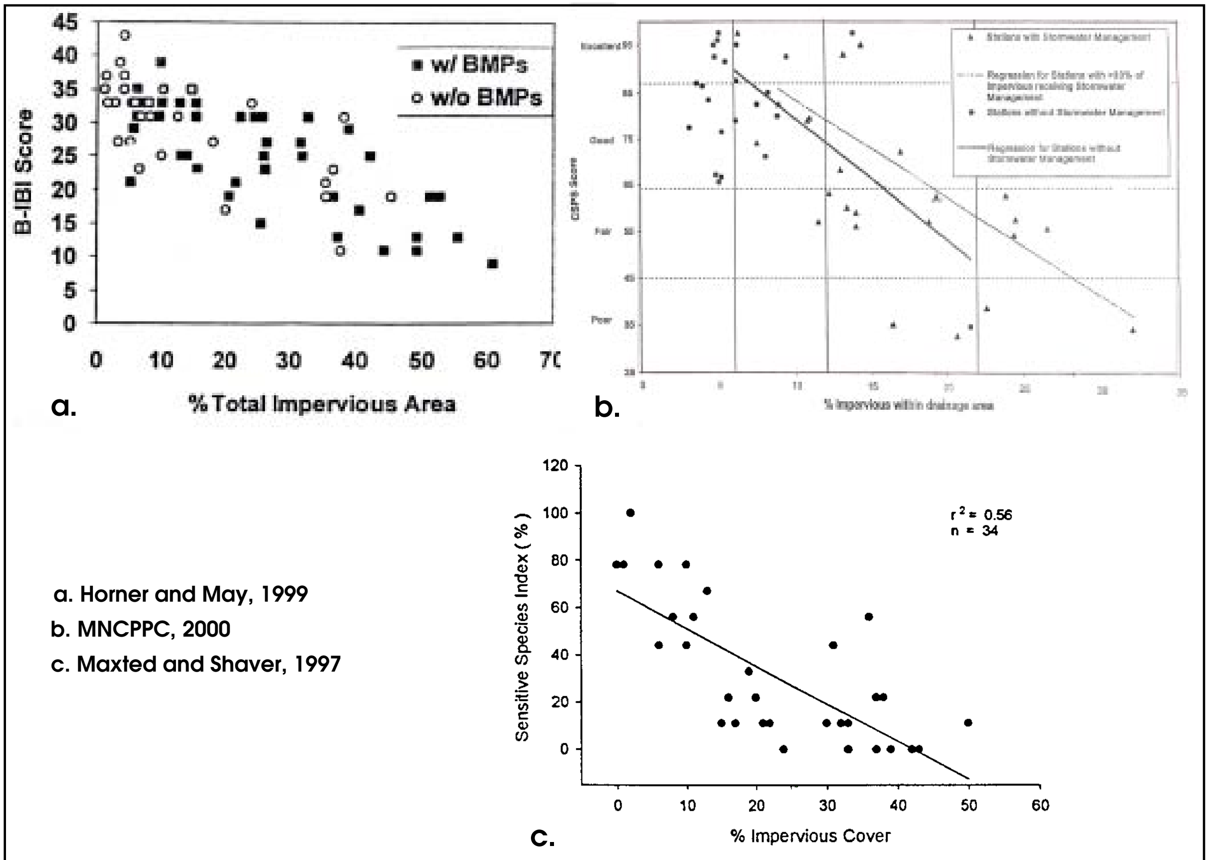


Figure 4: The Double Scatter Problem: Difficulties in Detecting the Effect of Watershed Treatment

overplot those in subwatersheds that lack treatment. While subtle statistical differences may be detected, they are not visibly evident. This suggests that the impact of watershed treatment would need to be extremely dramatic to be detected, given the inherent statistical variability seen in small watersheds (particularly so within the five to 25% IC range where scatter is considerable).

In an ideal world, a watershed study design would look at a controlled population of small urban watersheds that were developed with and without watershed practices to detect the impact of "treatment." In the real world, however, it is impossible to strictly control subwatershed variables. Quite simply, no two subwatersheds are ever alike. Each differs slightly with respect to drainage area, IC, forest cover, riparian continuity, historical land use, and percent watershed treatment. Researchers must also confront other real world issues when designing their watershed treatment experiments.

For example, researchers must carefully choose which indicator or group of indicators will be used to define stream health. IC has a negative influence on 26 stream quality indicators, yet nearly all of the watershed treatment research so far has focused on just a few biological indicators (e.g., aquatic insect or fish diversity) to define stream health. It is conceivable that watershed treatment might have no effect on biological indicators, yet have a positive influence on hydrology, habitat or water quality indicators. At this point, few of these indicators have been systematically tested in the field. It is extremely doubtful that any watershed practice can simultaneously improve or mitigate all 26 stream quality indicators, so researchers must carefully interpret the outcomes of their watershed treatment experiments.

The second issue involves how to quantify watershed treatment. In reality, watershed treatment collectively refers to dozens of practices that are installed at individual development sites in the many years or even decades it takes to fully "build out" a subwatershed. Several researchers have discovered that watershed practices are seldom installed consistently across an entire subwatershed. In some cases, less than a third of the IC in a subwatershed was actually treated by any practice, because development occurred prior to regulations; recent projects were exempted, waived or grandfathered; or practices were inadequately constructed or maintained (Horner and May, 1999 and MNCPPC, 2000).

Even when good coverage is achieved in a watershed, such as the 65 to 90% reported in studies of stormwater ponds (Jones *et al.*, 1996; Maxted, 1999; Maxted and Shaver, 1997), it is still quite difficult to quantify the actual quality of treatment. Often, each subwatershed contains its own unique mix of stormwater practices installed over several decades, designed under diverse design criteria, and utilizing widely different stormwater technologies. Given these inconsistencies, researchers will need to develop standard protocols to define the extent and quality of watershed treatment.

Effect of Stormwater Ponds

With this in mind, the effect of stormwater ponds and stream buffers can be discussed. The effect of larger stormwater ponds in mitigating the impacts of IC in small watersheds has received the most scrutiny to date. This is not surprising, since larger ponds often control a large fraction of their contributing subwatershed area (e.g. 100 to 1,000 acres) and are located on the stream itself, therefore lending themselves to easier monitoring. Three studies have evaluated the impact of large stormwater ponds on downstream aquatic insect communities (Jones *et al.*, 1996; Maxted and Shaver, 1997; Stribling *et al.*, 2001). Each of these studies was conducted in small headwater subwatersheds in the mid-Atlantic Region, and none was able to detect major differences in aquatic insect diversity in streams with or without stormwater ponds.

Four additional studies statistically evaluated the stormwater treatment effect in larger populations of small watersheds with varying degrees of IC (Horner and May, 1999; Horner *et al.,* 2001; Maxted, 1999; MNCPPC, 2000). These studies generally sampled larger watersheds that had many stormwater practices but not necessarily complete watershed coverage. In general, these studies detected a small but positive effect of stormwater treatment relative to aquatic insect diversity. This positive effect was typically seen only in the range of five to 20% IC and was generally undetected beyond about 30% IC. Although each author was hesitant about interpreting his results, all generally agreed that perhaps as much as 5% IC could be added to a subwatershed while maintaining aquatic insect diversity, given effective stormwater treatment. Forest retention and stream buffers were found to be very important, as well. Horner *et al.* (2001) reported a somewhat stronger IC threshold for various species of salmon in Puget Sound streams.

Some might conclude from these initial findings that stormwater ponds have little or no value in maintaining biological diversity in small streams. However, such a conclusion may be premature for several reasons. First, the generation of stormwater ponds that was tested was not explicitly designed to protect stream habitat or to prevent downstream channel erosion, which would presumably promote aquatic diversity. Several states have recently changed their stormwater criteria to require extended detention for the express purpose of preventing downstream channel erosion, and these new criteria may exert a stronger influence on aquatic diversity. Instead, their basic design objective was to maximize pollutant removal, which they did reasonably well.

The second point to stress is that streams with larger stormwater ponds should be considered "regulated streams" (Ward and Stanford, 1979), which have a significantly altered aquatic insect community downstream of the ponds. For example, Galli (1988) has reported that on-stream wet stormwater ponds shift the trophic structure of the aquatic insect community. The insect community above the pond was dominated by shredders, while the insect community below the pond was dominated by scrapers, filterers and collectors. Of particular note, several pollution-sensitive species were eliminated below the pond. Galli reported that changes in stream temperatures, carbon supply and substrate fouling were responsible for the downstream shift in the aquatic insect community. Thus, while it is clear that large stormwater ponds can be expected to have a negative effect on aquatic insect diversity, they could still exert positive influence on other stream quality indicators.

Effect of Stream Buffers
A handful of studies have evaluated biological indicator scores for urban streams that have extensive forest buffers, compared to streams where they were mostly or completely absent (Horner and May, 1999; Horner *et al.,* 2001; May *et al.*, 1997; MNCPPC, 2000; Roth *et al.,* 1998; Steedman, 1988). Biological indicators included various indices of aquatic insect, fish and salmon diversity. Each study sampled a large population of small subwatersheds over a range of IC and derived a quantitative measure to express the continuity, width and forest cover of the riparian buffer network within each subwatershed. Riparian forests were hypothesized to have a positive influence on stream biodiversity, given the direct ways they contribute to stream habitat (e.g., shading, woody debris, leaf litter, bank stability, and organic carbon supply).

All five studies detected a small to moderate positive effect when forested stream buffers were present (frequently defined as at least two-thirds of the stream network with at least 100 feet of stream side forest). The greatest effect was reported by Horner and May (1999) and Horner *et al.* (2001) for salmon streams in the Puget Sound ecoregion. If excellent riparian habitats were preserved, they generally reported that fish diversity could be maintained up to 15% IC, and good aquatic insect diversity could be maintained with as much as 30% IC. Steedman (1988) reported a somewhat smaller effect for Ontario streams. MNCPPC (2000), May *et al.* (1997), and Roth *et al.* (1998) could not find a statistically significant relationship between riparian quality and urban stream quality indicators but did report that most outliers (defined as higher IC subwatersheds with unusually high biological indicator scores) were generally associated with extensive stream side forest.

1.1.4 Recommendations for Further ICM Research

At this point, we recommend three research directions to improve the utility of the ICM for watershed managers. The **first direction** is to expand basic research on the relationship between IC and stream quality indicators that have received little scrutiny. In particular, more work is needed to define the relationship between IC and hydrological and physical indicators such as the following:

- Physical loss or alteration of the stream network
- Stream habitat measures
- Riparian continuity
- Baseflow conditions during dry weather

In addition, more watershed research is needed in ecoregions and physiographic areas where the ICM has not yet been widely tested. Key areas include Florida, arid and semiarid climates, karst areas and mountainous regions. The basic multiple subwatershed monitoring protocol set forth by Schueler (1994a) can be used to investigate IC/stream quality relationships, although it would be wise to measure a wider suite of subwatershed variables beyond IC (e.g., forest cover, turf cover, and riparian continuity).

The **second** research direction is to more clearly define the impact of watershed treatment on stream quality indicators. Based on the insurmountable problems encountered in controlling variation at the subwatershed level, it may be necessary to abandon the multiple watershed or paired watershed sampling approaches that have been used to date. Instead, longitudinal monitoring studies within individual subwatersheds may be a more powerful tool to detect the effect of watershed treatment. These studies could track changes in stream quality indicators in individual subwatersheds over the entire development cycle: pre-development land use, clearing, construction, build out, and post construction. In most cases, longitudinal studies would take five to 10 years to complete, but they would allow watershed managers to measure and control the inherent variability at the subwatershed level and provide a "before and after" test of watershed treatment. Of course, a large population of test subwatersheds would be needed to satisfactorily answer the watershed treatment question.

The **third** research direction is to monitor more non-supporting streams, in order to provide a stronger technical foundation for crafting more realistic urban stream standards and to see how they respond to various watershed restoration treatments. As a general rule, most researchers have been more interested in the behavior of sensitive and impacted streams. The non-supporting stream category spans a wide range of IC, yet we do not really understand how stream quality indicators behave over the entire 25 to 100% IC range.

For example, it would be helpful to establish the IC level at the upper end of the range where streams are essentially transformed into an artificial conveyance system (i.e., become pipes or artificial channels). It would also be interesting to sample more streams near the lower end of the non-supporting category (25 to 35% IC) to detect whether stream quality indicators respond to past watershed treatment or current watershed restoration efforts. For practical reasons, the multiple subwatershed sampling approach is still recommended to characterize indicators in non-supporting streams. However, researchers will need to screen a large number of non-supporting subwatersheds in order to identify a few subwatersheds that are adequate for subsequent sampling (i.e., to control for area, IC, development age, percent watershed treatment, type of conveyance systems, etc.).

1.2 Impacts of Urbanization on Downstream Receiving Waters

In this section, we review the impacts of urbanization on downstream receiving waters, primarily from the standpoint of impacts caused by poor stormwater quality. We begin by looking at the relationship between IC and stormwater pollutant loadings. Next, we discuss the sensitivity of selected downstream receiving waters to stormwater pollutant loads. Lastly, we examine the effect of watershed treatment in reducing stormwater pollutant loads.

1.2.1 Relationship Between Impervious Cover and Stormwater Quality

Urban stormwater runoff contains a wide range of pollutants that can degrade downstream water quality (Table 3). Several generalizations can be supported by the majority of research conducted to date. First, the unit area pollutant load delivered by stormwater runoff to receiving waters increases in direct proportion to watershed IC. This is not altogether surprising, since pollutant load is the product of the average pollutant concentration and stormwater runoff volume. Given that runoff volume increases in direct proportion to IC, pollutant loads must automatically increase when IC increases, as long the average pollutant concentration stays the same (or increases). This relationship is a central assumption in most simple and complex pollutant loading models (Bicknell *et al.*, 1993; Donigian and Huber, 1991; Haith *et al.*, 1992; Novotny and Chester, 1981; NVPDC, 1987; Pitt and Voorhees, 1989).

The second generalization is that stormwater pollutant concentrations are generally similar

Table 3: Summary of Urban Stormwater Pollutant Loads on Quality of Receiving Waters

Pollutants in Urban Stormwater	WQ Impacts To:					Higher Unit Load?	Load a function of IC?	Other Factors Important in Loading
	R	L	E	A	W			
Suspended Sediment	Y	Y	Y	N	Y	Y (ag)	Y	channel erosion
Total Nitrogen	N	N	Y	Y	N	Y (ag)	Y	septic systems
Total Phosphorus	Y	Y	N	N	Y	Y (ag)	Y	tree canopy
Metals	Y	Y	Y	?	N	Y	Y	vehicles
Hydrocarbons	Y	Y	Y	Y	Y	Y	?	related to VMTs and hotspots
Bacteria/Pathogens	Y	Y	Y	N	Y	Y	Y	many sources
Organic Carbon	N	?	?	?	Y	Y	Y	
MTBE	N	N	N	Y	Y	Y	?	roadway, VMTs
Pesticides	?	?	?	?	Y	Y	?	turf/landscaping
Chloride	?	Y	N	Y	Y	Y	?	road density
Trash/Debris	Y	Y	Y	N	?	Y	Y	curb and gutters

Major Water Quality Impacts Reported for:
R = River, L = Lake, E = Estuary, A = Aquifer, W = Surface Water Supply
Higher Unit Area Load? Yes (compared to all land uses) (ag): with exception of cropland
Load a function of IC? Yes, increases proportionally with IC

at the catchment level, regardless of the mix of IC types monitored (e.g., residential, commercial, industrial or highway runoff). Several hundred studies have examined stormwater pollutant concentrations from small urban catchments and have generally found that the variation within a catchment is as great as the variation between catchments. Runoff concentrations tend to be log-normally distributed, and therefore the long term "average" concentration is best expressed by a median value. It should be kept in mind that researchers have discovered sharp differences in pollutant concentrations for smaller, individual components of IC (e.g., rooftops, parking lots, streets, driveways and the like). Since most urban catchments are composed of many kinds of IC, this mosaic quality tempers the variability in long term pollutant concentrations at the catchment or subwatershed scale.

The third generalization is that median concentrations of pollutants in urban runoff are usually higher than in stormwater runoff from most other non-urban land uses. Consequently, the unit area nonpoint pollutant load generated by urban land normally exceeds that of nearly all watershed land uses that it replaces (forest, pasture, cropland, open space — see Table 3). One important exception is cropland, which often produces high unit area sediment and nutrient loads in many regions of the country. In these watersheds, conversion of intensively managed crops to low density residential development may actually result in a slightly decreased sediment or nutrient load. On the other hand, more intensive land development (30% IC or more) will tend to equal or exceed cropland loadings.

The last generalization is that the effect of IC on stormwater pollutant loadings tends to be weakest for subwatersheds in the one to 10% IC range. Numerous studies have suggested that other watershed and regional factors may have a stronger influence, such as the underlying geology, the amount of carbonate rock in the watershed, physiographic region, local soil types, and most important, the relative fraction of forest and crop cover in the subwatershed (Herlihy *et al*., 1998 and Liu *et al.,* 2000). The limited influence of IC on pollutant loads is generally consistent with the finding for hydrologic, habitat and biological indicators over this narrow range of IC. Once again, watershed managers are advised to track other watershed indicators in the sensitive stream category, such as forest or crop cover.

1.2.2 Water Quality Response to Stormwater Pollution

As noted in the previous section, most ICM research has been done on streams, which are directly influenced by increased stormwater. Many managers have wondered whether the ICM also applies to downstream receiving waters, such as lakes, water supply reservoirs and small estuaries. In general, the exact water quality response of downstream receiving waters to increased nonpoint source pollutant loads depends on many factors, including the specific pollutant, the existing loading generated by the converted land use, and the geometry and hydraulics of the receiving water. Table 3 indicates the sensitivity of rivers, lakes, estuaries, aquifers and water supply reservoirs to various stormwater pollutants.

Lakes and the ICM

The water column and sediments of urban lakes are impacted by many stormwater pollutants, including sediment, nutrients, bacteria, metals, hydrocarbons, chlorides, and trash/debris. Of these pollutants, limnologists have always regarded phosphorus as the primary lake management concern, given that more than 80% of urban lakes experience symptoms of eutrophication (CWP, 2001a).

In general, phosphorus export steadily increases as IC is added to a lake watershed, although the precise amount of IC that triggers eutrophication problems is unique to each urban lake. With a little effort, it is possible to calculate the specific IC threshold for an individual lake, given its internal geometry, the size of its contributing watershed, current in-lake phosphorus concentration, degree of watershed treatment, and the desired water quality goals for the lake (CWP, 2001a). As a general rule, most lakes are extremely sensitive to increases in phosphorus loads caused by watershed IC. Exceptions include lakes that are unusually deep and/or have very small drainage area/lake area ratios. In most lakes, however, even a small amount of watershed development will result in an upward shift in trophic status (CWP, 2001a).

Reservoirs and the ICM

While surface water supply reservoirs respond to stormwater pollutant loads in the same general manner as lakes, they are subject to stricter standards because of their uses for drinking water. In particular, water supply reservoirs are particularly sensitive to increased turbidity, pathogens, total organic carbon, chlorides, metals, pesticides and hydrocarbon loads, in addition to phosphorus (Kitchell, 2001). While some pollutants can be removed or reduced through expanded filtering and treatment at drinking water intakes, the most reliable approach is to protect the source waters through watershed protection and treatment.

Consequently, we often recommend that the ICM be used as a “threat index” for most drinking water supplies. Quite simply, if current or future development is expected to exceed 10% IC in the contributing watershed, we recommend that a very aggressive watershed protection strategy be implemented (Kitchell, 2001). In addition, we contend that drinking water quality cannot be sustained once watershed IC exceeds 25% and have yet to find an actual watershed where a drinking water utility has been maintained under these conditions.

Small Tidal Estuaries and Coves and the ICM

The aquatic resources of small tidal estuaries, creeks, and coves are often highly impacted by watershed development and associated activities, such as boating/marinas, wastewater discharge, septic systems, alterations in freshwater flow and wetland degradation and loss. Given the unique impacts of eutrophication on the marine system and stringent water quality standards for shellfish harvesting, the stormwater pollutants of greatest concern in the estuarine water column are nitrogen and fecal coliform bacteria. Metals and hydrocarbons in stormwater runoff can also contaminate bottom sediments, which can prove toxic to local biota (Fortner *et al*., 1996; Fulton *et al.*, 1996; Kucklick *et al.*, 1997; Lerberg *et al.*, 2000; Sanger *et al.,* 1999; Vernberg *et al.*, 1992).

While numerous studies have demonstrated that physical, hydrologic, water quality and biological indicators differ in urban and non-urban coastal watersheds, only a handful of studies have used watershed IC as an indicator of estuarine health. These studies show significant correlations with IC, although degradation thresholds may not necessarily adhere to the ICM due to tidal dilution and dispersion. Given the limited research, it is not fully clear if the ICM can be applied to coastal systems without modification.

Atmospheric deposition is considered a primary source of nitrogen loading to estuarine watersheds. Consequently, nitrogen loads in urban stormwater are often directly linked to IC. Total nitrogen loads have also been linked to groundwater input, especially from subsurface discharges from septic systems, which are common in low density coastal development (Swann, 2001; Valiela *et al.*, 1997; Vernberg *et al.*, 1996a). Nitrogen is generally considered to be the limiting nutrient in estuarine systems, and increased loading has been shown to increase algal and phytoplankton biomass and cause shifts in the phytoplankton community and food web structure that may increase the potential for phytoplankton blooms and fish kills (Bowen and Valiela, 2001; Evgenidou *et al.*, 1997; Livingston, 1996).

Increased nitrogen loads have been linked to declining seagrass communities, finfish populations, zooplankton reproduction, invertebrate species richness, and shellfish populations (Bowen and Valiela, 2001; Rutkowski *et al*., 1999; Short and Wyllie-Echeverria, 1996; Valiela and Costa, 1988). Multiple studies have shown significant increases in nitrogen loading as watershed land use becomes more urban (Valiela *et al.,* 1997; Vernberg *et al.* 1996a; Wahl *et al.,* 1997). While a few studies link nitrogen loads with building and population density, no study was found that used IC as an indicator of estuarine nitrogen loading.

The second key water quality concern in small estuaries is high fecal coliform levels in stormwater runoff, which can lead to the closure of shellfish beds and swimming beaches. Waterfowl and other wildlife have also been shown to contribute to fecal coliform loading (Wieskel *et al.*, 1996). Recent research has shown that fecal coliform standards are routinely violated during storm events at very low levels of IC in coastal watersheds (Mallin *et al.,* 2001; Vernberg *et al.*, 1996b; Schueler, 1999). Maiolo and Tschetter (1981) found a significant correlation between human population and closed shellfish acreage in North Carolina, and Duda and Cromartie (1982) found greater fecal coliform densities when septic tank density and IC increased, with an approximate threshold at 10% watershed IC.

Recently, Mallin *et al.* (2000) studied five small North Carolina estuaries of different land uses and showed that fecal coliform levels were significantly correlated with watershed population, developed land and IC. Percent IC was the most statistically significant indicator and could explain 95% of the variability in fecal coliform concentrations. They also found that shellfish bed closures were possible in watersheds with less than 10% IC, common in watersheds above 10% IC, and almost certain in watersheds above 20% IC. While higher fecal coliform levels were observed in developed watersheds, salinity, flushing and proximity to pollution sources often resulted in higher concentrations at upstream locations and at high tides (Mallin *et al.*, 1999). While these studies support the ICM, more research is needed to prove the reliability of the ICM in predicting shellfish bed closures based on IC.

Several studies have also investigated the impacts of urbanization on estuarine fish, macrobenthos and shellfish communities. Increased PAH accumulation in oysters, negative effects of growth in juvenile sheepshead minnows, reduced molting efficiency in copepods, and reduced numbers of grass shrimp have all been reported for urban estuaries as compared to forested estuaries (Fulton *et al.,* 1996). Holland *et al. (*1997) reported that the greatest abundance of penaid shrimp and mummichogs was observed in tidal creeks with forested watersheds compared to those with urban cover. Porter *et al.* (1997) found lower grass shrimp abundance in small tidal creeks adjacent to commercial and urban development, as compared to non-urban watersheds.

Lerberg *et al.* (2000) studied small tidal creeks and found that highly urban watersheds (50% IC) had the lowest benthic diversity and abundance as compared to suburban and forested creeks, and benthic communities were numerically dominated by tolerant oligochaetes and polychaetes. Suburban watersheds (15 to 35% IC) also showed signs of degradation and had some pollution tolerant macrobenthos, though not as markedly as urban creeks. Percent abundance of pollution-indicative species showed a marked decline at 30% IC, and the abundance of pollution-sensitive species also significantly correlated with IC (Lerberg *et al*., 2000). Holland *et al*. (1997) reported that the variety and food availability for juvenile fish species was impacted at 15 to 20% IC.

Lastly, a limited amount of research has focused on the direct impact of stormwater runoff on salinity and hypoxia in small tidal creeks. Blood and Smith (1996) compared urban and forested watersheds and found higher salinities in urban watersheds due to the increased number of impoundments. Fluctuations in salinity have been shown to affect shellfish and other aquatic populations (see Vernberg, 1996b). When urban and forested watersheds were compared, Lerberg *et al.* (2000) reported that higher salinity fluctuations occurred most often in developed watersheds; significant correlations with salinity range and IC were also determined. Lerberg *et al.* (2000) also found that the most severe and frequent hypoxia occurred in impacted salt marsh creeks and that dissolved oxygen dynamics in tidal creeks were comparable to dead-end canals common in residential marina-style coastal developments. Suburban watersheds (15 to 35% IC) exhibited signs of degradation and had some pollution-tolerant macrobenthic species, though not to the extent of urban watersheds (50% IC).

In summary, recent research suggests that indicators of coastal watershed health are linked to IC. However, more research is needed to clarify the relationship between IC and estuarine indicators in small tidal estuaries and high salinity creeks.

1.2.3 Effect of Watershed Treatment on Stormwater Quality

Over the past two decades, many communities have invested in watershed protection practices, such as stormwater treatment practices (STPs), stream buffers, and better site design, in order to reduce pollutant loads to receiving waters. In this section, we review the effect of watershed treatment on the quality of stormwater runoff.

Effect of Stormwater Treatment Practices
We cannot directly answer the question as to whether or not stormwater treatment practices can significantly reduce water quality impacts at the watershed level, simply because no controlled monitoring studies have yet been conducted at this scale. Instead, we must rely on more indirect research that has tracked the change in mass or concentration of pollutants as they travel through individual stormwater treatment practices. Thankfully, we have an abundance of these performance studies, with nearly 140 monitoring studies evaluating a diverse range of STPs, including ponds, wetlands, filters, and swales (Winer, 2000).

These studies have generally shown that stormwater practices have at least a moderate ability to remove many pollutants in urban stormwater. Table 4 provides average removal efficiency rates for a range of practices and stormwater pollutants, and Table 5 profiles the mean storm outflow concentrations for various practices. As can be seen, some groups of practices perform better than others in removing certain stormwater pollutants. Consequently, managers need to carefully choose which practices to apply to solve the primary water quality problems within their watersheds.

It is also important to keep in mind that site-based removal rates cannot be extrapolated to the watershed level without significant adjustment. Individual site practices are never implemented perfectly or consistently across a watershed. At least three discount factors need to be considered: bypassed load, treatability and loss of performance over time. For a review on how these discounts are derived, consult Schueler and Caraco (2001). Even under the most optimistic watershed implementation scenarios, overall pollutant reduc-

Table 4: The Effectiveness of Stormwater Treatment Practices in Removing Pollutants - Percent Removal Rate (Winer, 2000)

Practice	N	TSS	TP	OP	TN	NOx	Cu	Zn	Oil/ Grease[1]	Bacteria
Dry Ponds	9	47	19	N/R	25	3.5	26	26	3	44
Wet Ponds	43	80	51	65	33	43	57	66	78	70
Wetlands	36	76	49	48	30	67	40	44	85	78
Filtering Practices[2]	18	86	59	57	38	-14	49	88	84	37
Water Quality Swales	9	81	34	1.0	84	31	51	71	62	-25
Ditches[3]	9	31	-16	N/R	-9.0	24	14	0	N/R	0
Infiltration	6	95	80	85	51	82	N/R	N/R	N/R	N/R

1: Represents data for Oil and Grease and PAH
2: Excludes vertical sand filters
3: Refers to open channel practices not designed for water quality
N/R = Not Reported

Table 5: Median Effluent Concentrations from Stormwater Treatment Practices (mg/l) (Winer, 2000)								
Practice	N	TSS	TP	OP	TN	NOx	Cu[1]	Zn[1]
Dry Ponds[2]	3	28	0.18	N/R	0.86	N/R	9.0	98
Wet Ponds	25	17	0.11	0.03	1.3	0.26	5.0	30
Wetlands	19	22	0.20	0.07	1.7	0.36	7.0	31
Filtering Practices[3]	8	11	0.10	0.07	1.1	0.55	9.7	21
Water Quality Swales	7	14	0.19	0.09	1.1	0.35	10	53
Ditches[4]	3	29	0.31	N/R	2.4	0.72	18	32

1. Units for Zn and Cu are micrograms per liter (Fg/l)
2. Data available for Dry Extended Detention Ponds only
3. Excludes vertical sand filters
4. Refers to open channel practices not designed for water quality
N/R = Not Reported

tions by STPs may need to be discounted by at least 30% to account for partial watershed treatment.

Even with discounting, however, it is evident that STPs can achieve enough pollutant reduction to mimic rural background loads for many pollutants, as long as the watershed IC does not exceed 30 to 35%. This capability is illustrated in Figure 5, which shows phosphorus load as a function of IC, with and without stormwater treatment.

Effect of Stream Buffers/Riparian Areas
Forested stream buffers are thought to have very limited capability to remove stormwater pollutants, although virtually no systematic monitoring data exists to test this hypothesis. The major reason cited for their limited removal capacity is that stormwater generated from upland IC has usually concentrated before it reaches the forest buffer and therefore crosses the buffer in a channel, ditch or storm drain pipe. Consequently, the opportunity to filter runoff is lost in many forest buffers in urban watersheds.

Effect of Better Site Design
Better site design (BSD) is a term for nonstructural practices that minimize IC, conserve natural areas and distribute stormwater treatment across individual development sites. BSD is also known by many other names, including conservation development, low-impact development, green infrastructure, and sustainable urban drainage systems. While

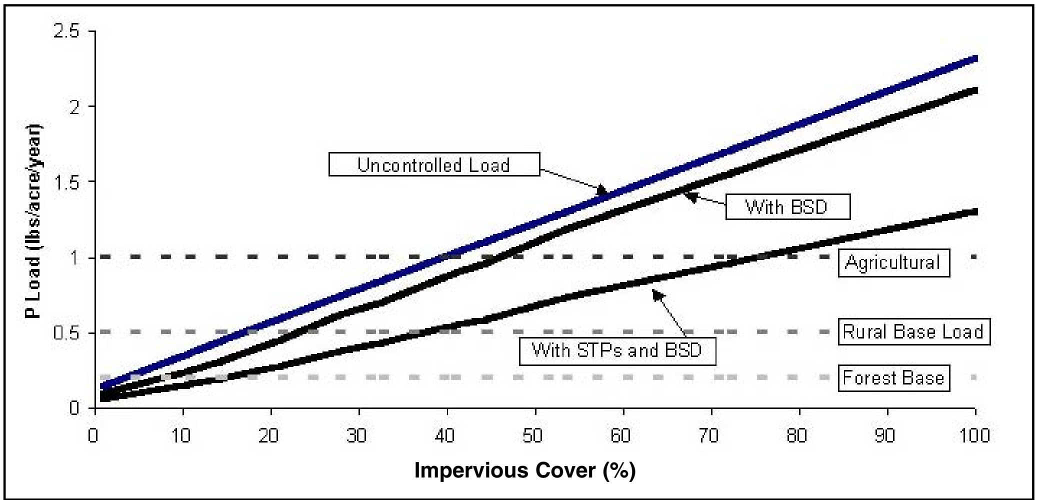


Figure 5: Estimated Phosphorus Load as a Function of Impervious Cover, Discounted Stormwater Treatment and Better Site Design (Schueler and Caraco, 2001)

some maintain that BSD is an alternative to traditional STPs, most consider it to be an important complement to reduce pollutant loads.

While BSD has become popular in recent years, only one controlled research study has evaluated its potential performance, and this is not yet complete (i.e. Jordan Cove, CT).

Indirect estimates of the potential value of BSD to reduce pollutant discharges have been inferred from modeling and redesign analyses (Zielinski, 2000). A typical example is provided in Figure 5, which shows the presumed impact of BSD in reducing phosphorus loadings. As is apparent, BSD appears to be a very effective strategy in the one to 25% IC range, but its benefits diminish beyond that point.

1.3 Implications of the ICM for Watershed Managers

One of the major policy implications of the ICM is that in the absence of watershed treatment, it predicts negative stream impacts at an extremely low intensity of watershed development. To put this in perspective, consider that a watershed zoned for two-acre lot residential development will generally exceed 10% IC, and therefore shift from a sensitive to an impacted stream classification (Cappiella and Brown, 2001). Thus, if a community wants to protect an important water resource or a highly regarded species (such as trout, salmon or an endangered freshwater mussel), the ICM suggests that there is a maximum limit to growth that is not only quite low, but is usually well below the current zoning for many suburban or even rural watersheds. Consequently, the ICM suggests the unpleasant prospect that massive down-zoning, with all of the associated political and legal carnage involving property rights and economic development, may be required to maintain stream quality.

It is not surprising, then, that the ICM debate has quickly shifted to the issue of whether or not watershed treatment practices can provide adequate mitigation for IC. How much relief can be expected from stream buffers, stormwater ponds, and other watershed practices, which might allow greater development density within a given watershed? Only a limited amount of research has addressed this question, and the early results are not reassuring (reviewed in section 1.1.3). At this early stage, researchers are still having trouble detecting the impact of watershed treatment, much less defining it. As noted earlier, both watershed research techniques and practice implementation need to be greatly improved if we ever expect to get a scientifically defensible answer to this crucial question. Until then, managers should be extremely cautious in setting high expectations for how much watershed treatment can mitigate IC.

1.3.1 Management of Non-Supporting Streams

Most researchers acknowledge that streams with more than 25% IC in their watersheds cannot support their designated uses or attain water quality standards and are severely degraded from a physical and biological standpoint. As a consequence, many of these streams are listed for non-attainment under the Clean Water Act and are subject to Total Maximum Daily Load (TMDL) regulations. Communities that have streams within this regulatory class must prepare implementation plans that demonstrate that water quality standards can ultimately be met.

While some communities have started to restore or rehabilitate these streams in recent years, their efforts have yielded only modest improvements in water quality and biological indicators. In particular, no community has yet demonstrated that they can achieve water quality standards in an urban watershed that exceeds 25% IC. Many communities are deeply concerned that non-supporting streams may never achieve water quality standards, despite massive investments in watershed restoration. The ICM suggests that water quality standards may need to be sharply revised for streams with more than 25% IC, if they are ever to come into attainment. While states have authority to create more achievable standards for non-supporting streams within the regulatory framework of the Clean Water Act (Swietlik, 2001), no state has yet exercised this authority. At this time, we are not aware of any water quality standards that are based on the ICM or similar urban stream classification techniques.

Two political perceptions largely explain why states are so reticent about revising water quality standards. The first is a concern that they will run afoul of anti-degradation provisions within the Clean Water Act or be accused of "backsliding" by the environmental community. The second concern relates to the demographics of watershed organizations across the country. According to recent surveys, slightly more than half of all watershed organizations represent moderately to highly developed watersheds (CWP, 2001a). These urban watershed organizations often have a keen interest in keeping the existing regulatory structure intact, since it is perceived to be the only lever to motivate municipalities to implement restoration efforts in non-supporting streams.

However, revised water quality standards are urgently needed to support smart growth efforts. A key premise of smart growth is that it is more desirable to locate new development within a non-supporting subwatershed rather than a sensitive or impacted one (i.e., concentrating density and IC within an existing subwatershed helps prevent sprawl from encroaching on a less developed one). Yet while smart growth is desirable on a regional basis, it will usually contribute to already serious problems in non-supporting watersheds, which makes it even more difficult to meet water quality standards.

This creates a tough choice for regulators: if they adopt stringent development criteria for non-supporting watersheds, their added costs can quickly become a powerful barrier to desired redevelopment. If, on the other hand, they relax or waive environmental criteria, they contribute to the further degradation of the watershed. To address this problem, the Center has developed a "smart watersheds" program to ensure that any localized degradation caused by development within a non-supporting subwatershed is more than compensated for by improvements in stream quality achieved through municipal restoration efforts (CWP, in press). Specifically, the smart watersheds program includes 17 public sector programs to treat stormwater runoff, restore urban stream corridors and reduce pollution discharges in highly urban watersheds. It is hoped that communities that adopt and implement smart watershed programs will be given greater flexibility to meet state and federal water quality regulations and standards within non-supporting watersheds.

1.3.2 Use of the ICM for Urban Stream Classification

The ICM has proven to be a useful tool for classifying and managing the large inventory of streams that most communities possess. It is not unusual for a typical county to have several thousand miles of headwater streams within its political boundaries, and the ICM provides a unified framework to identify and manage these subwatersheds. In our watershed practice, we use the ICM to make an initial diagnosis rather than a final determination for stream classification. Where possible, we conduct rapid stream and subwatershed assessments as a final check for an individual stream classification, particularly if it borders between the sensitive and impacted category. As noted earlier, the statistical variation in the IC/stream quality indicator makes it difficult to distinguish between a stream with 9% versus 11% IC. Some of the key criteria we use to make a final stream classification are provided in Table 6.

1.3.3 Role of the ICM in Small Watershed Planning

The ICM has also proven to be an extremely important tool for watershed planning, since it can rapidly project how streams will change in response to future land use. We routinely estimate existing and future IC in our watershed planning practice and find that it is an excellent indicator of change for subwatersheds in the zero to 30% IC range. In particular, the ICM often forces watershed planners to directly confront land use planning and land conservation issues early in the planning process.

On the other hand, we often find that the ICM has limited planning value when subwatersheds exceed 30% IC for two practical reasons. First, the ICM does not differentiate stream conditions within this very large span of IC (i.e., there is no difference in the stream quality prediction for a subwatershed that has 39.6% IC versus one that has 58.4% IC). Second, the key management question for non-supporting watersheds is whether or not they are potentially restorable. More detailed analysis and field investigations are needed to determine, in each subwatershed, the answer to this question. While a knowledge of IC is often used in these feasibility assessments, it is but one of many factors that needs to be considered.

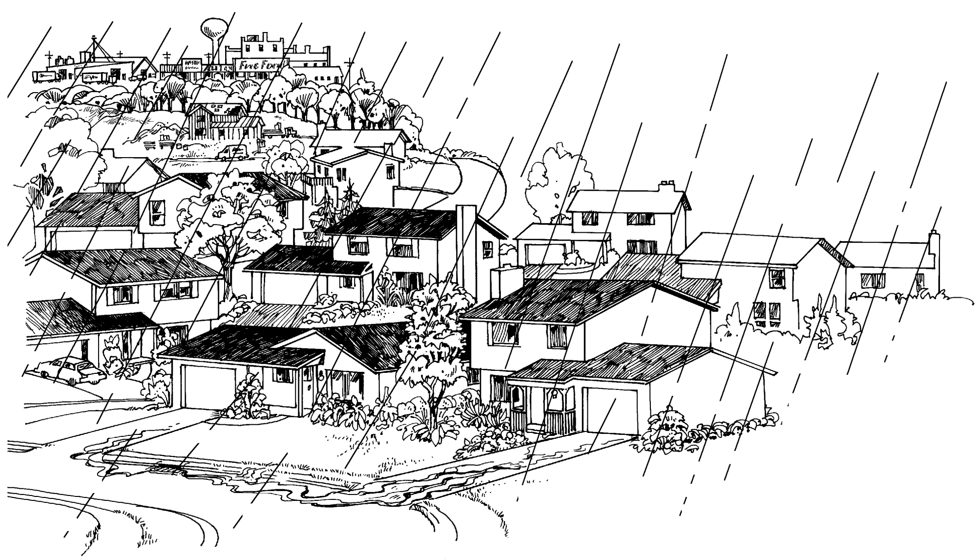
Lastly, we have come to recognize several practical factors when applying the ICM for small watershed planning. These include thoughtful delineation of subwatershed boundaries, the proper accounting of a direct drainage area in larger watersheds, and the critical need for the most recent IC data. More guidance on these factors can be found in Zielinski (2001).

Impervious cover is not a perfect indicator of existing stream quality. A number of stream and subwatershed criteria should be evaluated in the field before a final classification decision is made, particularly when the stream is on the borderline between two classifications. We routinely look at the stream and subwatershed criteria to decide whether a borderline stream should be classified as sensitive or impacted. Table 6 reviews these additional criteria.

Table 6: Additional Considerations for Urban Stream Classification
Stream Criteria
Reported presence of rare, threatened or endangered species in the aquatic community (e.g., freshwater mussels, fish, crayfish or amphibians) Confirmed spawning of cold-water fish species (e.g., trout) Fair/good, good, or good to excellent macro invertebrate scores More than 65% of EPT species present in macro-invertebrate surveys No barriers impede movement of fish between the subwatershed and downstream receiving waters Stream channels show little evidence of ditching, enclosure, tile drainage or channelization Water quality monitoring indicates no standards violations during dry weather Stream and flood plain remain connected and regularly interact Stream drains to a downstream surface water supply Stream channels are generally stable, as determined by the Rosgen level analysis Stream habitat scores are rated at least fair to good
Subwatershed Criteria
Contains terrestrial species that are documented as rare, threatened and endangered Wetlands, flood plains and/or beaver complexes make up more than 10% of subwatershed area Inventoried conservation areas comprise more than 10% of subwatershed area More than 50% of the riparian forest corridor has forest cover and is either publicly owned or regulated Large contiguous forest tracts remain in the subwatershed (more than 40% in forest cover) Significant fraction of subwatershed is in public ownership and management Subwatershed connected to the watershed through a wide corridor Farming, ranching and livestock operations in the subwatershed utilize best management practices Prior development in the subwatershed has utilized stormwater treatment practices

1.4 Summary

The remainder of this report presents greater detail on the individual research studies that bear on the ICM. Chapter 2 profiles research on hydrologic indicators in urban streams, while Chapter 3 summarizes the status of current research on the impact of urbanization on physical habitat indicators. Chapter 4 presents a comprehensive review of the impact of urbanization on ten major stormwater pollutants. Finally, Chapter 5 reviews the growing body of research on the link between IC and biological indicators within urban streams and wetlands.



Chapter 2: Hydrologic Impacts of Impervious Cover

The natural hydrology of streams is fundamentally changed by increased watershed development. This chapter reviews the impacts of watershed development on selected indicators of stream hydrology.

This chapter is organized as follows:

2.1 Introduction

Fundamental changes in urban stream hydrology occur as a result of three changes in the urban landscape that accompany land development. First, large areas of the watershed are paved, rendering them impervious. Second, soils are compacted during construction, which significantly reduces their infiltration capabilities. Lastly, urban stormwater drainage systems are installed that increase the efficiency with which runoff is delivered to the stream (i.e., curbs and gutters, and storm drain pipes). Consequently, a greater fraction of annual rainfall is converted to surface runoff, runoff occurs more quickly, and peak flows become larger. Additionally, dry weather flow in streams may actually decrease because less groundwater recharge is available. Figure 6 illustrates the change in hydrology due to increased urban runoff as compared to pre-development conditions.

Research has demonstrated that the effect of watershed urbanization on peak discharge is more marked for smaller storm events. In particular, the bankfull, or channel forming flow, is increased in magnitude, frequency and duration. Increased bankfull flows have strong ramifications for sediment transport and channel enlargement. All of these changes in the natural water balance have impacts on the physical structure of streams, and ultimately affect water quality and biological diversity.

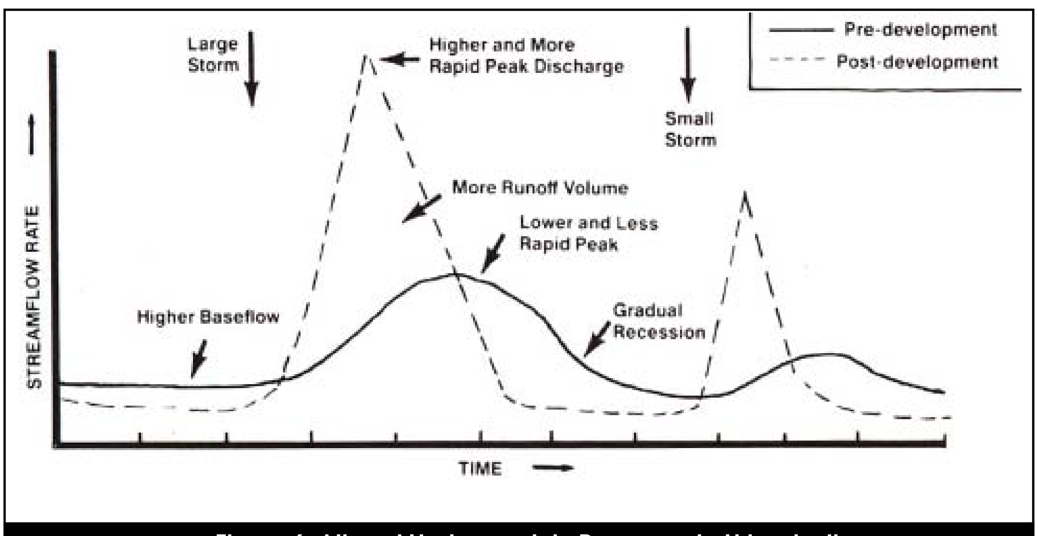
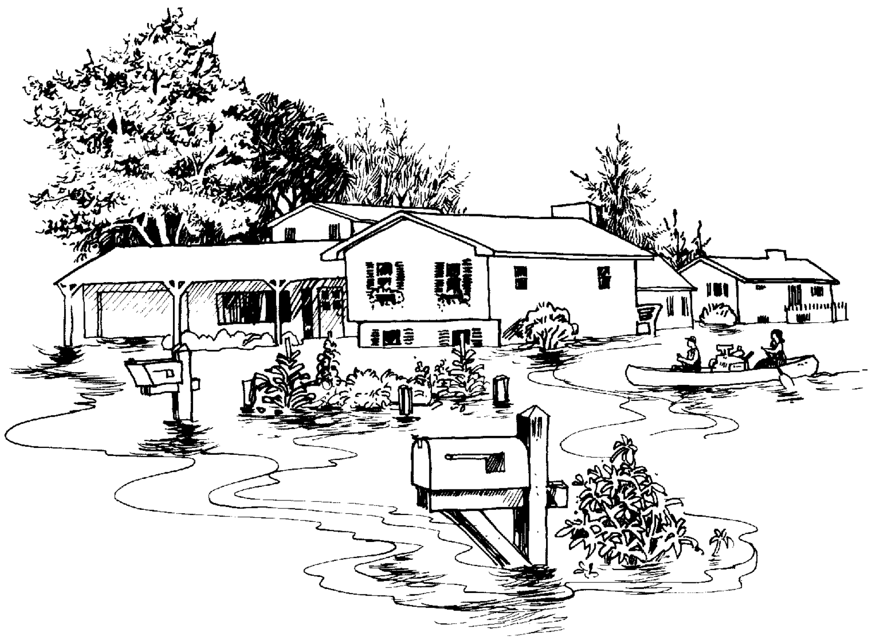


Figure 6: Altered Hydrograph in Response to Urbanization (Schueler, 1987)

The relationship between watershed IC and stream hydrology is widely accepted, and has been incorporated into many hydrologic engineering models over the past three decades. Several articles provide a good summary of these (Bicknell *et al.*, 1993; Hirsch *et al.*, 1990; HEC, 1977; Huber and Dickinson, 1988; McCuen and Moglen, 1988; Overton and Meadows, 1976; Pitt and Voorhees, 1989; Schueler, 1987; USDA, 1992; 1986).

The primary impacts of watershed development on stream hydrology are as follows:

- Increased runoff volume
- Increased peak discharge rates
- Increased magnitude, frequency, and duration of bankfull flows
- Diminished baseflow

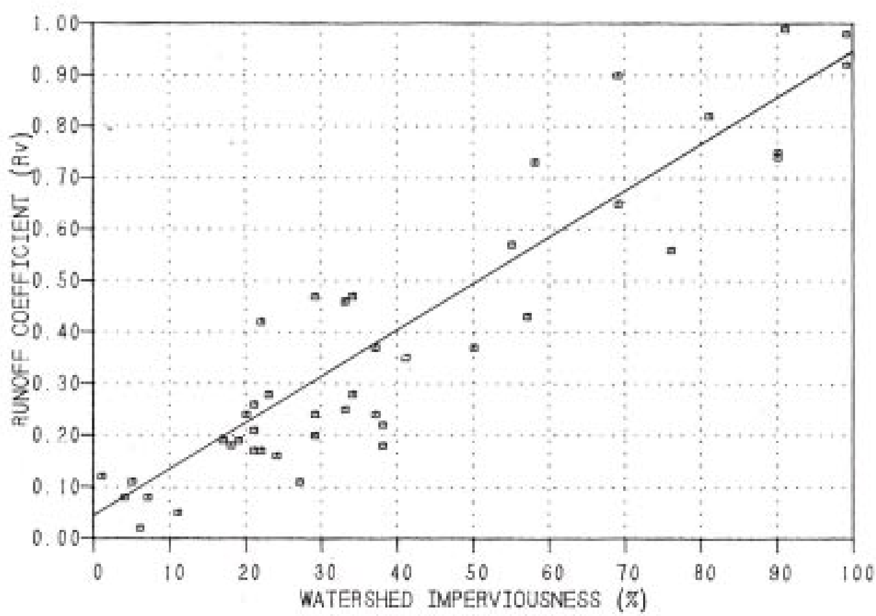


2.2 Increased Runoff Volume

Impervious cover and other urban land use alterations, such as soil compaction and storm drain construction, alter infiltration rates and increase runoff velocities and the efficiency with which water is delivered to streams. This decrease in infiltration and basin lag time can significantly increase runoff volumes. Table 7 reviews research on the impact of IC on runoff volume in urban streams. Schueler (1987) demonstrated that runoff values are directly related to subwatershed IC (Figure 7). Runoff data was derived from 44 small catchment areas across the country for EPA's Nationwide Urban Runoff Program.

Table 8 illustrates the difference in runoff volume between a meadow and a parking lot, as compiled from engineering models. The parking lot produces more than 15 times more runoff than a meadow for the same storm event.

Urban soils are also profoundly modified during the construction process. The compaction of urban soils and the removal of topsoil can decrease the infiltration capacity, causing increases in runoff volumes (Schueler, 2000). Bulk density is often used to measure soil compaction, and Table 9 illustrates how bulk density increases in many urban land uses.



Note: 44 small urban catchments monitored during the national NURP study

Figure 7: Runoff Coefficient vs. IC (Schueler, 1987)

Table 7: Research Review of Increased Runoff Volume and Peak Discharge in Urban Streams		
Reference	**Key Finding**	**Location**
	Increased Runoff Volume	
Schueler, 1987	Runoff coefficients were found to be strongly correlated with IC at 44 sites nationwide.	U.S.
Neller, 1988	Urban watershed produced more than seven times as much runoff as a similar rural watershed. Average time to produce runoff was reduced by 63% in urban watersheds compared to rural watersheds.	Australia
	Increased Peak Discharge	
Hollis, 1975	Review of data from several studies showed that floods with a return period of a year or longer are not affected by a 5% watershed IC; small floods may be increased 10 times by urbanization; flood with a return period of 100 years may be doubled in size by a 30% watershed IC.	N/A
Leopold, 1968	Data from seven nationwide studies showed that 20% IC can cause the mean annual flood to double.	U.S.
Neller, 1988	Average peak discharge from urban watersheds was 3.5 times higher than peak runoff from rural watersheds.	Australia
Doll *et al.*, 2000	Peak discharge was greater for 18 urban streams versus 11 rural Piedmont streams.	NC
Sauer *et al.*, 1983	Estimates of flood discharge for various recurrence intervals showed that less than 50% watershed IC can result in a doubling of the 2-year, 10-year, and 100-year floods.	U.S.
Leopold, 1994	Watershed development over a 29-year period caused the peak discharge of the 10-year storm to more than double.	MD
Kibler *et al.*, 1981	Rainfall/runoff model for two watersheds showed that an increase in IC caused a significant increase in mean annual flood.	PA
Konrad and Booth, 2002	Evaluated streamflow data at 11 streams and found that the fraction of annual mean discharges was exceeded and maximum annual instantaneous discharges were related to watershed development and road density for moderately and highly developed watersheds.	WA

Table 8: Hydrologic Differences Between a Parking Lot and a Meadow (Schueler, 1994a)

Hydrologic or Water Quality Parameter	Parking Lot	Meadow
Runoff Coefficient	0.95	0.06
Time of Concentration (minutes)	4.8	14.4
Peak Discharge, two-year, 24-hour storm (cfs)	4.3	0.4
Peak Discharge Rate, 100-year storm (cfs)	12.6	3.1
Runoff Volume from one-inch storm (cu. ft)	3,450	218
Runoff Velocity @ two-year storm (ft/sec)	8	1.8

Key Assumptions:
2-yr, 24-hr storm = 3.1 in; 100-yr storm = 8.9 in.
Parking Lot: 100% imperviousness; 3% slope; 200ft flow length; hydraulic radius =.03; concrete channel; suburban Washington C values
Meadow: 1% impervious; 3% slope; 200 ft flow length; good vegetative condition; B soils; earthen channel
Source: Schueler, 1994a

Table 9: Comparison of Bulk Density for Undisturbed Soils and Common Urban Conditions (Schueler, 2000)

Undisturbed Soil Type or Urban Condition	Surface Bulk Density (grams/cubic centimeter)	Urban Condition	Surface Bulk Density (grams/cubic centimeter)
Peat	0.2 to 0.3	Urban Lawns	1.5 to 1.9
Compost	1.0	Crushed Rock Parking Lot	1.5 to 1.9
Sandy Soils	1.1 to 1.3	Urban Fill Soils	1.8 to 2.0
Silty Sands	1.4	Athletic Fields	1.8 to 2.0
Silt	1.3 to 1.4	Rights-of-Way and Building Pads (85%)	1.5 to 1.8
Silt Loams	1.2 to 1.5	Rights-of-Way and Building Pads (95%)	1.6 to 2.1
Organic Silts/Clays	1.0 to 1.2	Concrete Pavement	2.2
Glacial Till	1.6 to 2.0	Rock	2.65

2.3 Increased Peak Discharge Rate

Watershed development has a strong influence on the magnitude and frequency of flooding in urban streams. Peak discharge rates are often used to define flooding risk. Doll *et al.* (2000) compared 18 urban streams with 11 rural streams in the North Carolina Piedmont and found that unit area peak discharge was always greater in urban streams (Figure 8). Data from Seneca Creek, Maryland also suggest a similar increase in peak discharge. The watershed experienced significant growth during the 1950s and 1960s. Comparison of pre- and post-development gage records suggests that the peak 10-year flow event more than doubled over that time (Leopold, 1994).

Hollis (1975) reviewed numerous studies on the effects of urbanization on floods of different recurrence intervals and found that the effect of urbanization diminishes when flood recurrence gets longer (i.e., 50 and 100 years). Figure 9 shows the effect on flood magnitude in urban watersheds with 30% IC, and shows the one-year peak discharge rate increasing by a factor of 10, compared to an undeveloped watershed. In contrast, floods with a 100-year recurrence interval only double in size under the same watershed conditions.

Sauer *et al.* (1983) evaluated the magnitude of flooding in urban watersheds throughout the United States. An equation was developed for estimating discharge for floods of two-year, 10-year, and 100-year recurrence intervals. The equations used IC to account for increased runoff volume and a basin development factor to account for sewers, curbs and gutters, channel improvements and drainage development. Sauer noted that IC is not the dominant factor in determining peak discharge rates for extreme floods because these storm events saturate the soils of undeveloped watersheds and produce high peak discharge rates. Sauer found that watersheds with 50% IC can increase peak discharge for the two-year flood by a factor of four, the 10-year flood by a factor of three, and the 100-year flood by a factor of 2.5, depending on the basin development factor (Figure 10).

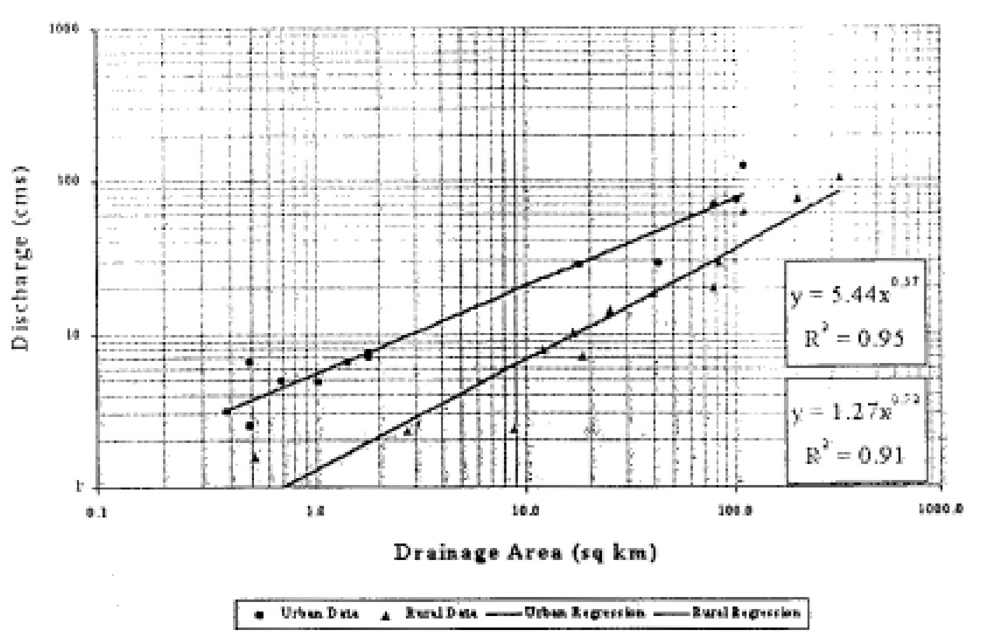


Figure 8: Peak Discharge for Urban and Rural Streams in North Carolina (Doll *et al.*, 2000)

2.4 Increased Bankfull Flow

Urbanization also increases the frequency and duration of peak discharge associated with smaller flood events (i.e., one- to two-year return storms). In terms of stream channel morphology, these more frequent bankfull flows are actually much more important than large flood events in forming the channel. In fact, Hollis (1975) demonstrated that urbanization increased the frequency and magnitude of bankfull flow events to a greater degree than the larger flood events.

An example of the increase in bankfull flow in arid regions is presented by the U.S. Geological Survey (1996), which compared the peak discharge rate from two-year storm events before and after watersheds urbanized in Parris Valley, California. Over an approximately 20-year period, watershed IC increased by 13.5%, which caused the two-year peak flow to more than double. Table 10 reviews other research studies on the relationship between watershed IC and bankfull flows in urban streams.

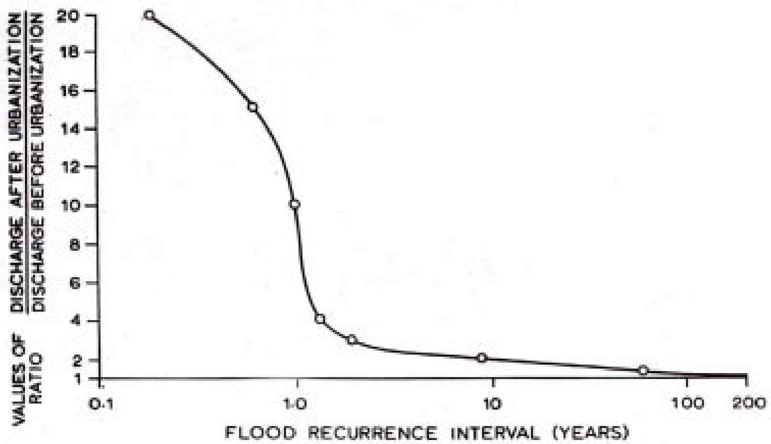


Fig. 3. Effect on flood magnitudes of paving 20% of a basin (based on Figure 2).

Figure 9: Effect on Flood Magnitudes of 30% Basin IC (Hollis, 1975)

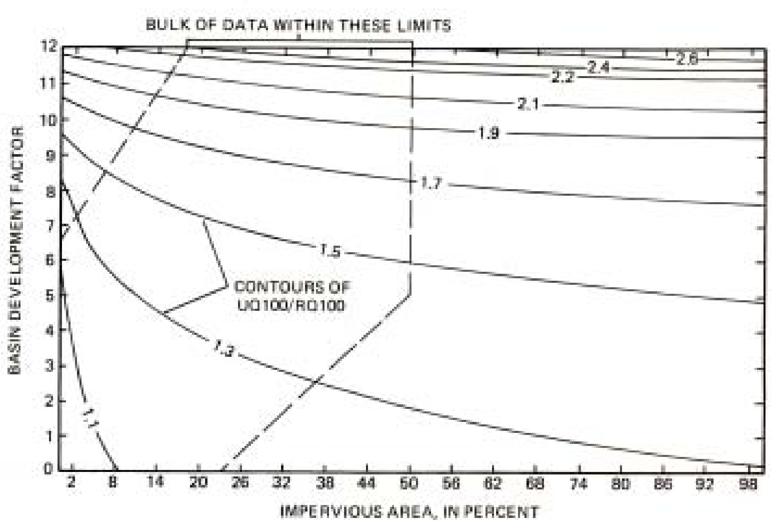


Figure 10: Relationship of Urban/Rural 100-Year Peak Flow Ratio to Basin Development Factor and IC (Sauer *et al.*, 1983)

Table 10: Research Review of Increased Bankfull Discharge in Urban Streams		
Reference	**Key Finding**	**Location**
Booth and Reinelt, 1993	Using a simulation model and hydrologic data from four watersheds, it was estimated that more than 10% watershed IC may cause discharge from the two-year storm under current conditions to equal or exceed discharge from the 10-year storm under forested conditions.	WA
Fongers and Fulcher, 2001	Bankfull flow of 1200 cfs was exceeded more frequently over time with urbanization, and exceedence was three times as frequent from 1930s to 1990s.	MI
USGS, 1996	Over a 20-year period, IC increased 13.5%, and the two-year peak flow more than doubled in a semi-arid watershed.	CA
Henshaw and Booth, 2000	Two of three watersheds in the Puget Sound lowlands showed increasing flashiness over 50 years with urbanization.	WA
Leopold, 1968	Using hydrologic data from a nine-year period for North Branch Brandywine Creek, it was estimated that for a 50% IC watershed, bankfull frequency would be increased fourfold.	PA
Leopold, 1994	Bankfull frequency increased two to seven times after urbanization in Watts Branch.	MD
MacRae, 1996	For a site downstream of a stormwater pond in Markham, Ontario hours of exceedence of bankfull flows increased by 4.2 times after the watershed urbanized (34% IC)	Ontario

Leopold (1968) evaluated data from seven nationwide studies and extrapolated this data to illustrate the increase in bankfull flows due to urbanization. Figure 11 summarizes the relationship between bankfull flows over a range of watershed IC. For example, watersheds that have 20% IC increase the number of flows equal to or greater than bankfull flow by a factor of two. Leopold (1994) also observed a dramatic increase in the frequency of the bankfull event in Watts Branch, an urban subwatershed in Rockville, Maryland. This watershed experienced significant urban development during the 1950s and 1960s. Leopold compared gage records and found that the bankfull storm event frequency increased from two to seven times per year from 1958 to 1987.

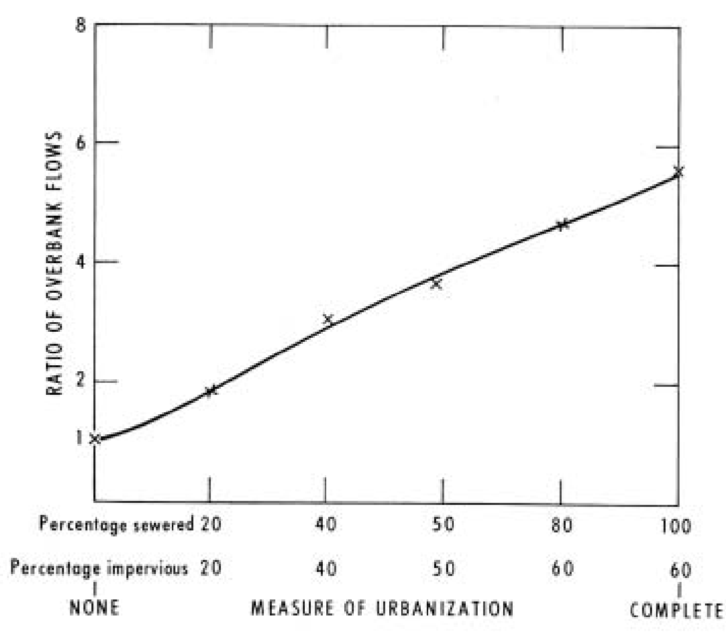


Figure 11: Increase in Bankfull Flows Due to Urbanization (Leopold, 1968)

More recent data on bankfull flow frequency was reported for the Rouge River near Detroit, Michigan by Fongers and Fulcher (2001). They noted that channel-forming flow (1200 cfs) was exceeded more frequently as urbanization increased in the watershed and had become three times more frequent between 1930 and 1990 (Figure 12).

McCuen and Moglen (1988) have documented the increase in duration of bankfull flows in response to urbanization using hydrology models. MacRae (1996), monitored a stream in Markham, Ontario downstream of a stormwater pond and found that the hours of

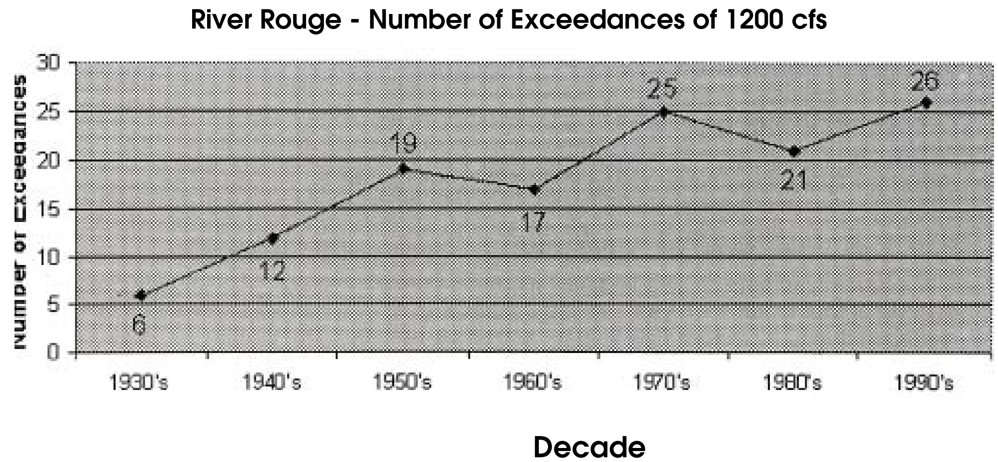


Figure 12: Increase in Number of Exceedences of Bankfull Flow Over Time With Urbanization in the Rouge River, MT (Fongers and Fulcher, 2001)

exceedence of bankfull flows increased by a factor of 4.2 once watershed IC exceeded 30%. Modeling for seven streams also downstream of stormwater ponds in Surrey, British Columbia also indicated an increase in bankfull flooding in response to watershed development (MacRae, 1996).

Watershed IC also increases the "flashiness" of stream hydrographs. Flashiness is defined here as the percent of daily flows each year that exceeds the mean annual flow. Henshaw and Booth (2000) evaluated seven urbanized watersheds in the Puget Sound lowland streams and tracked changes in flashiness over 50 years (Figure 13). The most urbanized watersheds experienced flashy discharges. Henshaw and Booth concluded that increased runoff in urban watersheds leads to higher but shorter-duration peak discharges.

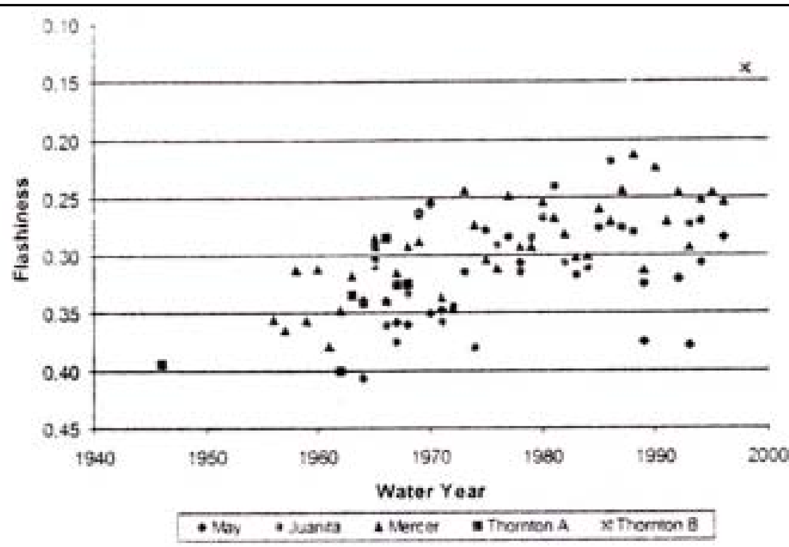


Figure 13: Percent of Gage Reading Above Mean Annual Flow for Puget Sound Lowland Streams (Henshaw and Booth, 2000)

2.5 Decreased Baseflow

As IC increases in a watershed, less groundwater infiltration is expected, which can potentially decrease stream flow during dry periods, (i.e. baseflow). Several East Coast studies provide support for a decrease in baseflow as a result of watershed development. Table 11 reviews eight research studies on baseflow in urban streams.

Klein (1979) measured baseflow in 27 small watersheds in the Maryland Piedmont and reported an inverse relationship between IC and baseflow (Figure 14). Spinello and Simmons (1992) demonstrated that baseflow in two urban Long Island streams declined seasonally as a result of urbanization (Figure 15). Saravanapavan (2002) also found that percentage of baseflow decreased in direct proportion to percent IC for 13 subwatersheds of the Shawsheen River watershed in Massachusetts (Figure 16).

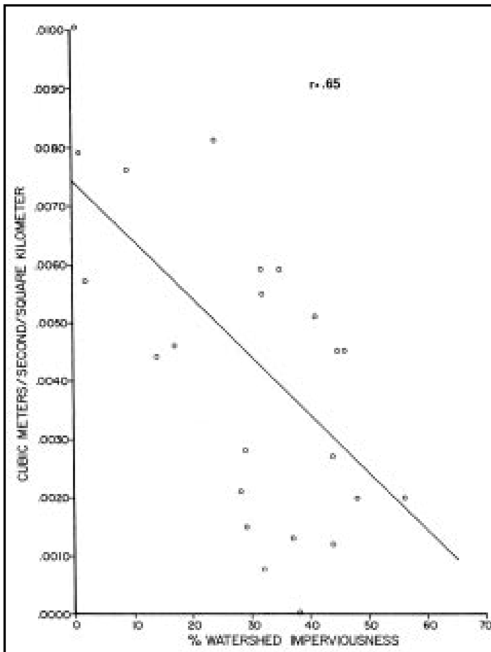
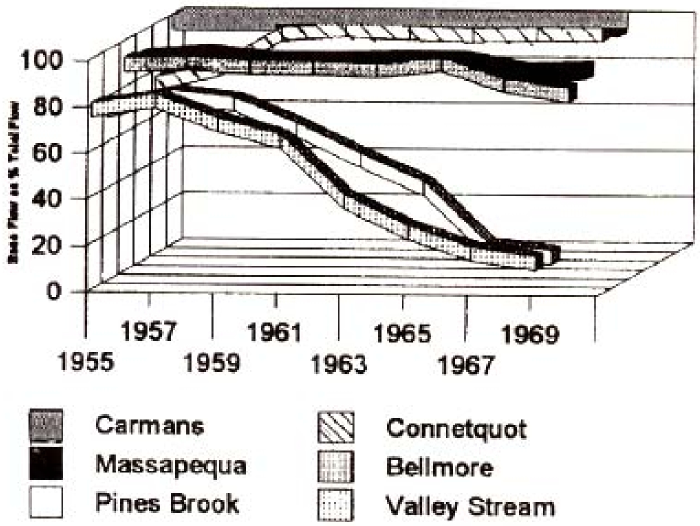


Figure 14: Relationship Between Baseflow and Watershed IC in the Streams on Maryland Piedmont (Klein, 1979)

Table 11: Research Review of Decreased Baseflow in Urban Streams

Reference	Key Finding	Location
Finkenbine *et al.*, 2000	Summer base flow was uniformly low in 11 streams when IC reached 40% or greater.	Vancouver
Klein, 1979	Baseflow decreased as IC increased in Piedmont streams.	MD
Saravanapavan, 2002	Percentage of baseflow decreased linearly as IC increased for 13 subwatersheds of Shawsheen River watershed.	MA
Simmons and Reynolds, 1982	Dry weather flow dropped 20 to 85% after development in several urban watersheds on Long Island.	NY
Spinello and Simmons, 1992	Baseflow in two Long Island streams went dry as a result of urbanization.	NY
Konrad and Booth, 2002	No discernable trend over many decades in the annual seven day low flow discharge for 11 Washington streams.	WA
Wang *et al.*, 2001	Stream baseflow was negatively correlated with watershed IC in 47 small streams, with an apparent breakpoint at 8 to 12% IC.	WI
Evett *et al.*, 1994	No clear relationship between dry weather flow and urban and rural streams in 21 larger watersheds.	NC



Notes:

Carmans and Connetquot: Rural/suburban, watersheds are unsewered

Bellmore and Massapequa: Moderately urbanized, not sewered until 1989

Valley Stream and Pine Brook: Urbanized and densely populated watersheds, sewer systems completed in 1960s

1953-1964: Period of sanitary sewer construction in eastern Nassau County

1962-1966: Drought years

Figure 15: Baseflow Response to Urbanization in Long Island Streams (Spinello and Simmons, 1992)

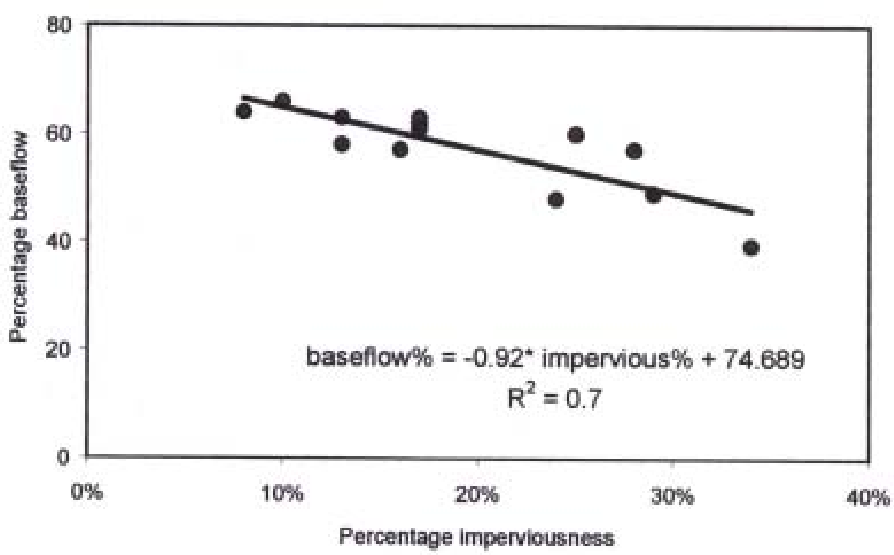


Figure 16: Relationship Between Percentage Baseflow and Percent IC in Massachusetts Streams (Saravanapan, 2002)

Finkebine *et al.* (2000) monitored summer baseflow in 11 streams near Vancouver, British Columbia and found that stream base flow was uniformly low due to decreased groundwater recharge in watersheds with more than 40% IC (Figure 17). Baseflow velocity also consistently decreased when IC increased (Figure 18). The study cautioned that other factors can affect stream baseflow, such as watershed geology and age of development.

Other studies, however, have not been able to establish a relationship between IC and declining baseflow. For example, a study in North Carolina could not conclusively determine that urbanization reduced baseflow in larger urban and suburban watersheds in that area (Evett *et al.*, 1994). In some cases, stream baseflow is supported by deeper aquifers or originate in areas outside the surface watershed boundary. In others, baseflow is augmented by leaking sewers, water pipes and irrigation return flows.

This appears to be particularly true in arid and semi-arid areas, where baseflow can actually increase in response to greater IC (Hollis, 1975). For instance, Crippen and Waananen (1969) found that Sharon Creek near San Francisco changed from an ephemeral stream into a perennial stream after urban development. Increased infiltration from lawn watering and return flow from sewage treatment plants are two common sources of augmented baseflows in these regions (Caraco, 2000a).

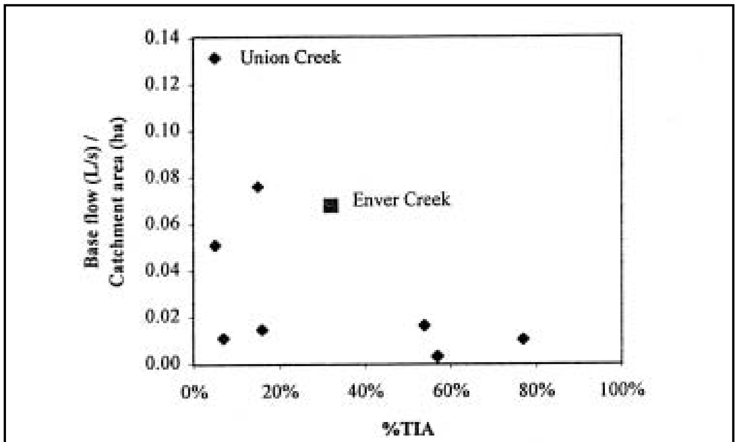


Figure 17: Effect of IC on Summer Baseflow in Vancouver Streams (Finkerbine *et al.*, 2000)

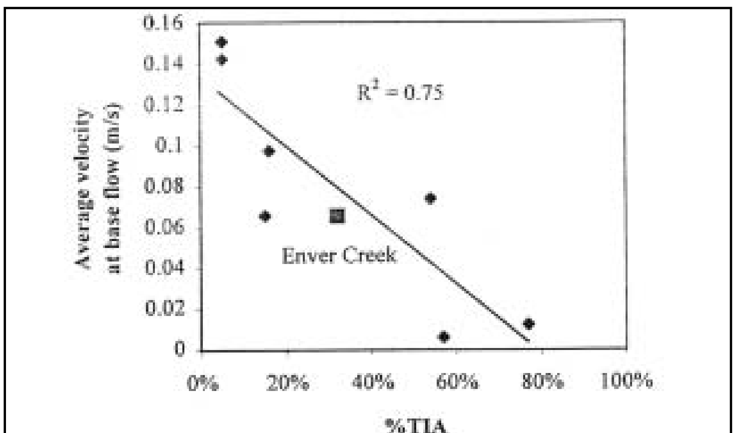


Figure 18: Effect of Watershed IC on Summer Stream Velocity in Vancouver Streams (Finkerbine *et al.*, 2000)

2.6 Conclusions

The changes in hydrology indicators caused by watershed urbanization include increased runoff volume; increased peak discharge; increased magnitude, frequency and duration of bankfull flows; flashier/less predictable flows; and decreased baseflow. Many studies support the direct relationship between IC and these indicators. However, at low levels of watershed IC, site-specific factors such as slope, soils, types of conveyance systems, age of development, and watershed dimensions often play a stronger role in determining a watershed's hydrologic response.

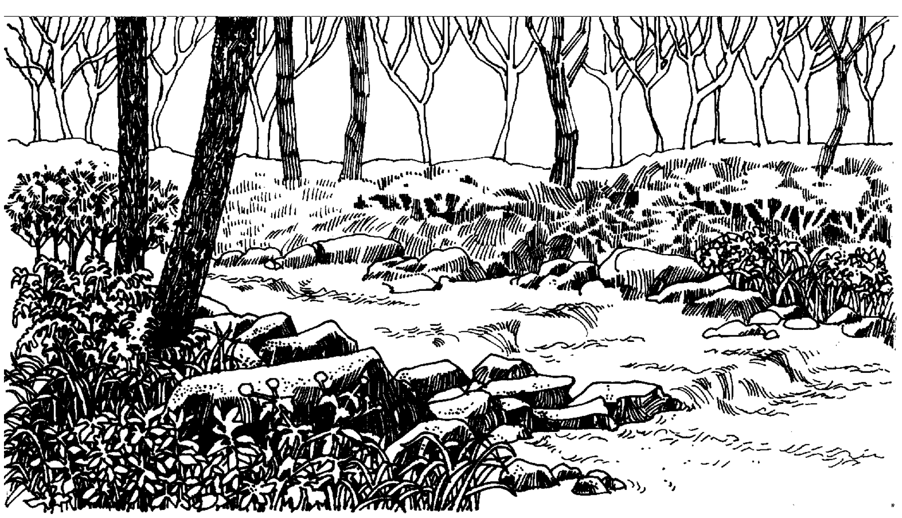
Overall, the following conclusions can be drawn from the relationship between watershed IC and hydrology indicators:

- Strong evidence exists for the direct relationship between watershed IC and increased stormwater runoff volume and peak discharge. These relationships are considered so strong that they have been incorporated into widely accepted engineering models.

- The relationship between IC and bankfull flow frequency has not been extensively documented, although abundant data exists for differences between urban and non-urban watersheds.

- The relationship between IC and declining stream flow is more ambiguous and appears to vary regionally in response to climate and geologic factors, as well as water and sewer infrastructure.

The changes in hydrology indicators caused by watershed urbanization directly influence physical and habitat characteristics of streams. The next chapter reviews how urban streams physically respond to the major changes to their hydrology.



Chapter 3: Physical Impacts of Impervious Cover

A growing body of scientific literature documents the physical changes that occur in streams undergoing watershed urbanization. This chapter discusses the impact of watershed development on various measures of physical habitat in urban stream channels and is organized as follows:

3.1 Difficulty in Measuring Habitat
3.2 Changes in Channel Geometry
3.3 Effect on Composite Indexes of Stream Habitat
3.4 Effect on Individual Elements of Stream Habitat
3.5 Increased Stream Warming
3.6 Alteration of Stream Channel Network
3.7 Conclusion

This chapter reviews the available evidence on stream habitat. We begin by looking at geomorphological research that has examined how the geometry of streams changes in response to altered urban hydrology. The typical response is an enlargement of the cross-sectional area of the stream channel through a process of channel incision, widening, or a combination of both. This process triggers an increase in bank and/or bed erosion that increases sediment transport from the stream, possibly for several decades or more.

Next, we examine the handful of studies that have evaluated the relationship between watershed development and composite indicators of stream habitat (such as the habitat Rapid Bioassessment Protocol, or RBP). In the fourth section, we examine the dozen studies that have evaluated how individual habitat elements respond to watershed development. These studies show a consistent picture. Generally, streams with low levels of IC have stable banks, contain considerable large woody debris (LWD) and possess complex habitat structure. As watershed IC increases, however, urban streambanks become increasingly unstable, streams lose LWD, and they develop a more simple and uniform habitat structure. This is typified by reduced pool depths, loss of pool and riffle sequences, reduced channel roughness and less channel sinuosity.

Water temperature is often regarded as a key habitat element, and the fifth section describes the stream warming effect observed in urban streams in six studies. The last section looks at the effect of watershed development on the stream channel network as a whole, in regard to headwater stream loss and the creation of fish barriers.

3.1 Difficulty in Measuring Habitat

The physical transformation of urban streams is perhaps the most conspicuous impact of watershed development. These dramatic physical changes are easily documented in sequences of stream photos with progressively greater watershed IC (see Figure 19). Indeed, the network of headwater stream channels generally disappears when watershed IC exceeds 60% (CWP).

3.1.1 The Habitat Problem

It is interesting to note that while the physical impacts of urbanization on streams are widely accepted, they have rarely been documented by the research community. As a consequence, no predictive models exist to quantify how physical indicators of stream habitat will decline in response to watershed IC, despite the fact that most would agree that some kind of decline is expected (see Table 12).

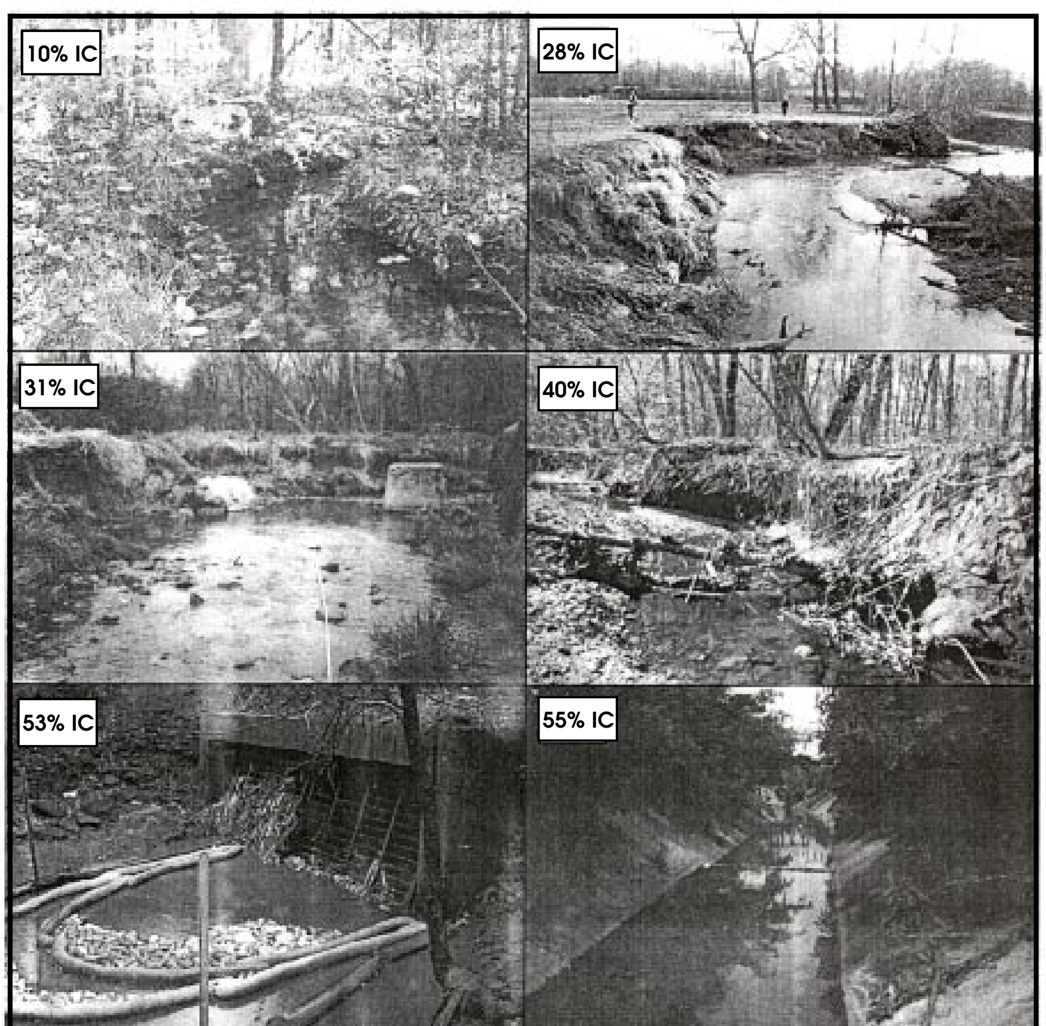


Figure 19: Urban Stream Channels with Progressively Greater IC

The main reason for this gap is that "habitat" is extremely hard to define, and even more difficult to measure in the field. Most indices of physical habitat involve a visual and qualitative assessment of 10 or more individual habitat elements that are perceived by fishery and stream biologists to contribute to quality stream habitat. Since these indices include many different habitat elements, each of which is given equal weight, they have not been very useful in discriminating watershed effects (Wang *et al.*, 2001).

Researchers have had greater success in relating individual habitat elements to watershed conditions, such as large woody debris (LWD), embeddedness, or bank stability. Even so, direct testing has been limited, partly because individual habitat elements are hard to measure and are notoriously variable in both space and time. Consider bank stability for a moment. It would be quite surprising to see a highly urban stream that did not have unstable banks. Yet, the hard question is exactly how would bank instability be quantitatively measured? Where would it be measured — at a point, a cross-section, along a reach, on the left bank or the right?

Geomorphologists stress that no two stream reaches are exactly alike, due to differences in gradient, bed material, sediment transport, hydrology, watershed history and many other factors. Consequently, it is difficult to make controlled comparisons among different streams. Indeed, geomorphic theory stresses that individual stream reaches respond in a highly dynamic way to changes in watershed hydrology and sediment transport, and can take several decades to fully adjust to a new equilibrium.

Table 12: Physical Impacts of Urbanization on Streams

Specific Impacts
Sediment transport modified Channel enlargement Channel incision Stream embeddedness Loss of large woody debris Changes in pool/riffle structure Loss of riparian cover Reduced channel sinuosity Warmer in-stream temperatures Loss of cold water species and diversity Channel hardening Fish blockages Loss of 1st and 2nd order streams through storm drain enclosure

Returning to our example of defining bank stability, how might our measure of bank instability change over time as its watershed gradually urbanizes, is built out, and possibly reaches a new equilibrium over several decades? It is not very surprising that the effect of watershed development on stream habitat is widely observed, yet rarely measured.

3.2 Changes in Stream Geometry

As noted in the last chapter, urbanization causes an increase in the frequency and duration of bankfull and sub-bankfull flow events in streams. These flow events perform more "effective work" on the stream channel, as defined by Leopold (1994). The net effect is that an urban stream channel is exposed to more shear stress above the critical threshold needed to move bank and bed sediments (Figure 20). This usually triggers a cycle of active bank erosion and greater sediment transport in urban streams. As a consequence, the stream channel adjusts by expanding its cross-sectional area, in order to effectively accommodate greater flows and sediment supply. The stream channel can expand by incision, widening, or both. Incision refers to stream down-cutting through the streambed, whereas widening refers to lateral erosion of the stream bank and its flood plain (Allen and Narramore, 1985; Booth, 1990; Morisawa and LaFlure, 1979).

3.2.1 Channel Enlargement

A handful of research studies have specifically examined the relationship between watershed development and stream channel enlargement (Table 13). These studies indicate that stream cross-sectional areas can enlarge by as much as two to eight times in response to urbanization, although the process is complex and may take several decades to complete (Pizzuto *et al.*, 2000; Caraco, 2000b; Hammer, 1972). An example of channel enlargement is provided in Figure 21, which shows how a stream cross-section in Watts Branch near Rockville, Maryland has expanded in response to nearly five decades of urbanization (i.e., watershed IC increased from two to 27%).

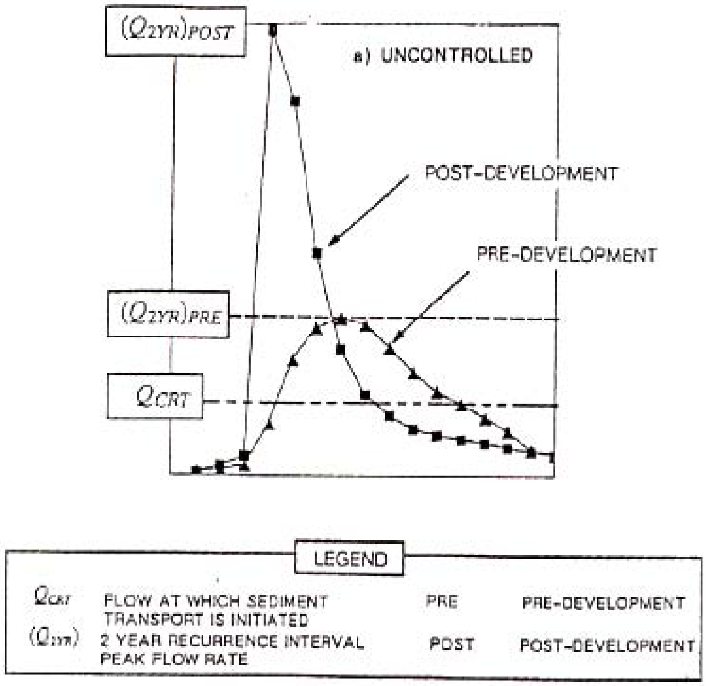


Figure 20: Increased Shear Stress from a Hydrograph (MacRae and Rowney, 1992)

Table 13: Research Review of Channel Enlargement and Sediment Transport in Urban Streams		
Reference	**Key Finding**	**Location**
	% IC used as Indicator	
Caraco, 2000b	Reported enlargement in ratios of 1.5 to 2.2 for 10 stream reaches in Watts Branch and computed ultimate enlargement ratios of 2.0	MD
MacCrae and De Andrea, 1999	Introduced the concept of ultimate channel enlargement based on watershed IC and channel characteristics.	Ontario, TX
Morse, 2001	Demonstrated increased erosion rates with increases in IC (channels were generally of the same geomorphic type).	ME
	Urbanization Used as Indicator	
Allen and Narramore, 1985	Enlargement ratios in two urban streams ranged from 1.7 to 2.4.	TX
Bledsoe, 2001	Reported that channel response to urbanization depends on other factors in addition to watershed IC including geology, vegetation, sediment and flow regimes.	N/A
Booth and Henshaw, 2001	Evaluated channel cross section erosion rates and determined that these rates vary based on additional factors including the underlying geology, age of development and gradient.	WA
Hammer, 1972	Enlargement ratios ranged from 0.7 to 3.8 in urban watersheds.	PA
Neller, 1989	Enlargement ratios in small urban catchments ranged from two to 7.19, the higher enlargement ratios were primarily from incision occurring in small channels.	Australia
Pizzuto *et al.*, 2000	Evaluated channel characteristics of paired urban and rural streams and demonstrated median bankfull cross sectional increase of 180%. Median values for channel sinuosity were 8% lower in urban streams; Mannings N values were found to be 10% lower in urban streams.	PA
Hession *et al.*, *in press*	Bankfull widths for urban streams were significantly wider than non-urban streams in 26 paired streams. Forested reaches were consistently wider than non-forested reaches in urban streams.	MD, DE, PA
Dartiguenave *et al.*, 1997	Bank erosion accounted for up to 75% of the sediment transport in urban watersheds.	TX
Trimble, 1997	Demonstrated channel enlargement over time in an urbanizing San Diego Creek; Bank erosion accounted for over 66% of the sediment transport.	CA

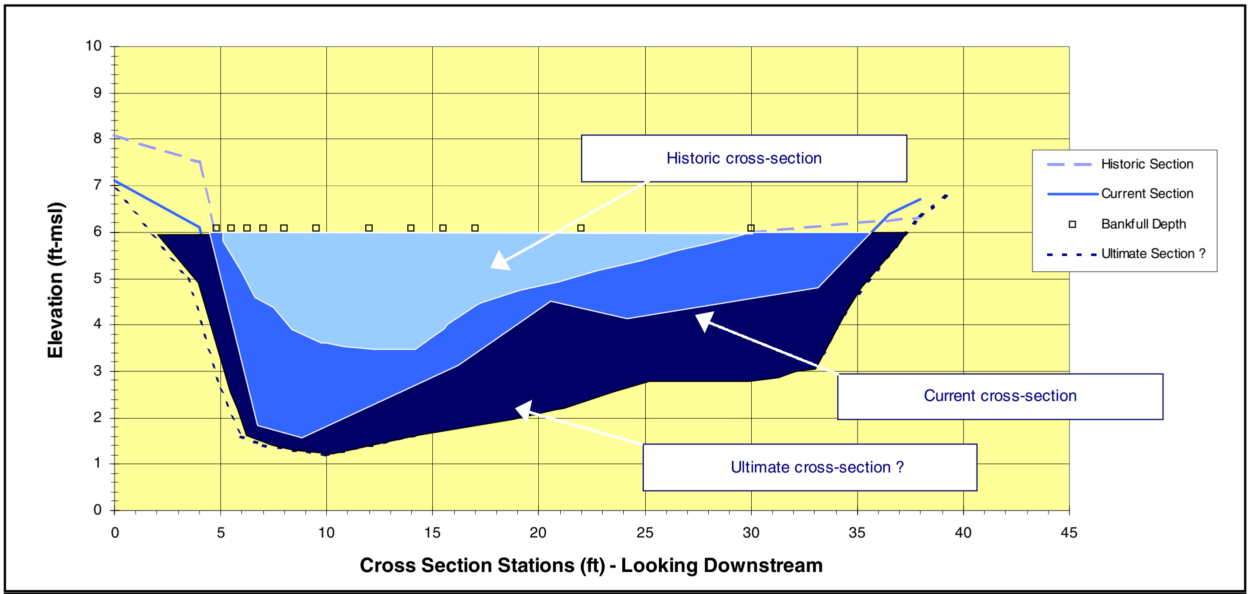


Figure 21: Stream Channel Enlargement in Watts Branch, MD 1950-2000 (Caraco, 2000b)

Some geomorphologists suggest that urban stream channels will reach an "ultimate enlargement" relative to pre-developed channels (MacRae and DeAndrea, 1999) and that this can be predicted based on watershed IC, age of development, and the resistance of the channel bed and banks. A relationship between ultimate stream channel enlargement and watershed IC has been developed for alluvial streams in Texas, Vermont and Maryland (Figure 22). Other geomorphologists such as Bledsoe (2001) and Booth and Henshaw (2001) contend that channel response to urbanization is more complex, and also depends on geology, grade control, stream gradient and other factors.

Channel incision is often limited by grade control caused by bedrock, cobbles, armored substrates, bridges, culverts and pipelines. These features can impede the downward erosion of the stream channel and thereby limit the incision process. Stream incision can become severe in streams that have softer substrates such as sand, gravel and clay (Booth, 1990). For example, Allen and Narramore (1985) showed that channel enlargement in chalk channels was 12 to 67% greater than in shale channels near Dallas, Texas. They attributed the differences to the softer substrate, greater velocities and higher shear stress in the chalk channels.

Neller (1989) and Booth and Henshaw (2001) also report that incised urban stream channels possess cross-sectional areas that are larger than would be predicted based on watershed area or discharge alone. This is due to the fact that larger floods are often contained within the stream channel rather than the floodplain. Thus, incised channels often result in greater erosion and geomorphic change. In general, stream conditions that can foster incision include erodible substrates, moderate to high stream gradients, and an absence of grade control features.

Channel widening occurs more frequently when streams have grade control and the stream has cut into its bank, thereby expanding its cross-sectional area. Urban stream channels often have artificial grade controls caused by frequent culverts and road crossings. These grade controls often cause localized sediment deposition that can reduce the capacity of culverts and bridge crossings to pass flood waters.

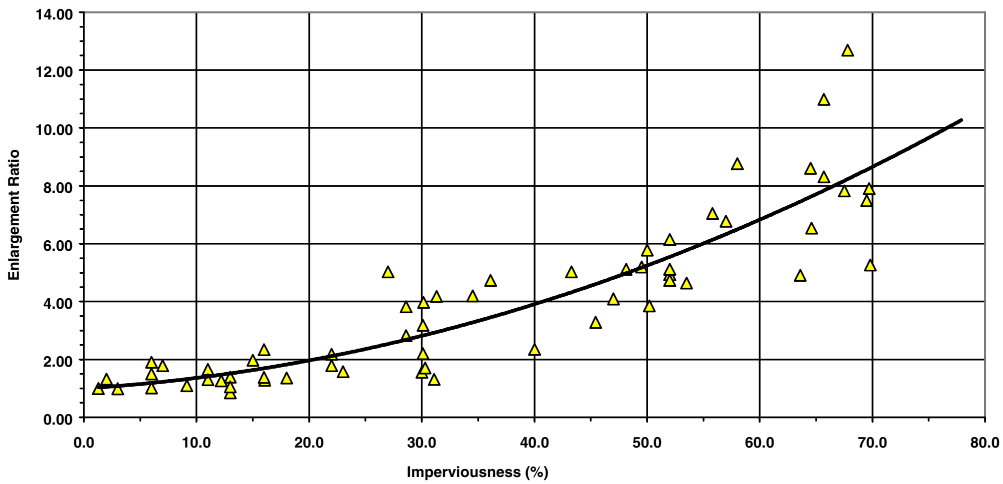


Figure 22: Ultimate Channel Enlargement in MD, UT and TX Alluvial Streams (MacRae and DeAndrea, 1999 and CWP, 2001b)

The loss of flood plain and riparian vegetation has been strongly associated with watershed urbanization (May *et al.*, 1997). A few studies have shown that the loss of riparian trees can result in increased erosion and channel migration rates (Beeson and Doyle, 1995 and Allmendinger *et al.*, 1999). For example, Beeson and Doyle (1995) found that meander bends with vegetation were five times less likely to experience significant erosion from a major flood than non-vegetated meander bends.Hession *et al.* (in press) observed that forested reaches consistently had greater bankfull widths than non-forested reaches in a series of urban streams in Pennsylvania, Maryland and Delaware.

3.2.2 Effect of Channel Enlargement on Sediment Yield

Regardless of whether a stream incises, widens, or does both, it will greatly increase sediment transport from the watershed due to erosion. Urban stream research conducted in California and Texas suggests that 60 to 75% of the sediment yield of urban watersheds can be derived from channel erosion (Trimble, 1997 and Dartingunave *et al.*, 1997) This can be compared to estimates for rural streams where channel erosion accounts for only five to 20% of the annual sediment yield (Collins *et al.*, 1997 and Walling and Woodward, 1995).

Some geomorphologists speculate that urban stream channels will ultimately adjust to their post-development flow regime and sediment supply. Finkenbine *et al.* (2000) observed these conditions in Vancouver streams, where study streams eventually stabilized two decades after the watersheds were fully developed. In older urban streams, reduced sediment transport can be expected when urbanization has been completed. At this point, headwater stream channels are replaced by storm drains and pipes, which can transport less sediment. The lack of available sediment may cause downstream channel erosion, due to the diminished sediment supply found in the stream.

3.3 Effect on Composite Measures of Stream Habitat

Composite measures of stream habitat refer to assessments such as EPA's Habitat Rapid Bioassessment Protocol (RBP) that combine multiple habitat elements into a single score or index (Barbour *et al*., 1999). For example, the RBP requires visual assessment of 10 stream habitat elements, including embeddedness, epifaunal substrate quality, velocity/depth regime, sediment deposition, channel flow status, riffle frequency, bank stabilization, streambank vegetation and riparian vegetation width. Each habitat element is qualitatively scored on a 20 point scale, and each element is weighted equally to derive a composite score for the stream reach.

To date, several studies have found a relationship between declining composite habitat indicator scores and increasing watershed IC in different eco-regions of the United States. A typical pattern in the composite habitat scores is provided for headwater streams in Maine (Morse, 2001; Figure 23). This general finding has been reported in the mid-Atlantic, Northeast and the Northwest (Black and Veatch, 1994; Booth and Jackson, 1997; Hicks and Larson, 1997; Maxted and Shaver, 1997; Morse, 2001; Stranko and Rodney, 2001).

However, other researchers have found a much weaker relationship between composite habitat scores and watershed IC. Wang and his colleagues (2001) found that composite habitat scores were not correlated with watershed IC in Wisconsin streams, although it was correlated with individual habitat elements, such as streambank erosion. They noted that many agricultural and rural streams had fair to poor composite habitat scores, due to poor riparian management and sediment deposition. The same basic conclusion was also reported for streams of the Maryland Piedmont (MNCPPC, 2000).

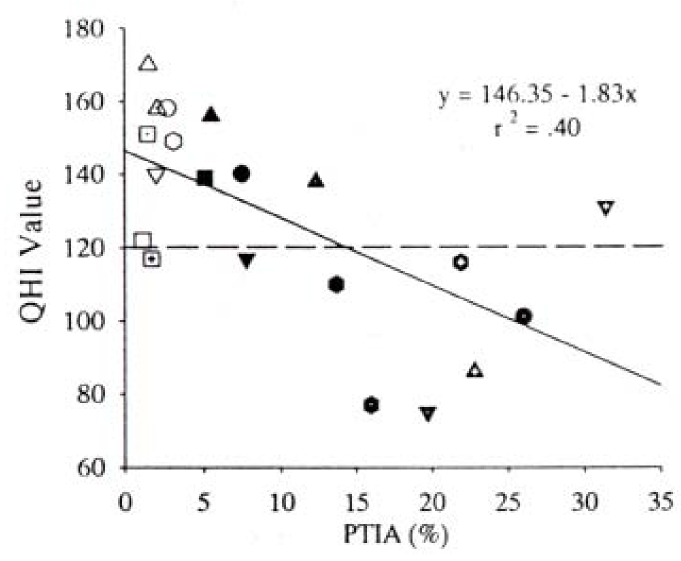


Figure 23: Relationship Between Habitat Quality and IC in Maine Streams (Morse, 2001)

3.4 Effect on Individual Elements of Stream Habitat

Roughly a dozen studies have examined the effect of watershed development on the degradation of individual stream habitat features such as bank stability, embeddedness, riffle/pool quality, and loss of LWD (Table 14). Much of this data has been acquired from the Pacific Northwest, where the importance of such habitat for migrating salmon has been a persistent management concern.

3.4.1 Bank Erosion and Bank Stability

It is somewhat surprising that we could only find one study that related bank stability or bank erosion to watershed IC. Conducted by Booth (1991) in the streams of the Puget Sound lowlands, the study reported that stream banks were consistently rated as stable in watersheds with less than 10% IC, but became progressively more unstable above this threshold. Dozens of stream assessments have found high rates of bank erosion in urban streams, but none, to our knowledge, has systematically related the prevalence or severity of bank erosion to watershed IC. As noted earlier, this may reflect the lack of a universally recognized method to measure comparative bank erosion in the field.

3.4.2 Embeddedness

Embeddedness is a term that describes the extent to which the rock surfaces found on the stream bottom are filled in with sand, silts and clay. In a healthy stream, the interstitial pores between cobbles, rock and gravel generally lack fine sediments, and are an active habitat zone and detrital processing area. The increased sediment transport in urban streams can rapidly fill up these pores in a process known as embedding. Normally, embeddedness is visually measured in riffle zones of streams. Riffles tend to be an important habitat for aquatic insects and fish (such as darters and sculpins). Clean stream substrates are also critical to trout and salmon egg incubation and embryo development. May *et al.* (1997) demonstrated that the percent of fine sediment particles in riffles generally increased with watershed IC (Figure 24). However, Finkenbine *et al.* (2000) reported that embeddedness eventually decreased slightly after watershed land use and sediment transport had stabilized for 20 years.

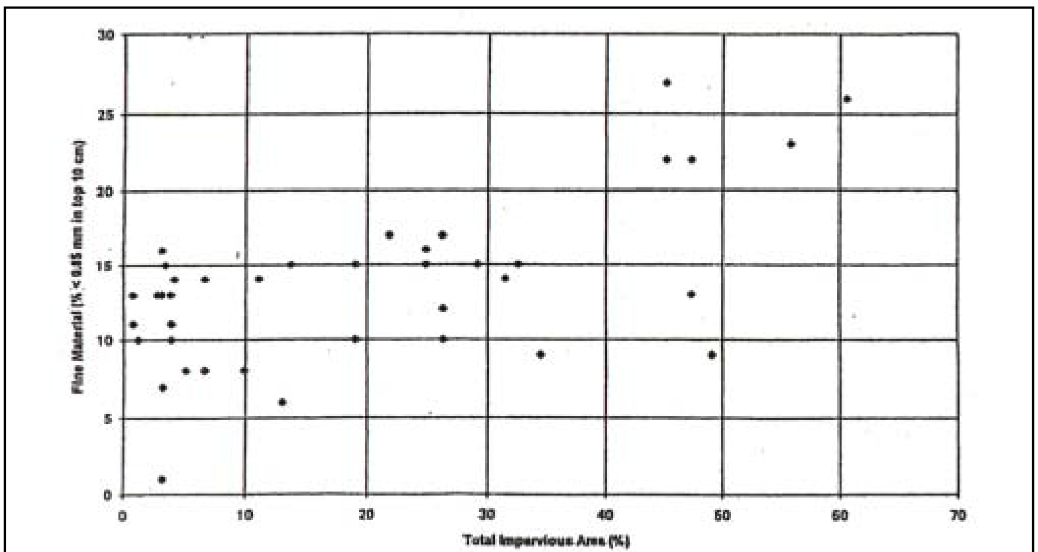


Figure 24: Fine Material Sediment Deposition as a Function of IC in Pacific Northwest Streams (Horner *et al.*, 1997)

Table 14: Research Review of Changes in Urban Stream Habitat		
Reference	**Key Finding**	**Location**
% IC Used as Indicator		
Black & Veatch, 1994	Habitat scores were ranked as poor in five subwatersheds that had greater than 30% IC.	MD
Booth and Jackson, 1997	Increase in degraded habitat conditions with increases in watershed IC.	WA
Hicks and Larson, 1997	Reported a reduction in composite stream habitat indices with increasing watershed IC.	MA
May *et al.*, 1997	Composite stream habitat declined most rapidly during the initial phase of the watershed urbanization, when percent IC exceeded the 5-10% range.	WA
Stranko and Rodney, 2001	Composite index of stream habitat declined with increasing watershed IC in coastal plain streams.	MD
Wang *et al.*, 2001	Composite stream habitat scores were not correlated with watershed IC in 47 small watersheds, although channel erosion was. Non-urban watersheds were highly agricultural and often lacked riparian forest buffers.	WI
MNCPPC, 2000	Reported that stream habitat scores were not correlated with IC in suburban watersheds.	MD
Morse, 2001	Composite habitat values tended to decline with increases in watershed IC.	ME
Booth, 1991	Channel stability and fish habitat quality declined rapidly after 10% watershed IC.	WA
Booth *et al.*, 1997	Decreased LWD with increased IC.	PNW
Finkenbine *et al.*, 2000	LWD was scarce in streams with greater than 20% IC in Vancouver.	B.C.
Horner & May, 1999	When IC levels were >5%, average LWD densities fell below 300 pieces/kilometer.	PNW
Horner *et al.*, 1997	Interstitial spaces in streambed sediments begin to fill with increasing watershed IC.	PNW
Urbanization Used as Indicator		
Dunne and Leopold, 1978	Natural channels replaced by storm drains and pipes; increased erosion rates observed downstream.	MD
May *et al.*, 1997	Forested riparian corridor width declines with increased watershed IC.	PNW
MWCOG, 1992	Fish blockages caused by bridges and culverts noted in urban watersheds.	D.C.
Pizzuto *et al.*, 2000	Urban streams had reduced pool depth, roughness, and sinuosity, compared to rural streams; Pools were 31% shallower in urban streams compared to non-urban ones.	PA
Richey, 1982	Altered pool/riffle sequence observed in urban streams.	WA
Scott *et al.*, 1986	Loss of habitat diversity noted in urban watersheds.	PNW
Spence *et al.*, 1996	Large woody debris is important for habitat diversity and anadromous fish.	PNW

3.4.3 Large Woody Debris (LWD)

LWD is a habitat element that describes the approximate volume of large woody material (< four inches in diameter) found in contact with the stream. The presence and stability of LWD is an important habitat parameter in streams. LWD can form dams and pools, trap sediment and detritus, stabilize stream channels, dissipate flow energy, and promote habitat complexity (Booth *et al.,* 1997). LWD creates a variety of pool features (plunge, lateral, scour and backwater); short riffles; undercut banks; side channels; and a range of water depths (Spence *et al.*, 1996). Urban streams tend to have a low supply of LWD, as increased stormwater flows transport LWD and clears riparian areas. Horner *et al.* (1997) presents evidence from Pacific Northwest streams that LWD decreases in response to increasing watershed IC (Figure 25).

3.4.4 Changes in Other Individual Stream Parameters

One of the notable changes in urban stream habitat is a decrease in pool depth and a general simplification of habitat features such as pools, riffles and runs. For example, Richey (1982) and Scott *et al.* (1986) reported an increase in the prevalence of glides and a corresponding altered riffle/pool sequence due to urbanization. Pizzuto *et al.* (2000) reported a median 31% decrease in pool depth in urban streams when compared to forested streams. Pizzuto *et al.* also reported a modest decrease in channel sinuosity and channel roughness in the same urban streams in Pennsylvania.

Several individual stream habitat parameters appear to have received no attention in urban stream research to date. These parameters include riparian shading, wetted perimeter, various measures of velocity/depth regimes, riffle frequency, and sediment deposition in pools. More systematic monitoring of these individual stream habitat parameters may be warranted.

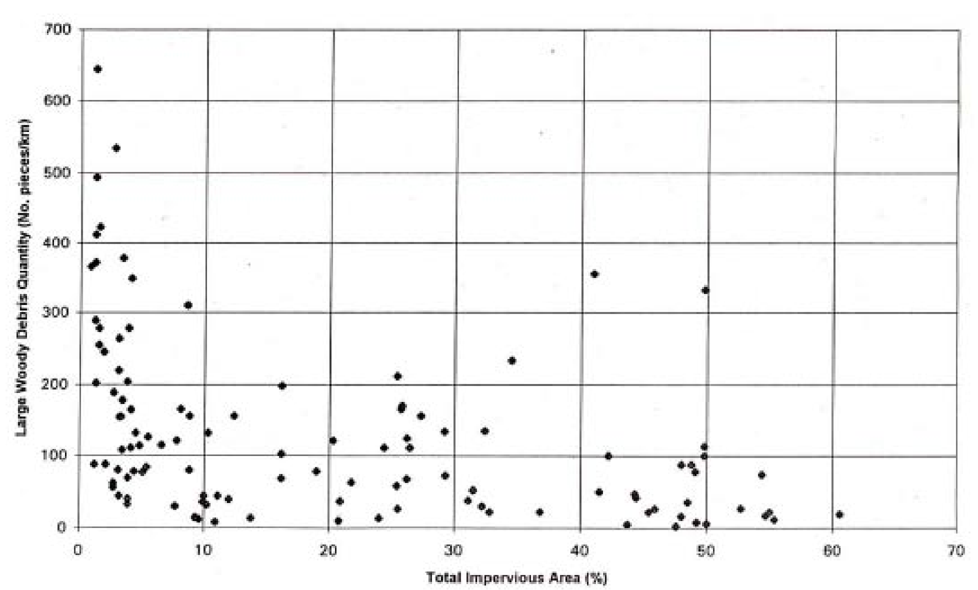


Figure 25: LWD as a Function of IC in Puget Sound Streams (Horner *et al.*, 1997)

3.5 Increased Stream Warming

IC directly influences our local weather in urban areas. This effect is obvious to anyone walking across a parking lot on a hot summer day, when temperatures often reach a scorching 110 to 120 degrees F. Parking lots and other hard surfaces tend to absorb solar energy and release it slowly. Furthermore, they lack the normal cooling properties of trees and vegetation, which act as natural air conditioners. Finally, urban areas release excess heat as a result of the combustion of fossil fuels for heating, cooling and transportation. As a result, highly urban areas tend to be much warmer than their rural counterparts and are known as urban heat islands. Researchers have found that summer temperatures tend to be six to eight degrees F warmer in the summer and two to four degrees F warmer during the winter months.

Water temperature in headwater streams is strongly influenced by local air temperatures. Summer temperatures in urban streams have been shown to increase by as much as five to 12 degrees F in response to watershed development (Table 15). Increased water temperatures can preclude temperature-sensitive species from being able to survive in urban streams. Figure 26 shows the stream warming phenomenon in small headwater streams in the Maryland Piedmont.

Galli (1990) reported that stream temperatures throughout the summer increased in urban watersheds. He monitored five headwater streams in the Maryland Piedmont with different levels of IC. Each urban stream had mean temperatures that were consistently warmer than a forested reference stream, and stream warming appeared to be a direct function of watershed IC. Other factors, such as lack of riparian cover and the presence of ponds, were also demonstrated to amplify stream warming, but the primary contributing factor appeared to be watershed IC.

Johnson (1995) studied how stormwater influenced an urban trout stream in Minnesota and reported up to a 10 degree F increase in stream water temperatures after summer storm events. Paul *et al.* (2001) evaluated stream temperatures for 30 subwatersheds to the Etowah River in Georgia, which ranged from five to 61% urban land. They found a correlation between summer daily mean water temperatures and the percentage of urban land in a subwatershed.

Table 15: Research Review of Thermal Impacts in Urban Streams

Reference	Key Finding	Location
%IC Used as Indicator		
Galli, 1990	Increase in stream temperatures of five to 12 degrees Fahrenheit in urban watersheds; stream warming linked to IC.	MD
Urbanization Used as Indicator		
Johnson, 1995	Up to 10 degrees Fahrenheit increases in stream temperatures after summer storm events in an urban area	MN
LeBlanc *et al.*, 1997	Calibrated a model predicting stream temperature increase as a result of urbanization	Ontario
MCDEP, 2000	Monitoring effect of urbanization and stormwater ponds on stream temperatures revealed stream warming associated with urbanization and stormwater ponds	MD
Paul *et al.*, 2001	Daily mean stream temperatures in summer increased with urban land use	GA

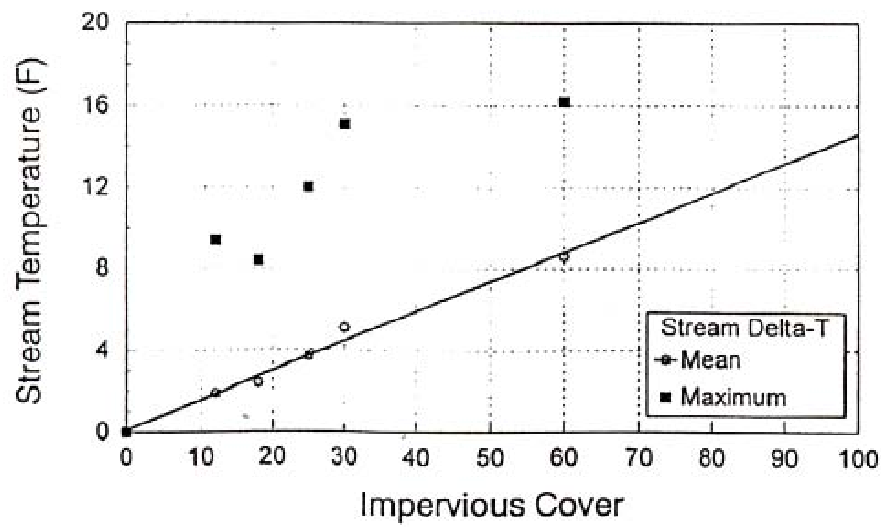


Figure 26: Stream Temperature Increase in Response to IC in Maryland Piedmont Streams (Galli, 1990)

Discharges from stormwater ponds can also contribute to stream warming in urban watersheds. Three studies highlight the temperature increase that can result from stormwater ponds. A study in Ontario found that baseflow temperatures below wet stormwater ponds increased by nine to 18 degrees F in the summer (SWAMP, 2000a, b). Oberts (1997) also measured change in the baseflow temperature as it flowed through a wetland/wet pond system in Minnesota. He concluded that the temperature had increased by an average of nine degrees F during the summer months. Galli (1988) also observed a mean increase of two to 10 degrees F in four stormwater ponds located in Maryland.

3.6 Alteration of Stream Channel Networks

Urban stream channels are often severely altered by man. Channels are lined with rip rap or concrete, natural channels are straightened, and first order and ephemeral streams are enclosed in storm drain pipes. From an engineering standpoint, these modifications rapidly convey flood waters downstream and locally stabilize stream banks. Cumulatively, however, these modifications can have a dramatic effect on the length and habitat quality of headwater stream networks.

3.6.1 Channel Modification

Over time, watershed development can alter or eliminate a significant percentage of the perennial stream network. In general, the loss of stream network becomes quite extensive when watershed IC exceeds 50%. This loss is striking when pre- and post-development stream networks are compared (Figure 27). The first panel illustrates the loss of stream network over time in a highly urban Northern Virginia watershed; the second panel shows how the drainage network of Rock Creek has changed in response to watershed development.

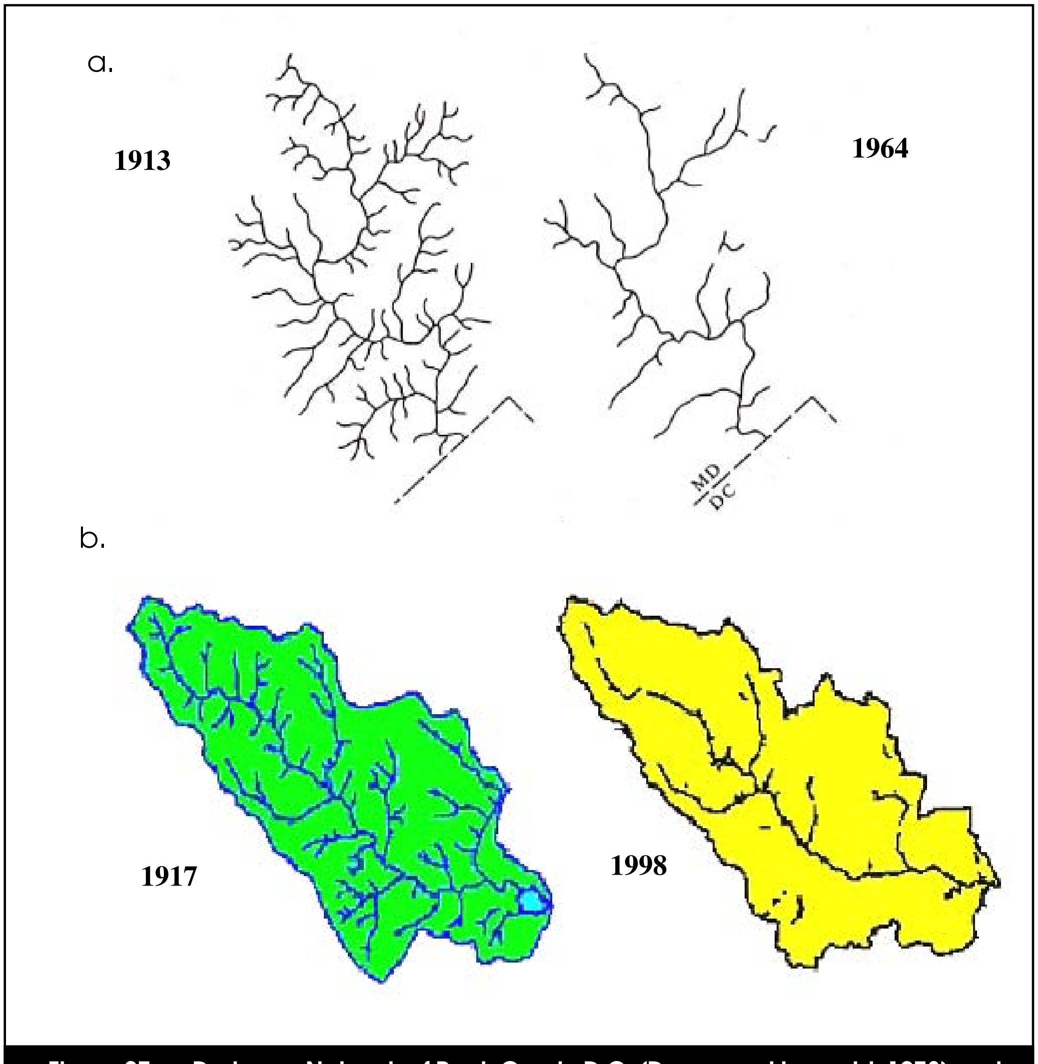


Figure 27: a. Drainage Network of Rock Creek, D.C. (Dunne and Leopold, 1978) and b. Drainage Network of Four Mile Run, VA Before and After Urbanization (NVRC, 2001)

In a national study of 269 gaged urban watersheds, Sauer *et al.* (1983) observed that channelization and channel hardening were important watershed variables that control peak discharge rates. The channel modifications increase the efficiency with which runoff is transported through the stream channel, increasing critical shear stress velocities and causing downstream channel erosion.

3.6.2 Barriers to Fish Migration

Infrastructure such as bridges, dams, pipelines and culverts can create partial or total barriers to fish migration and impair the ability of fish to move freely in a watershed. Blockages can have localized effects on small streams where non-migratory fish species can be prevented from re-colonizing upstream areas after acutely toxic events. The upstream movement of anadromous fish species such as shad, herring, salmon and steelhead can also be blocked by these barriers. Figure 28 depicts the prevalence of fish barriers in the Anacostia Watershed (MWCOG, 1992).

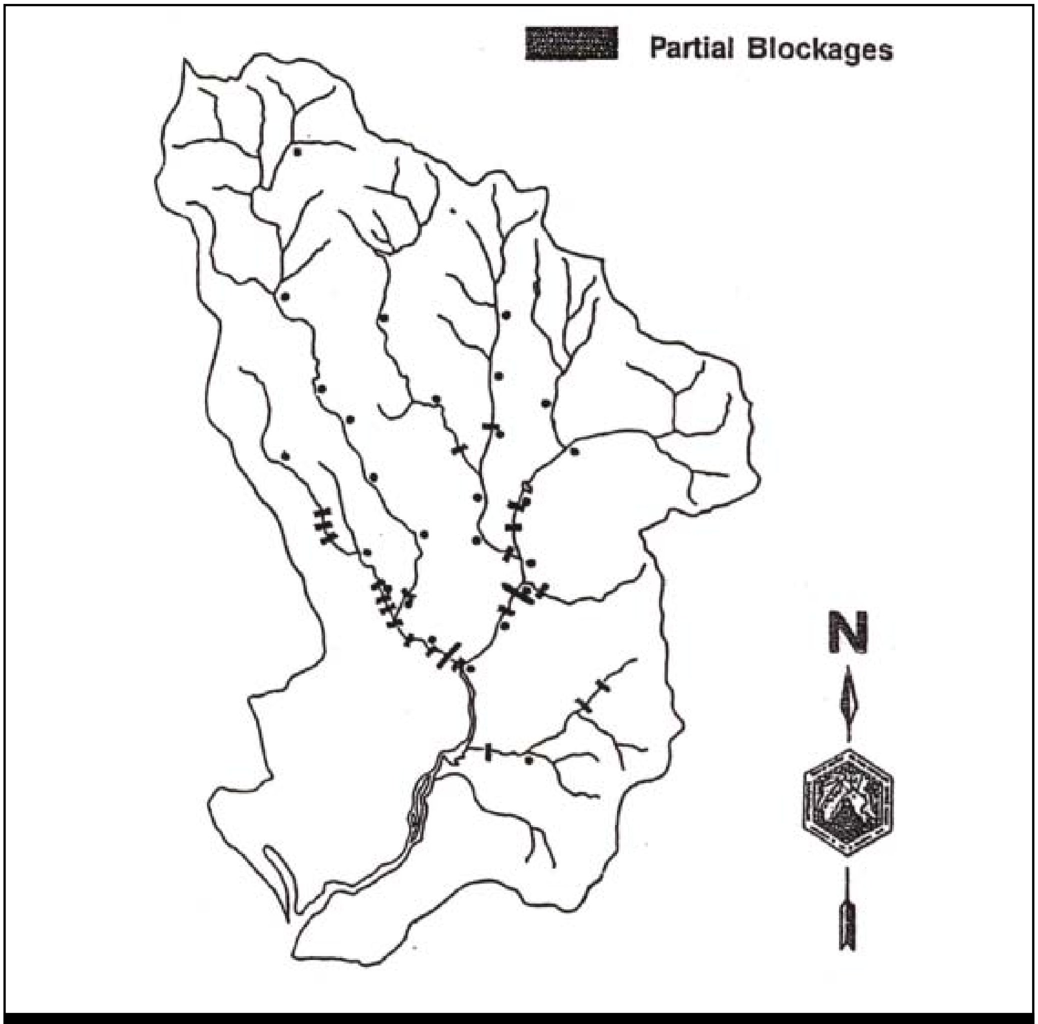


Figure 28: Fish Migration Barriers in the Anacostia Watershed of D.C. and MD (MWCOG, 1992)

3.7 Conclusion

Watershed development and the associated increase in IC have been found to significantly degrade the physical habitat of urban streams. In alluvial streams, the effects of channel enlargement and sediment transport can be severe at relatively low levels of IC (10 to 20%). However, the exact response of any stream is also contingent upon a combination of other physical factors such as geology, vegetation, gradient, the age of development, sediment supply, the use and design of stormwater treatment practices, and the extent of riparian buffers (Bledsoe, 2001).

Despite the uncertainty introduced by these factors, the limited geomorphic research to date suggests that physical habitat quality is almost always degraded by higher levels of watershed IC. Even in bedrock-controlled channels, where sediment transport and channel enlargement may not be as dramatic, researchers have noted changes in stream habitat features, such as embeddedness, loss of LWD, and stream warming.

Overall, the following conclusions can be made about the influence of watershed development on the physical habitat of urban streams:

- The major changes in physical habitat in urban streams are caused by the increased frequency and duration of bankfull and sub-bankfull discharges, and the attendant changes in sediment supply and transport. As a consequence, many urban streams experience significant channel enlargement. Generally, channel enlargement is most evident in alluvial streams.

- Typical habitat changes observed in urban streams include increased embeddedness, reduced supply of LWD, and simplification of stream habitat features such as pools, riffles and runs, as well as reduced channel sinuosity.

- Stream warming is often directly linked to watershed development, although more systematic subwatershed sampling is needed to precisely predict the extent of warming.

- Channel straightening, hardening and enclosure and the creation of fish barriers are all associated with watershed development. More systematic research is needed to establish whether these variables can be predicted based on watershed IC.

- In general, stream habitat diminishes at about 10% watershed IC, and becomes severely degraded beyond 25% watershed IC.

While our understanding of the relationship between stream habitat features and watershed development has improved in recent years, the topic deserves greater research in three areas. First, more systematic monitoring of composite habitat variables needs to be conducted across the full range of watershed IC. In particular, research is needed to define the approximate degree of watershed IC where urban streams are transformed into urban drainage systems.

Second, additional research is needed to explore the relationship between watershed IC and individual and measurable stream habitat parameters, such as bank erosion, channel sinuosity, pool depth and wetted perimeter. Lastly, more research is needed to determine if watershed treatment such as stormwater practices and stream buffers can mitigate the impacts of watershed IC on stream habitat. Together, these three research efforts could provide a technical foundation to develop a more predictive model of how watershed development influences stream habitat.

Chapter 4: Water Quality Impacts of Impervious Cover

This chapter presents information on pollutant concentrations found in urban stormwater runoff based on a national and regional data assessment for nine categories of pollutants. Included is a description of the Simple Method, which can be used to estimate pollutant loads based on the amount of IC found in a catchment or subwatershed. This chapter also addresses specific water quality impacts of stormwater pollutants and explores research on the sources and source areas of stormwater pollutants.

This chapter is organized as follows:

4.1 Introduction
4.2 Summary of National and Regional Stormwater Pollutant Concentration Data
4.3 Relationship Between Pollutant Loads and IC: The Simple Method
4.4 Sediment
4.5 Nutrients
4.6 Trace Metals
4.7 Hydrocarbons (PAH and Oil and Grease)
4.8 Bacteria and Pathogens
4.9 Organic Carbon
4.10 MTBE
4.11 Pesticides
4.12 Deicers
4.13 Conclusion

4.1 Introduction

Streams are usually the first aquatic system to receive stormwater runoff, and their water quality can be compromised by the pollutants it contains. Stormwater runoff typically contains dozens of pollutants that are detectable at some concentration, however small. Simply put, any pollutant deposited or derived from an activity on land will likely end up in stormwater runoff, although certain pollutants are consistently more likely to cause water quality problems in receiving waters. Pollutants that are frequently found in stormwater runoff can be grouped into nine broad categories: sediment, nutrients, metals, hydrocarbons, bacteria and pathogens, organic carbon, MTBE, pesticides, and deicers.

The impact that stormwater pollutants exert on water quality depends on many factors, including concentration, annual pollutant load, and category of pollutant. Based on nationally reported concentration data, there is considerable variation in stormwater pollutant concentrations. This variation has been at least partially attributed to regional differences, including rainfall and snowmelt. The volume and regularity of rainfall, the length of snow accumulation, and the rate of snowmelt can all influence stormwater pollutant concentrations.

The annual pollutant load can have long-term effects on stream water quality, and is particularly important information for stormwater managers to have when dealing with non-point source pollution control. The Simple Method is a model developed to estimate the pollutant load for chemical pollutants, assuming that the annual pollutant load is a function of IC. It is an effective method for determining annual sediment, nutrient, and trace metal loads. It cannot always be applied to other stormwater pollutants, since they are not always correlated with IC.

The direct water quality impact of stormwater pollutants also depends on the type of pollutant, as different pollutants impact streams differently. For example, sediments affect stream habitat and aquatic biodiversity; nutrients cause eutrophication; metals, hydrocarbons, deicers, and MTBE can be toxic to aquatic life; and organic carbon can lower dissolved oxygen levels.

The impact stormwater pollutants have on water quality can also directly influence human uses and activities. Perhaps the pollutants of greatest concern are those with associated public health impacts, such as bacteria and pathogens. These pollutants can affect the availability of clean drinking water and limit consumptive recreational activities, such as swimming or fishing. In extreme situations, these pollutants can even limit contact recreational activities such as boating and wading.

It should be noted that although there is much research available on the effects of urbanization on water quality, the majority has not been focused on the impact on streams, but on the response of lakes, reservoirs, rivers and estuaries. It is also important to note that not all pollutants are equally represented in monitoring conducted to date. While we possess excellent monitoring data for sediment, nutrients and trace metals, we have relatively little monitoring data for pesticides, hydrocarbons, organic carbon, deicers, and MTBE.

4.2 Summary of National and Regional Stormwater Pollutant Concentration Data

4.2.1 National Data

National mean concentrations of typical stormwater pollutants are presented in Table 16. National stormwater data are compiled from the Nationwide Urban Runoff Program (NURP), with additional data obtained from the U.S.Geological Survey (USGS), as well as initial stormwater monitoring conducted for EPA's National Pollutant Discharge Elimination System (NPDES) Phase I stormwater program.

In most cases, stormwater pollutant data is reported as an event mean concentration (EMC), which represents the average concentration of the pollutant during an entire stormwater runoff event.

When evaluating stormwater EMC data, it is important to keep in mind that regional EMCs can differ sharply from the reported national pollutant EMCs. Differences in EMCs between regions are often attributed to the variation in the amount and frequency of rainfall and snowmelt.

4.2.2 Regional Differences Due to Rainfall

The frequency of rainfall is important, since it influences the accumulation of pollutants on IC that are subsequently available for wash-off during storm events. The USGS developed a national stormwater database encompassing 1,123 storms in 20 metropolitan areas and used it as the primary data source to define regional differences in stormwater EMCs. Driver (1988) performed regression analysis to determine which factors had the greatest influence on stormwater EMCs and determined that annual rainfall depth was the best overall predictor. Driver grouped together stormwater EMCs based on the depth of average annual rainfall, and Table 17 depicts the regional rainfall groupings and general trends for each region. Table 18 illustrates the distribution of stormwater EMCs for a range of rainfall regions from 13 local studies, based on other monitoring studies. In general, stormwater EMCs for nutrients, suspended sediment and metals tend to be higher in arid and semi-arid

Table 16: National EMCs for Stormwater Pollutants

Pollutant	Source	EMCs		Number of Events
		Mean	Median	
Sediments (mg/l)				
TSS	(1)	78.4	54.5	3047
Nutrients (mg/l)				
Total P	(1)	0.32	0.26	3094
Soluble P	(1)	0.13	0.10	1091
Total N	(1)	2.39	2.00	2016
TKN	(1)	1.73	1.47	2693
Nitrite & Nitrate	(1)	0.66	0.53	2016
Metals (Fg/l)				
Copper	(1)	13.4	11.1	1657
Lead	(1)	67.5	50.7	2713
Zinc	(1)	162	129	2234
Cadmium	(1)	0.7	N/R	150
Chromium	(4)	4	7	164
Hydrocarbons (mg/l)				
PAH	(5)	3.5	N/R	N/R
Oil and Grease	(6)	3	N/R	N/R
Bacteria and Pathogens (colonies/ 100ml)				
Fecal Coliform	(7)	15,038	N/R	34
Fecal Streptococci	(7)	35,351	N/R	17
Organic Carbon (mg/l)				
TOC	(11)	17	15.2	19 studies
BOD	(1)	14.1	11.5	1035
COD	(1)	52.8	44.7	2639
MTBE	(8)	N/R	1.6	592
Pesticides (Fg/l)				
Diazinon	(10)	N/R	0.025	326
	(2)	N/R	0.55	76
Chlorpyrifos	(10)	N/R	N/R	327
Atrazine	(10)	N/R	0.023	327
Prometon	(10)	N/R	0.031	327
Simazine	(10)	N/R	0.039	327
Chloride (mg/l)				
Chloride	(9)	N/R	397	282

Sources: [1] Smullen and Cave, 1998; [2] Brush et al., 1995; [3] Baird et al., 1996; [4] Bannerman et al., 1996; [5] Rabanal and Grizzard, 1995; [6] Crunkilton et al., 1996; [7] Schueler, 1999; [8] Delzer, 1996; [9] Environment Canada, 2001; [10] USEPA, 1998; [11] CWP, 2001a N/R - Not Reported

Table 17: Regional Groupings by Annual Rainfall Amount (Driver, 1988)			
Region	**Annual Rainfall**	**States Monitored**	**Concentration Data**
Region I: Low Rainfall	<20 inches	AK, CA, CO, NM, UT	Highest mean and median values for Total N, Total P, TSS and COD
Region II: Moderate Rainfall	20 40 inches	HA, IL, MI, MN, MI, NY, TX, OR, OH, WA, WI	Higher mean and median values than Region III for TSS, dissolved phosphorus and cadmium
Region III: High Rainfall	>40 inches	FL, MD, MA, NC, NH, NY, TX, TN, AR	Lower values for many parameters likely due to the frequency of storms and the lack of build up in pollutants

regions and tend to decrease slightly when annual rainfall increases (Table 19).

It is also hypothesized that a greater amount of sediment is eroded from pervious surfaces in arid or semi-arid regions than in humid regions due to the sparsity of protective vegetative cover. Table 19 shows that the highest concentrations of total suspended solids were recorded in regions with least rainfall. In addition, the chronic toxicity standards for several metals are most frequently exceeded during low rainfall regions (Table 20).

4.2.3 Cold Region Snowmelt Data

In colder regions, snowmelt can have a significant impact on pollutant concentrations. Snow accumulation in winter coincides with pollutant build-up; therefore, greater concentrations of pollutants are measured during snowmelt events. Sources of snowpack pollution in urban areas include wet and dry atmospheric deposition, traffic emissions, urban litter, deteriorated infrastructure, and deicing chemicals and abrasives (WERF, 1999).

Oberts *et al.* (1989) measured snowmelt pollutants in Minnesota streams and found that as much as 50% of annual sediment, nutrient, hydrocarbon and metal loads could be attributed to snowmelt runoff during late winter and early spring. This trend probably applies to any region where snow cover persists through much of the winter. Pollutants accumulate in the snowpack and then contribute high concentrations during snowmelt runoff. Oberts (1994) described four types of snowmelt runoff events and the resulting pollutant characteristics (Table 21).

A typical hydrograph for winter and early spring snow melts in a northern cold climate is portrayed in Figure 29. The importance of snowpack melt on peak runoff during March 1989 can clearly be seen for an urban watershed located in St. Paul, Minnesota.

Major source areas for snowmelt pollutants include snow dumps and roadside snowpacks. Pollutant concentrations in snow dumps can be as much as five times greater than typical stormwater pollutant concentrations (Environment Canada, 2001). Snow dumps and packs accumulate pollutants over the winter months and can release them during a few rain or snow melt events in the early spring. High levels of chloride, lead, phosphorus, biochemical oxygen demand, and total suspended solids have been reported in snow pack runoff (La Barre *et al*, 1973; Oliver *et al.*, 1974; Pierstorff and Bishop, 1980; Scott and Wylie, 1980; Van Loon, 1972).

Atmospheric deposition can add pollutants to snow piles and snowpacks. Deposited pollutants include trace metals, nutrients and particles that are primarily generated by fossil fuel combustion and industrial emissions (Boom and Marsalek, 1988; Horkeby and Malmqvist, 1977; Malmqvist, 1978; Novotny and Chester, 1981; Schrimpff and Herrman, 1979).

Table 18: Stormwater Pollutant Event Mean Concentration for Different U.S. Regions (Units: mg/l, except for metals which are in *F*g/l)

		Region I - Low Rainfall				Region II - Moderate Rainfall			Region III - High Rainfall				Snow
	National	Phoenix, AZ	San Diego, CA	Boise, ID	Denver, CO	Dallas, TX	Marquette, MI	Austin, TX	MD	Louisville, KY	GA	FL	MN
Reference	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(11)	(12)
Annual Rainfall (in.)	N/A	7.1"	10"	11"	15"	28"	32"	32"	41"	43"	51"	52"	N/R
Number of Events	3000	40	36	15	35	32	12	N/R	107	21	81	N/R	49
Pollutant													
TSS	78.4	227	330	116	242	663	159	190	67	98	258	43	112
Total N	2.39	3.26	4.55	4.13	4.06	2.70	1.87	2.35	N/R	2.37	2.52	1.74	4.30
Total P	0.32	0.41	0.7	0.75	0.65	0.78	0.29	0.32	0.33	0.32	0.33	0.38	0.70
Soluble P	0.13	0.17	0.4	0.47	N/R	N/R	0.04	0.24	N/R	0.21	0.14	0.23	0.18
Copper	14	47	25	34	60	40	22	16	18	15	32	1.4	N/R
Lead	68	72	44	46	250	330	49	38	12.5	60	28	8.5	100
Zinc	162	204	180	342	350	540	111	190	143	190	148	55	N/R
BOD	14.1	109	21	89	N/R	112	15.4	14	14.4	88	14	11	N/R
COD	52.8	239	105	261	227	106	66	98	N/R	38	73	64	112

Sources: Adapted from Caraco, 2000a: (1) Smullen and Cave, 1998; (2) Lopes et al.; 1995; (3) Schiff, 1996; (4) Kjelstrom, 1995 (computed); (5) DRCOG, 1983, (6) Brush et al., 1995; (7) Steuer et al., 1997; (8) Barrett et al., 1995; (9) Barr, 1997; (10) Evaldi et al., 1992; (11) Thomas and McClelland, 1995; (12) Oberts, 1994 N/R = Not Reported; N/A = Not Applicable

Table 19: Mean and Median Nutrient and Sediment Stormwater Concentrations for Residential Land Use Based on Rainfall Regions (Driver, 1988)

Region	Total N (median)	Total P (median)	TSS (mean)
Region I: Low Rainfall	4	0.45	320
Region II: Moderate Rainfall	2.3	0.31	250
Region III: High Rainfall	2.15	0.31	120

Table 20: EPA 1986 Water Quality Standards and Percentage of Metal Concentrations Exceeding Water Quality Standards by Rainfall Region (Driver, 1988)

	Cadmium	Copper	Lead	Zinc
EPA Standards	10 Fg/l	12 Fg/l	32 Fg/l	47 Fg/l
	Percent Exceedance of EPA Standards			
Region I: Low Rainfall	1.5%	89%	97%	97%
Region II: Moderate Rainfall	0	78%	89%	85%
Region III: High Rainfall	0	75%	91%	84%

Table 21: Runoff and Pollutant Characteristics of Snowmelt Stages (Oberts, 1994)

Snowmelt Stage	Duration /Frequency	Runoff Volume	Pollutant Characteristics
Pavement	Short, but many times in winter	Low	Acidic, high concentrations of soluble pollutants; Chloride, nitrate, lead; total load is minimal
Roadside	Moderate	Moderate	Moderate concentrations of both soluble and particulate pollutants
Pervious Area	Gradual, often most at end of season	High	Dilute concentrations of soluble pollutants; moderate to high concentrations of particulate pollutants depending on flow
Rain-on-Snow	Short	Extreme	High concentrations of particulate pollutants; moderate to high concentrations of soluble pollutants; high total load

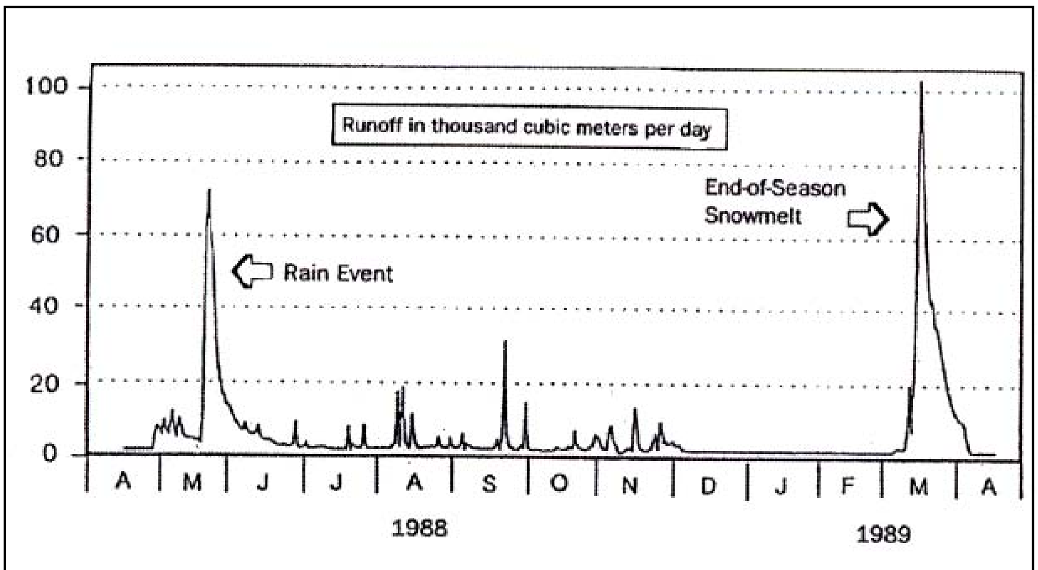


Figure 29: Snowmelt Runoff Hydrograph for Minneapolis Stream (Oberts, 1994)

4.3 Relationship Between Pollutant Loads and IC: The Simple Method

Urban stormwater runoff contains a wide range of pollutants that can degrade downstream water quality. The majority of stormwater monitoring research conducted to date supports several generalizations. First, the unit area pollutant load delivered to receiving waters by stormwater runoff increases in direct proportion to watershed IC. This is not altogether surprising, since pollutant load is the product of the average pollutant concentration and stormwater runoff volume. Given that runoff volume increases in direct proportion to IC, pollutant loads must automatically increase when IC increases, as long the average pollutant concentration stays the same (or increases). This relationship is a central assumption in most simple and complex pollutant loading models (Bicknell *et al.*, 1993; Donigian and Huber, 1991; Haith *et al.*, 1992; Novotny and Chester, 1981; NVPDC, 1987; Pitt and Voorhees, 1989).

Recognizing the relationship between IC and pollutant loads, Schueler (1987) developed the "Simple Method" to quickly and easily estimate stormwater pollutant loads for small urban watersheds (see Figure 30). Estimates of pollutant loads are important to watershed managers as they grapple with costly decisions on non-point source control. The Simple Method is empirical in nature and utilizes the extensive regional and national database (Driscoll, 1983; MWCOG, 1983; USEPA, 1983). Figure 30 provides the basic equations to estimate pollutant loads using the Simple

Figure 30: The Simple Method - Basic Equations

The Simple Method estimates pollutant loads as the product of annual runoff volume and pollutant EMC, as:

(1) $L = 0.226 * R * C * A$

Where: L = Annual load (lbs), and:
R = Annual runoff (inches)
C = Pollutant concentration in stormwater, EMC (mg/l)
A = Area (acres)
0.226 = Unit conversion factor

For bacteria, the equation is slightly different, to account for the differences in units. The modified equation for bacteria is:

(2) $L = 1.03 * 10^{-3} * R * C * A$

Where: L = Annual load (Billion Colonies), and:
R = Annual runoff (inches)
C = Bacteria concentration (#/100 ml)
A = Area (acres)
$1.03 * 10^{-3}$ = Unit conversion factor

Annual Runoff

The Simple Method calculates the depth of annual runoff as a product of annual runoff volume and a runoff coefficient (Rv). Runoff volume is calculated as:

(3) $R = P * P_j * Rv$

Where: R = Annual runoff (inches), and:
P = Annual rainfall (inches)
P_j = Fraction of annual rainfall events that produce runoff (usually 0.9)
Rv = Runoff coefficient

In the Simple Method, the runoff coefficient is calculated based on IC in the subwatershed. The following equation represents the best fit line for the data set (N=47, R^2=0.71).

(4) $Rv = 0.05 + 0.9Ia$

Where: Rv = runoff coefficient, and:
Ia = Impervious fraction

Method. It assumes that loads of stormwater pollutants are a direct function of watershed IC, as IC is the key independent variable in the equation.

The technique requires a modest amount of information, including the subwatershed drainage area, IC, stormwater runoff pollutant EMCs, and annual precipitation. With the Simple Method, the investigator can either divide up land use into specific areas (i.e. residential, commercial, industrial, and roadway) and calculate annual pollutant loads for each land use, or utilize a generic urban land use. Stormwater pollutant EMC data can be derived from the many summary tables of local, regional, or national monitoring efforts provided in this chapter (e.g., Tables 16, 18, 22, 28, 30, 35, 36, 40, and 44). The model also requires different IC values for separate land uses within a subwatershed. Representative IC data from Cappiella and Brown (2001) were provided in Table 2 (Chapter 1).

Additionally, the Simple Method should not be used to estimate annual pollutant loads of deicers, hydrocarbons and MTBE, because they have not been found to be correlated with IC. These pollutants have been linked to other indicators. Chlorides, hydrocarbons and MTBE are often associated with road density and vehicle miles traveled (VMT). Pesticides are associated with turf area, and traffic patterns and "hotspots" have been noted as potential indicators for hydrocarbons and MTBE.

Limitations of the Simple Method

The Simple Method should provide reasonable estimates of changes in pollutant export resulting from urban development. However, several caveats should be kept in mind when applying this method.

The Simple Method is most appropriate for assessing and comparing the relative stormflow pollutant load changes from different land uses and stormwater treatment scenarios. The Simple Method provides estimates of storm pollutant export that are probably close to the "true" but unknown value for a development site, catchment, or subwatershed. However, it is very important not to overemphasize the precision of the load estimate obtained. For example, it would be inappropriate to use the Simple Method to evaluate relatively similar development scenarios (e.g., 34.3% versus 36.9% IC). The Simple Method provides a general planning estimate of likely storm pollutant export from areas at the scale of a development site, catchment or subwatershed. More sophisticated modeling is needed to analyze larger and more complex watersheds.

In addition, the Simple Method only estimates pollutant loads generated during storm events. It does not consider pollutants associated with baseflow during dry weather. Typically, baseflow is negligible or non-existent at the scale of a single development site and can be safely neglected. However, catchments and subwatersheds do generate significant baseflow volume. Pollutant loads in baseflow are generally low and can seldom be distinguished from natural background levels (NVPDC, 1979).

Consequently, baseflow pollutant loads normally constitute only a small fraction of the total pollutant load delivered from an urban area. Nevertheless, it is important to remember that the load estimates refer only to storm event derived loads and should not be confused with the total pollutant load from an area. This is particularly important when the development density of an area is low. For example, in a low density residential subwatershed (IC < 5%), as much as 75% of the annual runoff volume could occur as baseflow. In such a case, annual baseflow load may be equivalent to the annual stormflow load.

4.4 Sediment

Sediment is an important and ubiquitous pollutant in urban stormwater runoff. Sediment can be measured in three distinct ways: Total Suspended Solids (TSS), Total Dissolved Solids (TDS) and turbidity. TSS is a measure of the total mass suspended sediment particles in water. The measurement of TSS in urban stormwater helps to estimate sediment load transported to local and downstream receiving waters. Table 22 summarizes stormwater EMCs for total suspended solids, as reported by Barrett *et al.* (1995), Smullen and Cave (1998), and USEPA (1983). TDS is a measure of the dissolved solids and minerals present in stormwater runoff and is used as a primary indication of the purity of drinking water. Since few stormwater monitoring efforts have focused on TDS, they are not reported in this document. Turbidity is a measure of how suspended solids present in water reduce the ability of light to penetrate the water column. Turbidity can exert impacts on aquatic biota, such as the ability of submerged aquatic vegetation to receive light and the ability of fish and aquatic insects to use their gills (Table 23).

4.4.1 Concentrations

TSS concentrations in stormwater across the country are well documented. Table 18 reviews mean TSS EMCs from 13 communities across the country and reveals a wide range of recorded concentrations. The lowest concentration of 43 mg/l was reported in Florida, while TSS reached 663 mg/l in Dallas, Texas. Variation in sediment concentrations has been attributed to regional rainfall differences (Driver, 1988); construction site runoff (Leopold, 1968); and bank erosion (Dartiguenave *et al.*, 1997). National values are provided in Table 22.

Turbidity levels are not as frequently reported in national and regional monitoring summaries. Barrett and Malina (1998) monitored turbidity at two sites in Austin, Texas and reported a mean turbidity of 53 NTU over 34 storm events (Table 22).

4.4.2 Impacts of Sediment on Streams

The impacts of sediment on aquatic biota are well documented and can be divided into impacts caused by suspended sediment and those caused by deposited sediments (Tables 23 and 24).

In general, high levels of TSS and/or turbidity can affect stream habitat and cause sedimentation in downstream receiving waters. Deposited sediment can cover benthic organisms such as aquatic insects and freshwater mussels. Other problems associated with high sediments loads include stream warming by reflecting radiant energy due to increased turbidity (Kundell and Rasmussen, 1995), decreased flow capacity (Leopold, 1973), and increasing overbank flows (Barrett and Malina, 1998). Sediments also transport other pollutants which bind to sediment particles. Significant levels of pollutants can be transported by sediment during stormwater runoff events,

Table 22: EMCs for Total Suspended Solids and Turbidity

Pollutant	EMCs		Number of Events	Source
	Mean	Median		
TSS (mg/l)	78.4	54.5	3047	Smullen and Cave, 1998
	174	113	2000	USEPA, 1983
Turbidity (NTU)	53	N/R	423	Barrett and Malina, 1998

N/R = Not Reported

Table 23: Summary of Impacts of Suspended Sediment on the Aquatic Environment (Schueler and Holland, 2000)
Abrades and damages fish gills, increasing risk of infection and disease
Scouring of periphyton from stream (plants attached to rocks)
Loss of sensitive or threatened fish species when turbidity exceeds 25 NTU
Shifts in fish community toward more sediment-tolerant species
Decline in sunfish, bass, chub and catfish when month turbidity exceeds 100 NTU
Reduces sight distance for trout, with reduction in feeding efficiency
Reduces light penetration causing reduction in plankton and aquatic plant growth
Adversely impacts aquatic insects, which are the base of the food chain
Slightly increases the stream temperature in the summer
Suspended sediments can be a major carrier of nutrients and metals
Reduces anglers chances of catching fish

Table 24: Summary of Impacts of Deposited Sediments on the Aquatic Environment (Schueler and Holland, 2000)
1. Physical smothering of benthic aquatic insect community
2. Reduced survival rates for fish eggs
3. Destruction of fish spawning areas and eggs
4. Embeddedness of stream bottom reduced fish and macroinvertebrate habitat value
5. Loss of trout habitat when fine sediments are deposited in spawning or riffle-runs
6. Sensitive or threatened darters and dace may be eliminated from fish community
7. Increase in sediment oxygen demand can deplete dissolved oxygen in streams
8. Significant contributing factor in the alarming decline of freshwater mussels
9. Reduced channel capacity, exacerbating downstream bank erosion and flooding
10. Reduced flood transport capacity under bridges and through culverts
11. Deposits diminish scenic and recreational values of waterways

including trace metals, hydrocarbons and nutrients (Crunkilton *et al.,* 1996; Dartiguenave *et al*., 1997; Gavin and Moore, 1982; Novotny and Chester, 1989; Schueler 1994b).

4.4.3 Sources and Source Areas of Sediment

Sediment sources in urban watersheds include stream bank erosion; erosion from exposed soils, such as from construction sites; and washoff from impervious areas (Table 25).

As noted in this chapter, streambank erosion is generally considered to be the primary source of sediment to urban streams. Recent studies by Dartiguenave *et al.* (1997) and Trimble (1997) determined that streambank erosion contributes the majority of the annual sediment budget of urban streams. Trimble (1997) directly measured stream cross sections, sediment aggradation and suspended sediment loads and determined that two-thirds of the annual sediment budget of a San Diego, California watershed was supplied by streambank erosion. Dartiguenave *et al.* (1997) developed a GIS based model in Austin, Texas to determine the effects of stream bank erosion on the annual sediment budget. They compared modeled sediment loads from the watershed with the actual sediment loads measured at USGS gaging stations and concluded that more than 75% of the sediment load came from streambank erosion. Dartiguenave *et al.* (1997) reported that sediment load per unit area increases with increasing IC (Figure 31).

Sediment loads are also produced by washoff of sediment particles from impervious areas and their subsequent transport in stormwater runoff sediment. Source areas include parking lots, streets, rooftops, driveways and lawns. Streets and parking lots build up dirt and grime from the wearing of the street surface, exhaust particulates, "blown on" soil and organic matter, and atmospheric deposition. Lawn runoff primarily contains soil and organic matter. Urban source areas that produce the highest TSS concentrations include streets, parking lots and lawns (Table 26).

Parking lots and streets are not only responsible for high concentrations of sediment but also high runoff volumes. The SLAMM source loading model (Pitt and Voorhees, 1989) looks at runoff volume and concentrations of pollutants from different urban land uses and predicts stream loading. When used in the Wisconsin and Michigan subwatersheds, it demonstrated that parking lots and streets were responsible for over 70% of the TSS delivered to the stream. (Steuer *et al.*, 1997; Waschbusch *et al.*, 2000).

Table 25: Sources and Loading of Suspended Solids Sediment in Urban Areas

Sources	Loading	Source
Bank Erosion	75% of stream sediment budget	Dartinguenave *et al.*, 1997
	66% of stream sediment budget	Trimble, 1997
Overland Flow- Lawns	397 mg/l (geometric mean)	Bannerman *et al.*, 1993
	262 mg/l	Steuer *et al.*, 1997
	11.5% (estimated; 2 sites)	Waschbusch *et al.*, 2000
Construction Sites	200 to 1200 mg/l	Table 27
Washoff from Impervious Surfaces	78 mg/l (mean)	Table 16

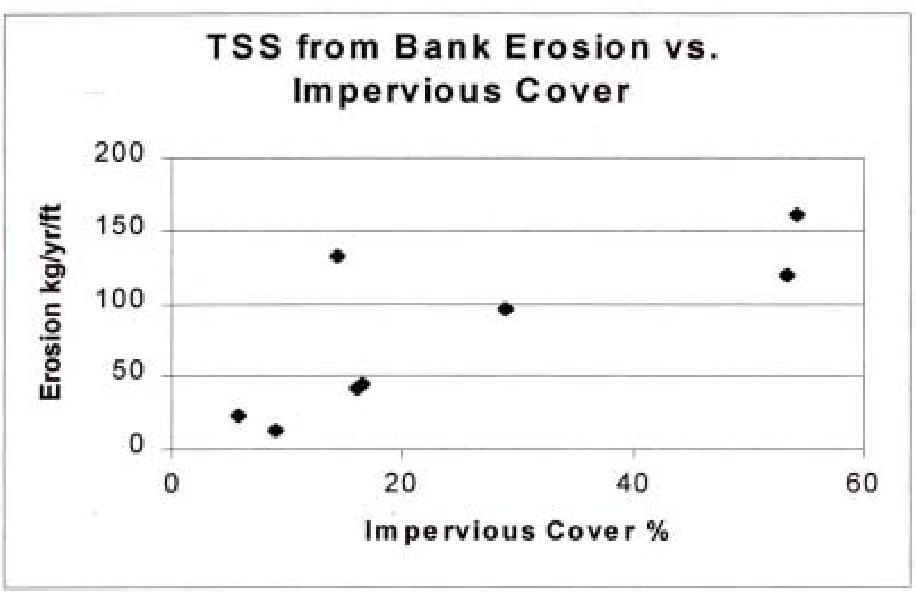


Figure 31: TSS from Bank Erosion vs. IC in Texas Streams (Daringuenave *et al.*, 1997)

The third major source of sediment loads is erosion from construction sites. Several studies have reported extremely high TSS concentrations in construction site runoff, and these findings are summarized in Table 27. TSS concentrations from uncontrolled construction sites can be more than 150 times greater than those from undeveloped land (Leopold, 1968) and can be reduced if erosion and sediment control practices are applied to construction sites.

Table 26: Source Area Geometric Mean Concentrations for Suspended Solids in Urban Areas

Source Area	Suspended Solids (mg/l)		
Source	(1)	(2)	(3)
Commercial Parking Lot	110	58	51
High Traffic Street	226	232	65
Medium Traffic Street	305	326	51
Low Traffic Street	175	662	68
Commercial Rooftop	24	15	18
Residential Rooftop	36	27	15
Residential Driveway	157	173	N/R
Residential Lawn	262	397	59

Sources: (1) Steuer et al., 1997; (2) Bannerman et al., 1993; (3) Waschbusch et al., 2000; N/R = Not Reported

Table 27: Mean TSS Inflow and Outflow at Uncontrolled, Controlled and Simulated Construction Sites

Source	Mean Inflow TSS Concentration (mg/l)	Mean Outflow TSS Concentration (mg/l)	Location
Uncontrolled Sites			
Horner *et al.*, 1990	7,363	281	PNW
Schueler and Lugbill,1990	3,646	501	MD
York and Herb, 1978	4,200	N/R	MD
Islam *et al.*, 1988	2,950	N/R	OH
Controlled Sites			
Schueler and Lugbill, 1990	466	212	MD
Simulated Sediment Concentrations			
Jarrett, 1996	9,700	800	PA
Sturm and Kirby, 1991	1,500-4,500	200-1,000	GA
Barfield and Clar, 1985	1,000-5,000	200-1,200	MD
Dartiguenave *et al.*, 1997	N/R	600	TX

N/R = Not Reported

4.5 Nutrients

Nitrogen and phosphorus are essential nutrients for aquatic systems. However, when they appear in excess concentrations, they can exert a negative impact on receiving waters. Nutrient concentrations are reported in several ways. Nitrogen is often reported as nitrate (NO_3) and nitrite (NO_2), which are inorganic forms of nitrogen; total nitrogen (Total N), which is the sum of nitrate, nitrite, organic nitrogen and ammonia; and total Kjeldhal nitrogen (TKN), which is organic nitrogen plus ammonia.

Phosphates are frequently reported as soluble phosphorus, which is the dissolved and reactive form of phosphorus that is available for uptake by plants and animals. Total phosphorus (Total P) is also measured, which includes both organic and inorganic forms of phosphorus. Organic phosphorus is derived from living plants and animals, while inorganic phosphate is comprised of phosphate ions that are often bound to sediments.

4.5.1 Concentrations

Many studies have indicated that nutrient concentrations are linked to land use type, with urban and agricultural watersheds producing the highest nutrient loads (Chessman *et al.* 1992; Paul *et al.*, 2001; USGS, 2001b and Wernick *et al.*,1998). Typical nitrogen and phosphorus EMC data in urban stormwater runoff are summarized in Table 28.

Some indication of the typical concentrations of nitrate and phosphorus in stormwater runoff are evident in Figures 32 and 33. These graphs profile average EMCs in stormwater runoff recorded at 37 residential catchments across the U.S. The average nitrate EMC is remarkably consistent among residential neighborhoods, with most clustered around the mean of 0.6 mg/l and a range of 0.25 to 1.4 mg/l. The concentration of phosphorus during storms is also very consistent with a mean of 0.30 mg/l and a rather tight range of 0.1 to 0.66 mg/l (Schueler, 1995).

The amount of annual rainfall can also influence the magnitude of nutrient concentrations in stormwater runoff. For example, both Caraco (2000a) and Driver (1988) reported that the highest nutrient EMCs were found in stormwater from arid or semi-arid regions.

Table 28: EMCs of Phosphorus and Nitrogen Urban Stormwater Pollutants

Pollutant	EMCs (mg/l)		Number of Events	Source
	Mean	Median		
Total P	0.315	0.259	3094	Smullen and Cave, 1998
	0.337	0.266	1902	USEPA, 1983
Soluble P	0.129	0.103	1091	Smullen and Cave, 1998
	0.1	0.078	767	USEPA, 1983
Total N	2.39	2.00	2016	Smullen and Cave, 1998
	2.51	2.08	1234	USEPA, 1983
TKN	1.73	1.47	2693	Smullen and Cave, 1998
	1.67	1.41	1601	USEPA, 1983
Nitrite & Nitrate	0.658	0.533	2016	Smullen and Cave, 1998
	0.837	0.666	1234	USEPA, 1983

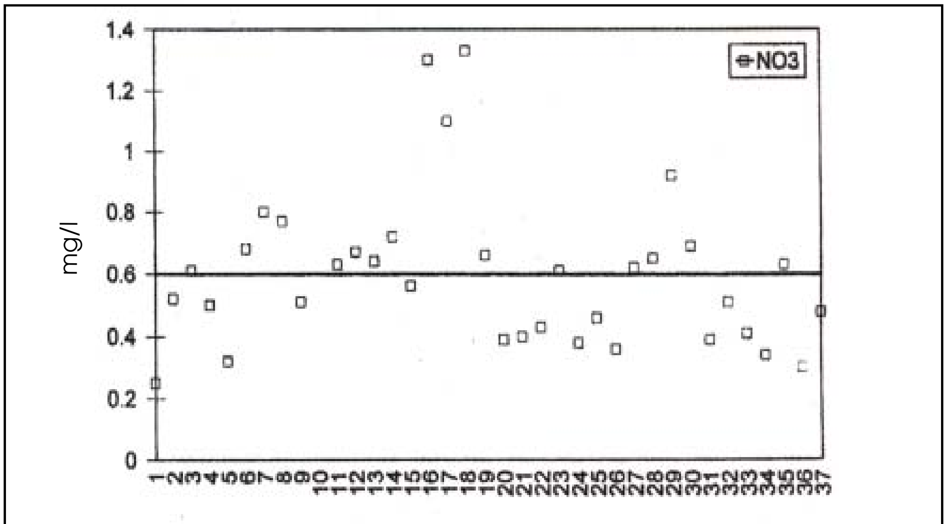


Figure 32: Nitrate-Nitrogen Concentration in Stormwater Runoff at 37 Sites Nationally (Schueler, 1999)

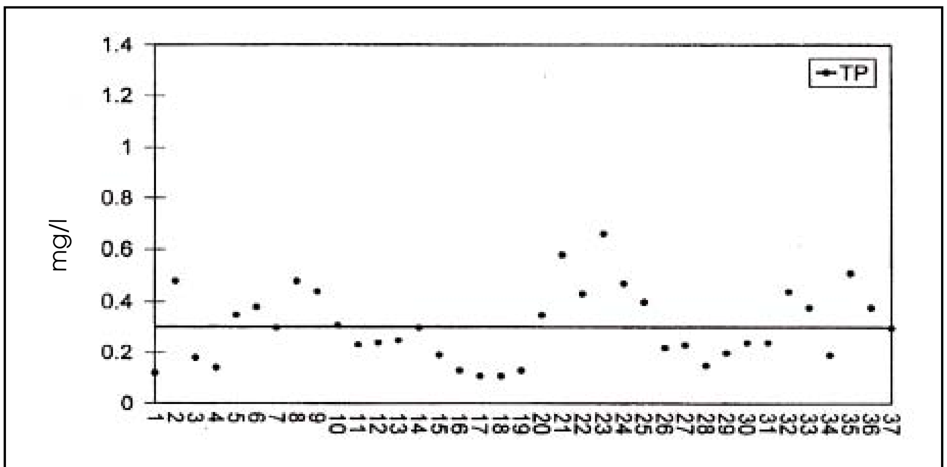


Figure 33: Total Phosphorus Concentration in Stormwater at 37 Sites Nationally (Schueler, 1999)

4.5.2 Impacts of Nutrients on Streams

Much research on the impact of nutrient loads has been focused on lakes, reservoirs and estuaries, which can experience eutrophication. Nitrogen and phosphorus can contribute to algae growth and eutrophic conditions, depending on which nutrient limits growth (USEPA, 1998). Dissolved oxygen is also affected by eutrophication. When algae or aquatic plants that are stimulated by excess nutrients die off, they are broken down by bacteria, which depletes the oxygen in the water. Relatively few studies have specifically explored the impact of nutrient enrichment on urban streams. Chessman *et al*. (1992) studied the limiting nutrients for periphyton growth in a variety of streams and noted that the severity of eutrophication was related to low flow conditions. Higher flow rates in streams may cycle nutrients faster than in slow flow rates, thus diminishing the extent of stream eutrophication.

4.5.3 Sources and Source Areas of Nutrients

Phosphorus is normally transported in surface water attached to sediment particles or in soluble forms. Nitrogen is normally transported by surface water runoff in urban watersheds. Sources for nitrogen and phosphorus in urban stormwater include fertilizer, pet waste, organic matter (such as leaves and detritus), and stream bank erosion. Another significant source of nutrients is atmospheric deposition. Fossil fuel combustion by automobiles, power plants and industry can supply nutrients in both wet fall and dry fall. The Metropolitan Washington Council of Governments (MWCOG, 1983) estimated total annual atmospheric deposition rates of 17 lbs/ac for nitrogen and 0.7 lbs/ac for phosphorus in the Washington, D.C. metro area.

Research from the upper Midwest suggests "hot spot" sources can exist for both nitrogen and phosphorus in urban watersheds. Lawns, in particular, contribute greater concentrations of Total N, Total P and dissolved phosphorus than other urban source areas. Indeed, source research suggests that nutrient concentrations in lawn runoff can be as much as four times greater than other urban sources such as streets, rooftops or driveways (Bannerman *et al.*, 1993; Steuer *et al.*, 1997 and Waschbusch *et al.*, 2000) (Table 29). This finding is significant, since lawns can comprise more than 50% of the total area in suburban watersheds. Lawn care, however, has seldom been directly linked to elevated nutrient concentrations during storms. A very recent lakeshore study noted that phosphorus concentrations were higher in fertilized lawns compared to unfertilized lawns, but no significant difference was noted for nitrogen (Garn, 2002).

Wash-off of deposited nutrients from IC is thought to be a major source of nitrogen and phosphorus during storms (MWCOG, 1983). While the concentration of nitrogen and phosphorus from parking lots and streets is lower than lawns, the volume of runoff is significantly higher. In two studies using the SLAMM source loading model (Pitt and Voorhees, 1989), parking lots and streets were responsible for over 30% of the nitrogen and were second behind lawns in their contributions to the phosphorus load (Steuer *et al.*, 1997; Waschbusch *et al.*, 2000).

Table 29: Source Area Monitoring Data for Total Nitrogen and Total Phosphorous in Urban Areas

Source Area	Total N (mg/l)	Total P (mg/l)		
Source	(1)	(1)	(2)	(3)
Commercial Parking Lot	1.94	0.20	N/R	0.10
High Traffic Street	2.95	0.31	0.47	0.18
Med. Traffic Street	1.62	0.23	1.07	0.22
Low Traffic Street	1.17	0.14	1.31	0.40
Commercial Rooftop	2.09	0.09	0.20	0.13
Residential Rooftop	1.46	0.06	0.15	0.07
Residential Driveway	2.10	0.35	1.16	N/R
Residential Lawn	9.70	2.33	2.67	0.79
Basin Outlet	1.87	0.29	0.66	N/R

(1) Steuer et al., 1997; (2) Bannerman et al., 1993; (3) Waschbusch et al., 2000; N/R= Not Reported

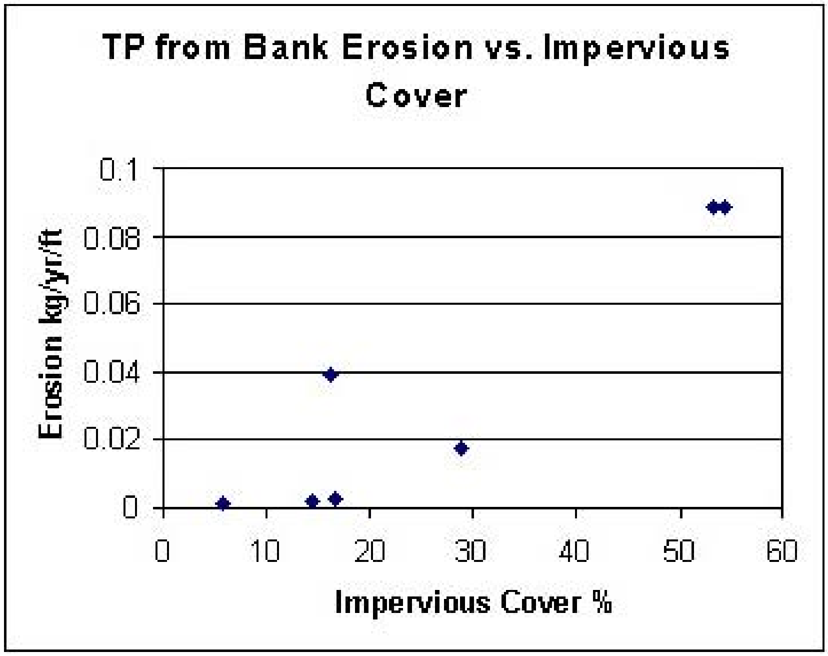


Figure 34: Total Phosphorus from Bank Erosion as a Function of IC in Texas Streams (Dartiguenave *et al.*, 1997)

Streambank erosion also appears to be a major source of nitrogen and phosphorus in urban streams. Both nitrogen and phosphorus are often attached to eroded bank sediment, as indicated in a recent study by Dartiguenave *et al.* (1997) in Austin, Texas. They showed that channel erosion contributed nearly 50% of the Total P load shown for subwatersheds with IC levels between 10 and 60 % (Figure 34). These findings suggest that prevention or reduction of downstream channel erosion may be an important nutrient reduction strategy for urban watersheds.

Snowmelt runoff generally has higher nutrient EMCs, compared to stormwater runoff. Oberts (1994) found that TKN and nitrate EMCs were much higher in snowmelt at all sites. The same pattern has also been observed for phosphorus EMCs during snowmelt and stormwater runoff. Zapf-Gilje *et al*. (1986) found that the first 20% of snowmelt events contained 65% of the phosphorus and 90% of the nitrogen load. Ayers *et al.* (1985) reported that a higher percentage of the annual nitrate, TKN and phosphorus load was derived from snowmelt runoff compared to stormwater runoff in an urban Minnesota watershed, which presumably reflects the accumulation of nutrients in the snowpack during the winter.

4.6 Trace Metals

Many trace metals can be found at potentially harmful concentrations in urban stormwater. Certain metals, such as zinc, copper, lead, cadmium and chromium, are consistently present at concentrations that may be of concern. These metals primarily result from the use of motor vehicles, weathering of metals and paints, burning of fossil fuels and atmospheric deposition.

Metals are routinely reported as the total recoverable form or the dissolved form. The dissolved form refers to the amount of metal dissolved in the water, which excludes metals attached to suspended particles that cannot pass through a 0.45 micron filter. Total recoverable refers to the concentration of an unfiltered sample that is treated with hot dilute mineral acid. In general, the toxicity of metals is related more to the dissolved form than the recoverable form.

4.6.1 Concentrations

Stormwater EMCs for zinc, copper, lead, cadmium and chromium vary regionally and are reviewed in Table 30. Regional differences in trace metal concentrations and water quality standard exceedence appears to be related to climate. In general, drier regions often have a

Table 30: EMCs and Detection Frequency for Metals in Urban Stormwater

Metal	Detection Frequency[1]	EMCs (Fg/l)		Number of Events	Source
		Mean	Median		
Zinc	94%	162	129	2234	Smullen and Cave, 1998
		176	140	1281	USEPA, 1983
Copper	91%	13.5	11.1	1657	Smullen and Cave, 1998
		66.6	54.8	849	USEPA, 1983
Lead	94%	67.5	50.7	2713	Smullen and Cave, 1998
		175[2]	131 [2]	1579	USEPA, 1983
Cadmium	48%	0.7	N/R	150	USEPA, 1983
		0.5	N/R	100	USEPA, 1993
		N/R	0.75 **R** 0.96 **C** 2.1 **I**	30	Baird *et al.*, 1996
		3 **I** 1**U**	N/R	9	Doerfer and Urbonas, 1993
Chromium	58%	4	N/R	32	Baird *et al.*, 1996
		N/R	2.1 **R** 10 **C** 7 **I**	30	Baird *et al.*, 1996
		N/R	7	164	Bannerman *et al.*, 1993

N/R = Not Reported; R- Residential, C- Commercial, I- Industrial; (1) as reprinted in USEPA, 1983; (2) Lead levels have declined over time with the introduction of unleaded gasoline

Table 31: Average Total Recoverable and Dissolved Metals for 13 Stormwater Flows and Nine Baseflow Samples from Lincoln Creek in 1994 (Crunkilton *et al.*, 1996)

	Total Recoverable		Dissolved	
Metal (Fg/l)	Storm Flow	Baseflow	Storm Flow	Baseflow
Lead	35	3	1.7	1.2
Zinc	133	22	13	8
Copper	23	7	5	4
Cadmium	0.6	0.1	0.1	0.1

higher risk of exceeding trace metal concentration standards.

Crunkilton *et al.* (1996) measured recoverable and dissolved metals concentrations in Lincoln Creek, Wisconsin and found higher EMCs during storm events compared to baseflow periods (Table 31). They also found that total recoverable metal concentrations were almost always higher than the dissolved concentration (which is the more available form).

4.6.2 Impacts of Trace Metals on Streams

Although a great deal is known about the concentration of metals in urban stormwater, much less is known about their possible toxicity on aquatic biota. The primary concern related to the presence of trace metals in streams is their potential toxicity to aquatic organisms. High concentrations can lead to bioaccumulation of metals in plants and animals, possible chronic or acute toxicity, and contamination of sediments, which can affect bottom dwelling organisms (Masterson and Bannerman, 1994). Generally, trace metal concentrations found in urban stormwater are not high enough to cause acute toxicity (Field and Pitt, 1990). The cumulative accumulation of trace metal concentrations in bottom sediments and animal tissues are of greater concern. Some evidence exists for trace metal accumulation in bottom sediments of receiving waters and for bioaccumulation in aquatic species (Bay and Brown, 2000 and Livingston, 1996).

Relatively few studies have examined the chronic toxicity issue. Crunkilton *et al.* (1996) found that concentrations of lead, zinc and copper exceeded EPA's Chronic Toxicity Criteria more than 75% of the time in stormflow in stormwater samples for Lincoln Creek in Wisconsin. When exposed to storm and base flows in Lincoln Creek, *Ceriodaphnia dubia*, a common invertebrate test species, demonstrated significant mortality in extended flow-through tests. Around 30% mortality was recorded after seven days of exposure and 70% mortality was recorded after 14 days.

Crunkilton *et al.* (1996) also found that significant mortality in bullhead minnows occurred in only 14% of the tests by the end of 14 days, but mortality increased to 100% during exposures of 17 to 61 days (see Table 32). In a related study in the same watershed, Masterson and Bannerman (1994) determined that crayfish in Lincoln Creek had elevated levels of lead, cadmium, chromium and copper when compared to crayfish from a reference stream. The Lincoln Creek research provides limited evidence that prolonged exposure to trace metals in urban streams may result in significant toxicity.

Most toxicity research conducted on urban stormwater has tested for acute toxicity over a short period of time (two to seven days). Shorter term whole effluent toxicity protocols are generally limited to seven days (Crunkilton *et al.*, 1996). Research by Ellis (1986) reported delayed toxicity in urban streams. Field and Pitt (1990) demonstrated that pollutants deposited to the stream during storm events may take upwards of 10 to 14 days to exert influence. The research suggests that longer term in-situ and flow-through monitoring are needed to definitively answer the question whether metal levels in stormwater can be chronically toxic.

An additional concern is that trace metals co-occur with other pollutants found in urban stormwater, and it is not clear whether they interact to increase or decrease potential toxicity. Hall and Anderson (1988) investigated the toxicity and chemical composition of urban stormwater runoff in British Columbia and found that the interaction of pollutants changed the toxicity of some metals. In laboratory analysis with *Daphnia pulex*, an aquatic invertebrate, they found that the toxicity of iron was low and that its presence reduced the toxicity of other metals. On the other hand, the presence of lead increased the toxicity of copper and zinc.

Interaction with sediment also influences the impact of metals. Often, over half of the trace metals are attached to sediment (MWCOG, 1983). This effectively removes the metals from the water column and reduces the availability for biological uptake and subsequent bioaccumulation (Gavin and Moore, 1982 and OWML, 1983). However, metals accumulated in bottom sediment can then be resuspended during storms (Heaney and Huber, 1978). It is important to note that the toxic effect of metals can be altered when found in conjunction with other substances. For instance, the presence of chlorides can increase the toxicity of some metals. Both metals and chlorides are common pollutants in snowpacks (see section 4.2 for more snow melt information).

4.6.3 Sources and Source Areas of Trace Metals

Research conducted in the Santa Clara Valley of California suggests that cars can be the dominant loading source for many metals of concern, such as cadmium, chromium, copper, lead, mercury and zinc (EOA, Inc., 2001). Other sources are also important and include atmospheric deposition, rooftops and runoff from industrial and residential sites.

The sources and source areas for zinc, copper, lead, chromium and cadmium are listed in Table 33. Source areas for trace metals in the urban environment include streets, parking lots, snowpacks and rooftops. Copper is often found in higher concentrations on urban streets, because some vehicles have brake pads that contain copper. For example, the Santa Clara study estimated that 50% of the total copper load was due to brake pad wear (Woodward-Clyde, 1992). Sources of lead include atmospheric deposition and diesel fuel emissions, which frequently occur along rooftops

Table 32: Percentage of In-situ Flow-through Toxicity Tests Using Daphnia *magna* and Pimephales *promelas* with Significant Toxic Effects from Lincoln Creek (Crunkilton *et al.*, 1996)

Species	Effect	Percent of Tests with Significant (p<0.05) Toxic Effects as Compared to Controls According to Exposure				
		48 hours	96 hours	7 days	14 days	17-61 days
D. *magna*	Mortality	0	N/R	36%	93%	N/R
	Reduced Reproduction	0	N/R	36%	93%	N/R
P. *promelas*	Mortality	N/R	0	0	14%	100%
	Reduced Biomass	N/R	N/R	60%	75%	N/R

N/R = Not Reported

and streets. Zinc in urban environments is a result of the wear of automobile tires (estimated 60% in the Santa Clara study), paints, and weathering of galvanized gutters and downspouts. Source area concentrations of trace metals are presented in Table 34. In general, trace metal concentrations vary considerably, but the relative rank among source areas remains relatively constant. For example, a source loading model developed for an urban watershed in Michigan estimated that parking lots, driveways and residential streets were the primary source areas for zinc, copper and cadmium loads (Steuer *et al.*, 1997).

Table 33: Metal Sources and Source Area "Hotspots" in Urban Areas

Metal	Sources	Source Area Hotspots
Zinc	tires, fuel combustion, galvanized pipes, roofs and gutters, road salts **estimate of 60% from tires*	parking lots, commercial and industrial rooftops, and streets
Copper	auto brake linings, pipes and fittings, algacides, and electroplating **estimate of 50% from brake pad wear*	parking lots, commercial roofs and streets
Lead	diesel fuel, paints and stains	parking lots, rooftops, and streets
Cadmium	component of motor oil and corrodes from alloys and plated surfaces	parking lots, rooftops, and streets
Chromium	found in exterior paints and corrodes from alloys and plated surfaces	most frequently found in industrial and commercial runoff

Sources: Bannerman et al., 1993; Barr, 1997; Steuer et al., 1997; Good, 1993; Woodward - Clyde, 1992

Table 34: Metal Source Area Concentrations in the Urban Landscape (Fg/l)

Source Area	Dissolved Zinc	Total Zinc	Dissolved Copper		Total Copper	Dissolved Lead		Total Lead		
Source	(1)	(2)	(1)	(2)	(2)	(1)	(3)	(1)	(3)	(2)
Commercial Parking Lot	64	178	10.7	9	15	N/R	N/R	40	N/R	22
High Traffic Street	73	508	11.2	18	46	2.1	1.7	37	25	50
Medium Traffic Street	44	339	7.3	24	56	1.5	1.9	29	46	55
Low Traffic Street	24	220	7.5	9	24	1.5	.5	21	10	33
Commercial Rooftop	263	330	17.8	6	9	20	N/R	48	N/R	9
Residential Rooftop	188	149	6.6	10	15	4.4	N/R	25	N/R	21
Residential Driveway	27	107	11.8	9	17	2.3	N/R	52	N/R	17
Residential Lawn	N/R	59	N/R	13	13	N/R	N/R	N/R	N/R	N/R
Basin Outlet	23	203	7.0	5	16	2.4	N/R	49	N/R	32

Sources: (1) Steuer et al., 1997; (2) Bannerman et al., 1993; (3) Waschbusch, 2000; N/R = Not Reported

4.7 Hydrocarbons: PAH, Oil and Grease

Hydrocarbons are petroleum-based substances and are found frequently in urban stormwater. The term "hydrocarbons" is used to refer to measurements of oil and grease and polycyclic-aromatic hydrocarbons (PAH). Certain components of hydrocarbons, such as pyrene and benzo[b]fluoranthene, are carcinogens and may be toxic to biota (Menzie-Cura , 1995). Hydrocarbons normally travel attached to sediment or organic carbon. Like many pollutants, hydrocarbons accumulate in bottom sediments of receiving waters, such as urban lakes and estuaries. Relatively few studies have directly researched the impact of hydrocarbons on streams.

4.7.1 Concentrations

Table 35 summarizes reported EMCs of PAH and oil and grease derived from storm event monitoring at three different areas of the U.S. The limited research on oil and grease concentrations in urban runoff indicated that the highest concentrations were consistently found in commercial areas, while the lowest were found in residential areas.

4.7.2 Impacts of Hydrocarbons on Streams

The primary concern of PAH and oil and grease on streams is their potential bioaccumulation and toxicity in aquatic organisms. Bioaccumulation in crayfish, clams and fish has been reported by Masterson and Bannerman (1994); Moring and Rose (1997); and Velinsky and Cummins (1994).

Table 35: Hydrocarbon EMCs in Urban Areas

Hydrocarbon Indicator	EMC Mean	Number of Events	Source	Location
PAH (Fg/l)	3.2*	12	Menzie-Cura, 1995	MA
	7.1	19	Menzie-Cura, 1995	MA
	13.4	N/R	Crunkilton *et al.*, 1996	WI
Oil and Grease (mg/l)	1.7 **R**** 9 **C** 3 **I**	30	Baird *et al.*, 1996	TX
	3	N/R	USEPA, 1983	U.S.
	5.4*	8	Menzie-Cura, 1995	MA
	3.5	10	Menzie-Cura, 1995	MA
	3.89 **R** 13.13 **C** 7.10 **I**	N/R	Silverman *et al.*, 1988	CA
	2.35 **R** 5.63 **C** 4.86 **I**	107	Barr, 1997	MD

*N/R = Not Reported; R = Residential, C = Commercial, I = Industrial; * = geometric mean, ** = median*

Moring and Rose (1997) also showed that not all PAH compounds accumulate equally in urban streams. They detected 24 different PAH compounds in semi-permeable membrane devices (SPMDs), but only three PAH compounds were detected in freshwater clam tissue. In addition, PAH levels in the SPMDs were significantly higher than those reported in the clams.

While acute PAH toxicity has been reported at extremely high concentrations (Ireland *et al.*, 1996), delayed toxicity has also been found (Ellis, 1986). Crayfish from Lincoln Creek had a PAH concentration of 360 Fg/kg, much higher than the concentration thought to be carcinogenic (Masterson and Bannerman, 1994). By comparison, crayfish in a non-urban stream had undetectable PAH levels. Toxic effects from PAH compounds may be limited since many are attached to sediment and may be less available, with further reduction occurring through photodegradation (Ireland *et al.,* 1996).

The metabolic effect of PAH compounds on aquatic life is unclear. Crunkilton *et al.* (1996) found potential metabolic costs to organisms, but Masterson and Bannerman (1994) and MacCoy and Black (1998) did not. The long-term effect of PAH compounds in sediments of receiving waters remains a question for further study.

4.7.3 Sources and Source Areas of Hydrocarbons

In most residential stormwater runoff, hydrocarbon concentrations are generally less than 5mg/l, but the concentrations can increase to five to 10 mg/l within some commercial, industrial and highway areas (See Table 35). Specific "hotspots" for hydrocarbons include gas stations, commuter parking lots, convenience stores, residential parking areas and streets (Schueler and Shepp, 1993). These authors evaluated hydrocarbon concentrations within oil and grease separators in the Washington Metropolitan area and determined that gas stations had significantly higher concentrations of hydrocarbons and trace metals, as compared to other urban source areas. Source area research in an urban catchment in Michigan showed that commercial parking lots contributed 64% of the total hydrocarbon load (Steuer *et al.*, 1997). In addition, highways were found to be a significant contributor of hydrocarbons by Lopes and Dionne (1998).

4.8 Bacteria and Pathogens

Bacteria are single celled organisms that are too small to see with the naked eye. Of particular interest are coliform bacteria, typically found within the digestive system of warm-blooded animals. The coliform family of bacteria includes fecal coliform, fecal streptococci and Escherichia coli, which are consistently found in urban stormwater runoff. Their presence confirms the existence of sewage or animal wastes in the water and indicates that other harmful bacteria, viruses or protozoans may be present, as well. Coliform bacteria are indicators of potential public health risks and not actual causes of disease.

A pathogen is a microbe that is actually known to cause disease under the right conditions. Two of the most common waterborne pathogens in the U.S. are the protozoans *Cryptosporidium parvum* and *Giardia lambia*. *Cryptosporidium* is a waterborne intestinal parasite that infects cattle and domestic animals and can be transmitted to humans, causing life-threatening problems in people with impaired immune systems (Xiao *et al.*, 2001). *Giardia* can cause intestinal problems in humans and animals when ingested (Bagley *et al.,* 1998). To infect new hosts, protozoans create hard casings known as oocysts (*Cryptosporidium*) or cysts (*Giardia*) that are shed in feces and travel through surface waters in search of a new host.

4.8.1 Concentrations

Concentrations of fecal coliform bacteria in urban stormwater typically exceed the 200 MPN/100 ml threshold set for human contact recreation (USGS, 2001b). Bacteria concentrations also tend to be highly variable from storm to storm. For example, a national summary of fecal coliform bacteria in stormwater runoff is shown in Figure 35 and Table 36. The variability in fecal coliform ranges from 10 to 500,000 MPN/100ml with a mean of 15,038 MPN/100ml (Schueler, 1999). Another national database of more than 1,600 stormwater events computed a mean concentration of 20,000

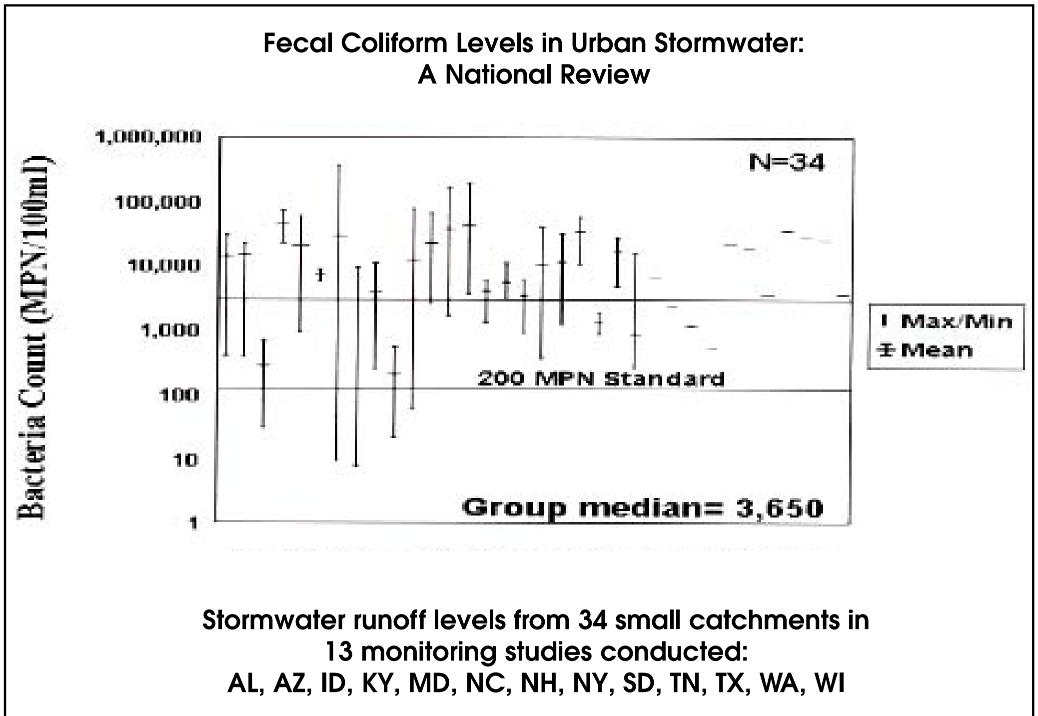


Figure 35: Fecal Coliform Levels in Urban Stormwater (Schueler, 1999)

Table 36: Bacteria EMCs in Urban Areas				
Bacteria Type	**EMCs (MPN/100ml)** **Mean**	**Number of Events**	**Source**	**Location**
Fecal Coliform	15,038	34	Schueler, 1999	U.S.
	20,000	1600	Pitt, 1998	U.S.
	7,653	27	Thomas and McClelland, 1995	GA
	20,000 **R*** 6900 **C** 9700 **I**	30*	Baird *et al.*, 1996	TX
	77,970	21 watersheds	Chang *et al.*, 1990	TX
	4,500	189	Varner, 1995	WA
	23,500	3	Young and Thackston, 1999	TN
Fecal Strep	35,351	17	Schueler, 1999	U.S.
	28,864 **R**	27	Thomas and McClelland, 1995	GA
	56,000 **R** * 18,000 **C** 6,100 **I**	30*	Baird *et al.*, 1996	TX

*N/R = Not Reported, R = Residential Area, C = Commercial Area, I = Industrial Area, * = Median*

MPN/100ml for fecal coliform (Pitt, 1998). Fecal streptococci concentrations for 17 urban sites across the country had a mean of 35,351 MPN/100ml (Schueler, 1999).

Young and Thackston (1999) showed that bacteria concentrations at four sites in metro Nashville were directly related to watershed IC. Increasing IC reflects the cumulative increase in potential bacteria sources in the urban landscape, such as failing septic systems, sewage overflows, dogs, and inappropriate discharges. Other studies show that concentrations of bacteria are typically higher in urban areas than rural areas (USGS, 1999a), but they are not always directly related to IC. For example, Hydroqual (1996) found that concentrations of fecal coliform in seven subwatersheds of the Kensico watershed in New York were generally higher for more developed basins, but fecal coliform concentrations did not directly increase with IC in the developed basins (Figure 36).

There is some evidence that higher concentrations of coliform are found in arid or semi-arid watersheds. Monitoring data from semi-arid regions in Austin, San Antonio, and Corpus Christi, Texas averaged 61,000, 37,500 and 40,500 MPN/100ml, respectively (Baird *et al.*,1996 and Chang *et al.* 1990). Schiff (1996), in a report of Southern California NPDES monitoring, found that median concentrations of fecal coliform in San Diego were 50,000 MPN/100ml and averaged 130,000 MPN/100ml in Los Angeles. In all of these arid and semi-arid regions, concentrations were significantly higher than the national average of 15,000 to 20,000 MPN/100ml.

Concentrations of *Cryptosporidium* and *Giardia* in urban stormwater are shown in Table 37. States *et al.* (1997) found high concentrations of *Cryptosporidium* and *Giardia* in storm samples from a combined sewer in Pittsburgh (geometric mean 2,013 oocysts/100ml and 28,881 cysts/100ml). There is evidence that urban stormwater runoff may have higher concentrations of *Cryptosporidium* and *Giardia* than other surface waters, as reported in Table 38 (Stern, 1996). Both pathogens were detected in about 50% of urban stormwater samples, suggesting some concern for drinking water supplies.

4.8.2 Impacts of Bacteria and Pathogens on Streams

Fecal coliform bacteria indicate the potential for harmful bacteria, viruses, or protozoans and are used by health authorities to determine public health risks. These standards were established to protect human health based on exposures to water during recreation and drinking. Bacteria standards for various water uses are presented in Table 39 and are all easily exceeded by typical urban stormwater concentrations. In fact, over 80,000 miles of streams and rivers are currently in non-attain-

Table 37: *Cryptosporidium* and *Giardia* EMCs

Pathogens	Units	EMCs		Number of Events	Source
		Mean	Median		
Cryptosporidium	oocysts	37.2	3.9	78	Stern, 1996
	oocysts/100ml	2013	N/R	N/R	States *et al.*, 1997
Giardia	cysts	41.0	6.4	78	Stern, 1996
	cysts/100ml	28,881	N/R	N/R	States *et al.*, 1997

N/R= Not reported

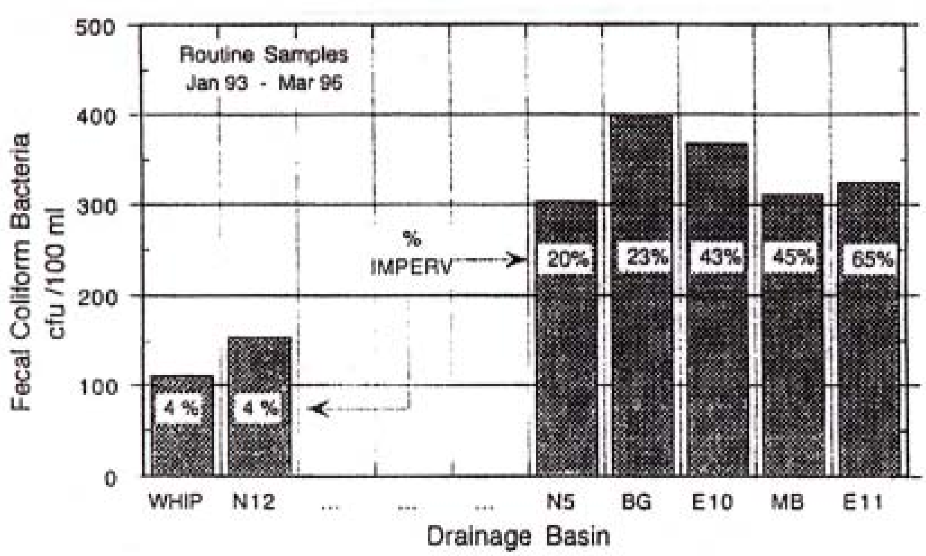


Figure 36: Relationship Between IC and Fecal Coliform Concentrations in New York Streams (Hydroqual, 1996)

Table 38: Percent Detection of *Giardia* cysts and *Cryptosporidium* oocysts in Subwatersheds and Wastewater Treatment Plant Effluent in the New York City Water Supply Watersheds (Stern, 1996)

Source Water Sampled	Number of Sources/ Number of Samples	Percent Detection			
		Total *Giardia*	Confirmed *Giardia*	Total *Cryptosporidium*	Confirmed *Cryptosporidium*
Wastewater Effluent	8/147	41.5%	12.9%	15.7%	5.4%
Urban Subwatershed	5/78	41.0%	6.4%	37.2%	3.9%
Agricultural Subwatershed	5/56	30.4%	3.6%	32.1%	3.6%
Undisturbed Subwatershed	5/73	26.0%	0.0%	9.6%	1.4%

Table 39: Typical Coliform Standards for Different Water Uses (USEPA, 1998)

Water Use	Microbial Indicator	Typical Water Standard
Water Contact Recreation	Fecal Coliform	<200 MPN per 100ml
Drinking Water Supply	Fecal Coliform	<20 MPN per 100ml
Shellfish Harvesting	Fecal Coliform	<14 MPN/ 100ml
Treated Drinking Water	Total Coliform	No more than 1% coliform positive samples per month
Freshwater Swimming	E.Coli	<126 MPN per 100ml

Important Note: Individual state standards may employ different sampling methods, indicators, averaging periods, averaging methods, instantaneous maximums and seasonal limits. MPN = most probable number. Higher or lower limits may be prescribed for different water use classes.

ment status because of high fecal coliform levels (USEPA, 1998).

4.8.3 Sources and Source Areas of Bacteria and Pathogens

Sources of coliform bacteria include waste from humans and wildlife, including livestock and pets. Essentially, any warm-blooded species that is present in significant numbers in a watershed is a potential culprit. Source identification studies, using methods such as DNA fingerprinting, have put the blame on species such as rats in urban areas, ducks and geese in stormwater ponds, livestock from hobby farms, dogs and even raccoons (Blankenship, 1996; Lim and Olivieri, 1982; Pitt, 1998; Samadpour and Checkowitz, 1998).

Transport of bacteria takes place through direct surface runoff, direct inputs to receiving waters, or indirect secondary sources. Source areas in the urban environment for direct runoff include lawns and turf, driveways, parking lots and streets. For example, dogs have high concentrations of fecal coliform in their feces and have a tendency to defecate in close proximity to IC (Schueler, 1999). Weiskel *et al.* (1996) found that direct inputs of fecal coliform from waterfowl can be very important; these inputs accounted for as much as 67% of the annual coliform load to Buttermilk Bay, Massachusetts.

Indirect sources of bacteria include leaking septic systems, illicit discharges, sanitary sewer overflows (SSOs), and combined sewer overflows (CSOs). These sources have the potential to deliver high coliform concentrations to urban streams. In fact, extremely high bacteria concentrations are usually associated with wastewater discharges. CSOs and SSOs occur when the flow into the sewer exceeds the capacity of the sewer lines to drain them. CSOs result from stormwater flow in the lines, and SSOs are a result of infiltration problems or blockages in the lines.

Illicit connections from businesses and homes to the storm drainage system can discharge sewage or washwater into receiving waters. Illicit discharges can often be identified by baseflow sampling of storm sewer systems. Leaking septic systems are estimated to comprise between 10 and 40% of the systems, and individual inspections are the best way to determine failing systems (Schueler, 1999).

There is also evidence that coliform bacteria can survive and reproduce in stream sediments and storm sewers (Schueler, 1999). During a storm event, they often become resuspended and add to the in-stream bacteria load. Source area studies reported that end of pipe concentrations were an order of magnitude higher than any source area on the land surface; therefore, it is likely that the storm sewer system itself acts as a source of fecal coliform (Bannerman *et al.*, 1993 and Steuer *et al.*, 1997). Resuspension of fecal coliform from fine stream sediments during storm events has been reported in New Mexico (NMSWQB, 1999). The sediments in-stream and in the storm sewer system may be significant contributors to the fecal coliform load.

Sources of *Cryptosporidium* and *Giardia* include human sewage and animal feces. *Cryptosporidium* is commonly found in cattle, dogs and geese. Graczyk *et al.* (1998) found that migrating Canada geese were a vector for *Cryptosporidium* and *Giardia*, which has implications for water quality in urban ponds that support large populations of geese.

4.9 Organic Carbon

Total organic carbon (TOC) is often used as an indicator of the amount of organic matter in a water sample. Typically, the more organic matter present in water, the more oxygen consumed, since oxygen is used by bacteria in the decomposition process. Adequate levels of dissolved oxygen in streams and receiving waters are important because they are critical to maintain aquatic life. Organic carbon is routinely found in urban stormwater, and high concentrations can result in an increase in Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD). BOD and COD are measures of the oxygen demand caused by the decay of organic matter.

4.9.1 Concentrations

Urban stormwater has a significant ability to exert a high oxygen demand on a stream or receiving water, even two to three weeks after an individual storm event (Field and Pitt, 1990). Average concentrations of TOC, BOD and COD in urban stormwater are presented in Table 40. Mean concentrations of TOC, BOD and COD during storm events in nationwide studies were 17 mg/l, 14.1 mg/l and 52.8 mg/l, respectively (Kitchell, 2001 and Smullen and Cave,1998).

4.9.2 Impacts of Organic Carbon on Streams

TOC is primarily a concern for aquatic life because of its link to oxygen demand in streams, rivers, lakes and estuaries. The initial effect of increased concentrations of TOC, BOD or COD in stormwater runoff may be a depression in oxygen levels, which may persist for many days after a storm, as deposited organic matter gradually decomposes (Field and Pitt, 1990).

TOC is also a concern for drinking water quality. Organic carbon reacts with chlorine during the drinking water disinfection process and forms trihalomethanes and other disinfection by-products, which can be a serious drinking water quality problem (Water, 1999). TOC concentrations greater than 2 mg/l in treated water and 4 mg/l in source water can result in unacceptably high levels of disinfection byproducts and must be treated to reduce TOC or remove the disinfection byproducts (USEPA, 1998). TOC can also be a carrier for other pollutants, such as trace metals, hydrocarbons and nutrients.

4.9.3 Sources and Source Areas of Total Organic Carbon

The primary sources of TOC in urban areas appear to be decaying leaves and other organic matter, sediment and combustion by-products. Source areas include curbs, storm drains, streets and stream channels. Dartiguenave *et al.* (1997) determined that about half of the annual TOC load in urban watersheds of Austin, TX was derived from the eroding streambanks.

Table 40: EMCs for Organic Carbon in Urban Areas

Organic Carbon Source	EMCs (mg/l)		Number of Events	Source
	Mean	Median		
Total Organic Carbon (TOC)	32.0	N/R	423	Barrett and Malina, 1998
	17	15.2	19 studies	Kitchell, 2001
Biological Oxygen Demand (BOD)	14.1	11.5	1035	Smullen and Cave, 1998
	10.4	8.4	474	USEPA, 1983
Chemical Oxygen Demand (COD)	52.8	44.7	2639	Smullen and Cave, 1998
	66.1	55	1538	USEPA, 1983

N/R = Not Reported

4.10 MTBE

Methyl tertiary butyl-ether (MTBE) is a volatile organic compound (VOC) that is added to gasoline to increase oxygen levels, which helps gas burn cleaner (called an oxygenate). MTBE has been used as a performance fuel additive since the 1970s. In 1990, the use of oxygenates was mandated by federal law and concentrations of MTBE in gasoline increased. Today, MTBE is primarily used in large metropolitan areas that experience air pollution problems. Since 1990, MTBE has been detected at increasing levels in both surface water and groundwater and is one of the most frequently detected VOCs in urban watersheds (USGS, 2001a). EPA has declared MTBE to be a potential human carcinogen at high doses. In March 2000, a decision was made by EPA to follow California's lead to significantly reduce or eliminate the use of MTBE in gasoline.

4.10.1 Concentrations

MTBE is highly soluble in water and therefore not easily removed once it enters surface or ground water. Delzer (1999) detected the presence of MTBE in 27% of the shallow wells monitored in eight urban areas across the country (Figure 37). Detection frequency was significantly higher in New England and Denver, as shown in Table 41. In a second study conducted in 16 metropolitan areas, Delzer (1999) found that 83% of MTBE detections occurred between October and March, the time when MTBE is primarily used as a fuel additive. The median MTBE concentration was 1.5 ppb, well below EPA's draft advisory level of 20 ppb (Delzer, 1996).

4.10.2 Impacts of MTBE on Streams

The primary concerns regarding MTBE are that it is a known carcinogen to small mammals, a suspected human carcinogen at higher

Table 41: MTBE Detection Frequency

Location	Detection Frequency	Source	Year
211 shallow wells in eight urban areas	27%	Delzer	1999
Surface water samples in 16 metro areas	7%	Delzer	1996

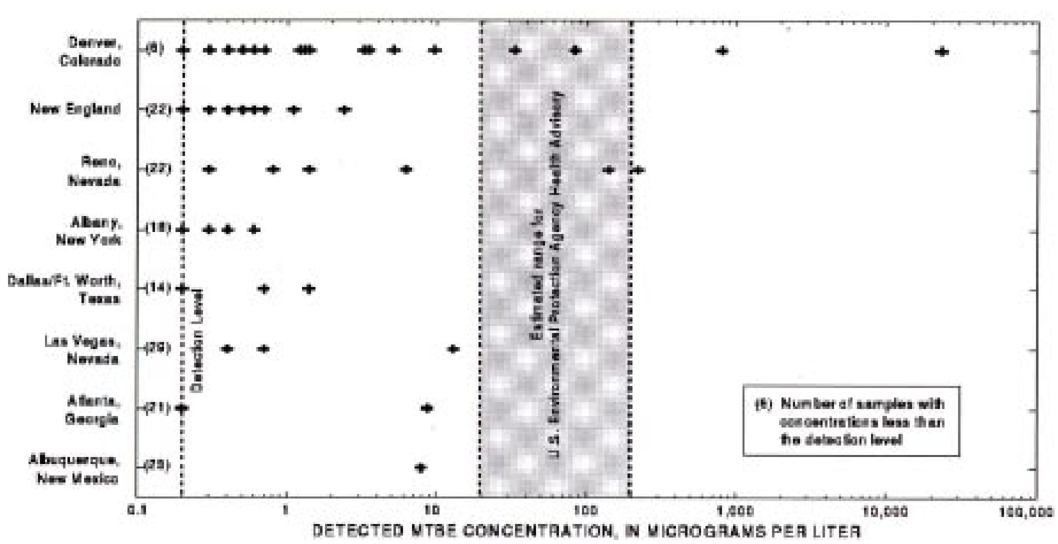


Figure 37: MTBE Concentrations in Surface Water from Eight Cities (Delzer, 1996)

doses and may possibly be toxic to aquatic life in small streams (Delzer, 1996). MTBE can also cause taste and odor problems in drinking water at fairly low concentrations. EPA issued a Drinking Water Advisory in 1997 that indicated that MTBE concentrations less than 20 ppb should not cause taste and odor problems for drinking water. However, the Association of California Water Agencies reports that some consumers can detect MTBE at levels as low as 2.5 ppb (ACWA, 2000). Because MTBE is frequently found in groundwater wells, it is thought to be a potential threat to drinking water (Delzer, 1999). For example, Santa Monica, California reportedly lost half of its groundwater drinking water supply due to MTBE contamination (Bay and Brown, 2000). MTBE has also been detected in human blood, especially in people frequently exposed to gasoline, such as gas station attendants (Squillace *et al.*, 1995).

4.10.3 Sources and Source Areas of MTBE

Since MTBE is a gasoline additive, its potential sources include any area that produces, transports, stores, or dispenses gasoline, particularly areas that are vulnerable to leaks and spills. Leaking underground storage tanks are usually associated with the highest MTBE concentrations in groundwater wells (Delzer, 1999). Vehicle emissions are also an important source of MTBE. Elevated levels are frequently observed along road corridors and drainage ditches. Once emitted, MTBE can travel in stormwater runoff or groundwater. Main source areas include heavily used multilane highways. Gas stations may also be a hotspot source area for MTBE contamination.

Another potential source of MTBE is watercraft, since two cycle engines can discharge as much as 20 to 30% of their fuel through the exhaust (Boughton and Lico, 1998). MTBE concentrations are clearly associated with increased use of gas engines, and there is concern that MTBE is an increasing component of atmospheric deposition (Boughton and Lico, 1998 and UC Davis, 1998).

4.11 Pesticides

Pesticides are used in the urban environment to control weeds, insects and other organisms that are considered pests. EPA estimates that nearly 70 million pounds of active pesticide ingredients are applied to urban lawns each year as herbicides or insecticides. Herbicides are used on urban lawns to target annual and perennial broadleaf weeds, while insecticides are used to control insects. Many types of pesticides are available for use in urban areas. Immerman and Drummond (1985) report that 338 different active ingredients are applied to lawns and gardens nationally. Each pesticide varies in mobility, persistence and potential aquatic impact. At high levels, many pesticides have been found to have adverse effects on ecological and human health. Several recent research studies by the USGS have shown that insecticides are detected with the greatest frequency in urban streams, and that pesticide detection frequency increases in proportion to the percentage of urban land in a watershed (Ferrari *et al.*, 1997; USGS, 1998, 1999a-b, 2001b). A national assessment by the USGS

Table 42: Median Concentrations and Detection Frequency of Herbicides and Insecticides in Urban Streams

Pollutant	Detection Frequency	Median Concentration (Fg/l)	Number of Samples	Source
Insecticides				
Diazinon	75%	0.025	326	USGS, 1998b
	92%	0.55	76	Brush *et al.*, 1995
	17%	0.002	1795	Ferrari *et al.*, 1997
Chlorpyrifos	41%	Non Detect	327	USGS, 1998b
	14%	0.004	1218	Brush *et al.*, 1995
Carbaryl	46%	Non Detect	327	USGS, 1998b
	22%	0.003	1128	Ferrari *et al.*, 1997
Herbicides				
Atrazine	86%	0.023	327	USGS, 1998b
	72%	0.099	2076	Ferrari *et al.*, 1997
Prometon	84%	0.031	327	USGS, 1998b
	56%	0.029	1531	Ferrari *et al.*, 1997
Simazine	88%	0.039	327	USGS, 1998b
	17%	0.046	1995	Ferrari *et al.*, 1997
2,4 -D	67%	1.1	11	Dindorf, 1992
	17%	0.035	786	Ferrari *et al.*, 1997
Dicamba	22%	1.8	4	Dindorf, 1992
MCPP	56%	1.8	10	Dindorf, 1992
MCPA	28%	1.0	5	Dindorf, 1992

(2001a) also indicates that insecticides are usually detected at higher concentrations in urban streams than in agricultural streams.

4.11.1 Concentrations

Median concentrations and detection frequency for common pesticides are shown in Table 42. Herbicides that are frequently detected in urban streams include atrazine; simazine; prometon; 2,4-D; dicamba; MCPP; and MCPA. Insecticides are also frequently encountered in urban streams, including diazinon, chlorpyrifos, malathion, and carbaryl. A USGS (1996) study monitored 16 sites in Gills Creek in Columbia, South Carolina over four days. This study reported that pesticide detection frequency increased as percent urban land increased.

Wotzka *et al.* (1994) monitored herbicide levels in an urban stream in Minneapolis, Minnesota during more than 40 storms. They found herbicides, such as 2,4-D; dicamba; MCPP; and MCPA in 85% of storm runoff events sampled. Total herbicide EMCs ranged from less than one to 70 µg/l. Ferrari *et al.* (1997) analyzed 463 streams in the mid-Atlantic region for the presence of 127 pesticide compounds. At least one pesticide was detected at more than 90% of the streams sampled.

Diazinon is one of the most commonly detected insecticides in urban stormwater runoff and dry weather flow. Diazinon was detected in 75% of National Water Quality Assessment (NAWQA) samples, 92% of stormflow samples from Texas, and 100% of urban stormflow samples in King County, Washington (Brush *et al.*, 1995 and USGS, 1999b). Diazinon is most frequently measured at concentrations greater than freshwater aquatic life criteria in urban stormwater (USGS, 1999a). USGS reports that diazinon concentrations were generally higher during urban stormflow (Ferrari *et al.,* 1997).

4.11.2 Impacts of Pesticides on Streams

Many pesticides are known or suspected carcinogens and can be toxic to humans and aquatic species. However, many of the known health effects require exposure to higher concentrations than typically found in the environment, while the health effects of chronic exposure to low levels are generally unknown (Ferrari *et al.*, 1997).

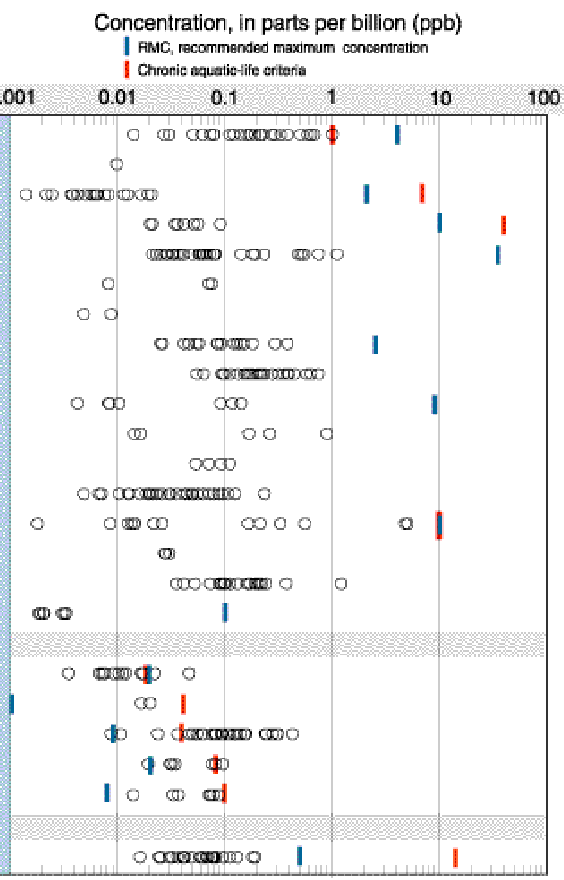
Studies that document the toxicity of insecticides and herbicides in urban stormwater have been focused largely on diazinon. Diazinon is responsible for the majority of acute toxicity in stormwater in Alameda County, California and King County, Washington (S.R. Hansen & Associates, 1995). Concentrations of diazinon in King County stormwater frequently exceed the freshwater aquatic life criteria (Figure 38). Similarly, research on Sacramento, California streams revealed acute toxicity for diazinon in 100% of stormwater samples using *Ceriodaphnia* as the test organism (Connor, 1995). Diazinon has a half-life of 42 days and is very soluble in water, which may explain its detection frequency and persistence in urban stormwater. Diazinon is also reported to attach fairly readily to organic carbon; consequently, it is likely re-suspended during storm events.

Insecticide concentrations exceeding acute and chronic toxicity thresholds for test organisms such as *Ceriodaphnia* have frequently been found in urban stormwater in New York, Texas, California, and Washington (Scanlin and Feng, 1997; Brush *et al.*, 1995; USGS, 1999b). The possibility exists that pesticides could have impacts on larger bodies of water, but there is a paucity of data on the subject at this time.

4.11.3 Sources and Source Areas of Pesticides

Sources for pesticides in urban areas include applications by homeowners, landscaping contractors and road maintenance crews. Source areas for pesticides in urban areas include lawns in residential areas; managed turf, such as golf courses, parks, and ball fields; and rights-of-way in nonresidential areas. Storage areas, which are subject to spills and leaks, can also be a source area. A study in San Francisco was able to trace high diazinon concentrations in some streams back to just a few households which had applied the pesticide at high levels (Scanlin and Feng, 1997). Two herbicides, simazine and atrazine, were detected in over 60% of samples in King County, WA stormwater but were not identified as being sold in retail stores. It is likely these herbicides are applied to nonresidential areas such as rights-of-way, parks and recreational areas (USGS, 1999b). Because pesticides are typically applied to turf, IC is not a direct indicator for pesticide concentrations, although they can drift onto paved surfaces and end up in stormwater runoff.

Active ingredient and trade name[1] example in parentheses	Freshwater aquatic-life criteria, in parts per billion (-- no aquatic-life criteria exist)		
Herbicide	**Acute**	**Chronic**	**RMC**
2,4-D (Weedone)	[4]10	[4]1	[5,2]4
Acetochlor (Guardian)	--	--	--
Atrazine (AAtrex)	[4]70	[4]7	[5]2
Dicamba (Banvel)	[4]390	[4]39	[5]10
Dichlobenil (Casoron)	--	--	[2]37
Dichlorprop (2,4-DP)	--	--	--
EPTC (Eptam)	--	--	--
MCPA (Kilsem)	--	--	[5]2.6
MCPP (Mecoprop)	--	--	--
Metolachlor (Dual)	--	--	[5]8
Napropamide (Devrinol)	--	--	--
Oxadiazon (Ronstar)	--	--	--
Prometon (Pramitol)	--	--	--
Simazine (Princep)	[4]100	[4]10	[2,5]10
Tebuthiuron (Spike)	--	--	--
Triclopyr (Garlon)	[4]5,600	[4]560	--
Trifluralin (Treflan)	--	--	[5]0.1
Insecticide			
Carbaryl (Sevin)	[4]0.17	[4]0.017	[2]0.02
Chlorpyrifos (Dursban)	[3,7]0.083	[3,7]0.041	[2]0.001
Diazinon (Diazinon)	[6]0.16	[6]0.04	[2]0.009
gamma-HCH (Lindane)	[3]0.95	[7]0.08	[2]0.02
Malathion (Malathion)	--	[3]0.1	[2]0.008
Fungicide			
Pentachlorophenol (Penta)	[3,8]19	[3,8]15	[5]0.5



1 Use of trade names is for descriptive purposes and does not imply endorsement by the U.S. Geological Survey, the Department of Ecology, or King County
2 National Academy of Sciences and National Academy of Engineering, 1973
3 U.S. Environmental Protection Agency, 1998
4 Norris and Dost, 1991, Table 3
5 Ministers of Health Canada and Environment Canada, 1995
6 Menconi and Cox, 1994
7 State of Washington, 1992
8 Criteria are pH dependent; values shown calculated at pH of 7.8

Figure 38: Concentrations of Pesticides in Stormwater in King County, WA (S.R. Hansen & Associates, 1995 and USGS, 1999b)

4.12 Deicers

Deicers are substances used to melt snow and ice to keep roads and walking areas safe. The most commonly used deicer is sodium chloride, although it may also be blended with calcium chloride or magnesium chloride. Other less frequently used deicers include urea and glycol, which are primarily used at airports to deice planes. Table 43 summarizes the composition, use and water quality effects of common deicers.

Chlorides are frequently found in snowmelt and stormwater runoff in most regions that experience snow and ice in the winter months (Oberts, 1994 and Sherman, 1998). Figure 39 shows that the application of deicer salts has increased since 1940 from 200,000 tons to 10 to 20 million tons per year in recent years (Salt Institute, 2001). Several U.S. and Canadian studies indicate severe inputs of road salts on water quality and aquatic life (Environment Canada, 2001 and Novotny *et al.*, 1999).

Table 43: Use and Water Quality Effect of Snowmelt Deicers (Ohrel, 1995; Sills and Blakeslee, 1992)

Deicer	Description	Use	Water Quality Effect
Chlorides	Chloride based deicer usually combined with Na, Ca or Mg	Road Deicer and Residential Use	Cl complexes can release heavy metals, affect soil permeability, impacts to drinking water, potential toxic effects to small streams
Urea	Nitrogen-based fertilizer product	Used as alternative to glycol	Increased nitrogen in water and potential toxicity to organisms
Ethylene Glycol	Petroleum based organic compounds, similar to antifreeze	Used at airports for deicing planes	Toxicity effects, high BOD and COD, hazardous air pollutant

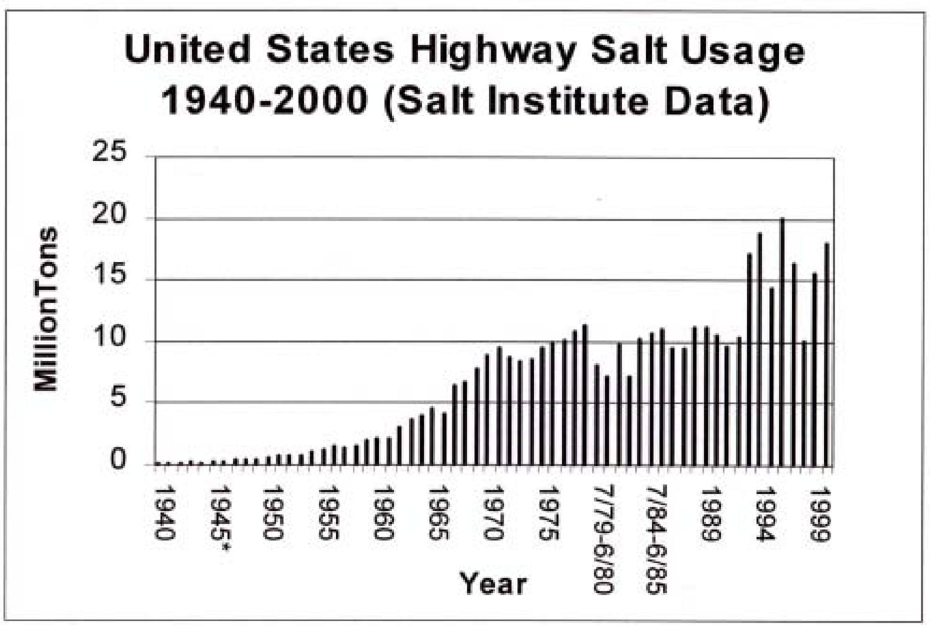


Figure 39: U.S. Highway Salt Usage Data (Salt Institute, 2001)

4.12.1 Concentrations

Chloride concentrations in snowmelt runoff depend on the amount applied and the dilution in the receiving waters. Data for snowmelt and stormwater runoff from several studies are presented in Table 44. For example, chloride concentrations in Lincoln Creek in Wisconsin were 1,612 mg/l in winter snowmelt runoff, as compared to 40 mg/l in non-winter runoff (Novotny *et al.*, 1999 and Masterson and Bannerman, 1994). Chloride concentrations in the range of 2,000 to 5,000 mg/l have been reported for Canadian streams (Environment Canada, 2001). Novotny *et al.* (1999) monitored chloride concentrations in snowmelt near Syracuse, New York and found that residential watersheds had higher chloride concentrations than rural watersheds.

Concentrations of glycol in stormwater runoff are also highly variable and depend on the amount of deicer used, the presence of a recovery system, and the nature of the precipitation event. Corsi *et al*. (2001) monitored streams receiving stormwater runoff from a Wisconsin airport. They found concentrations of propylene glycol as high as 39,000 mg/l at airport outfall sites during deicing operations and concentrations of up to 960 mg/l during low-flow sampling at an airport outfall site.

4.12.2 Impacts of Deicers on Streams

Chloride levels can harm aquatic and terrestrial life and contaminate groundwater and drinking water supplies (Ohrel, 1995). Generally, chloride becomes toxic to many organisms when it reaches concentrations of 500 to1,000 mg/l (Environment Canada, 2001). These concentrations are common in small streams in snow regions, at least for short periods of time. Many plant species are relatively intolerant to high salt levels in wetland swales and roadside corridors. Fish are also negatively affected by high chloride concentrations, with sensitivity as low as 600 mg/l for some species (Scott and Wylie, 1980).

Table 45 compares the maximum chloride concentrations for various water uses in eight states (USEPA, 1988). Snowmelt chloride concentrations typically exceed these levels.

Table 44: EMCs for Chloride in Snowmelt and Stormwater Runoff in Urban Areas

Form of Runoff	EMCs (mg/l) Mean	Number of Events	Sources	Location
Snowmelt	116*	49	Oberts, 1994	MN
	2119	N/R	Sherman, 1998	Ontario
	1267 **R** 474 **U**	N/R	Novotny *et al.*, 1999	NY
	1612	N/R	Masterson and Bannerman, 1994	WI
	397	282	Environment Canada, 2001	Ontario, Canada
Non-winter Storm Event	42	61	Brush *et al.*, 1995	TX
	45	N/R	Sherman, 1998	Ontario
	40.5	N/R	Masterson and Bannerman, 1994	WI

*N/R = Not Reported, R = residential, U = urban, * = Median*

Chloride is a concern in surface drinking water systems because it can interfere with some of the treatment processes and can cause taste problems at concentrations as low as 250 mg/l. Chloride is also extremely difficult to remove once it enters the water.

Glycol-based deicers have been shown to be highly toxic at relatively low concentrations in streams receiving airport runoff. These deicers contain many proprietary agents, which may increase their toxicity and also make it very difficult to set standards for their use (Hartwell *et al.*, 1995). Corsi *et al.* (2001) observed acute toxicity of *Ceriodaphnia dubia*, *Pimephelas promelax*, *Hyalela azteca*, and *Chironimus tentans* in Wisconsin streams that experienced propylene glycol concentrations of 5,000 mg/l or more. Chronic toxicity was observed for *Ceriodaphnia dubia* and *Pimephelas promelax* at propylene glycol concentrations of 1,500 mg/l in the same study. In addition, glycol exerts an extremely high BOD on receiving waters, which can quickly reduce or eliminate dissolved oxygen. Glycol can also be toxic to small animals that are attracted by its sweet taste (Novotny *et al.*, 1999).

As with many urban pollutants, the effects of chloride can be diluted in larger waterbodies. In general, small streams are more likely to experience chloride effects, compared to rivers, which have a greater dilution ability.

4.12.3 Sources and Source Areas of Deicers

The main sources for deicers in urban watersheds include highway maintenance crews, airport deicing operations, and homeowner applications. Direct road application is the largest source of chloride, by far. Source areas include roads, parking lots, sidewalks, storm drains, airport runways, and snow collection areas. Because deicers are applied to paved surfaces, the primary means of transport to streams is through stormwater and meltwater runoff. Therefore, concentrations of deicer compounds are typically associated with factors such as road density or traffic patterns.

Table 45: Summary of State Standards for Salinity of Receiving Waters (USEPA, 1988)

State	Limiting Concentration (mg/l)	Beneficial Use
CO	250*	Drinking water
IL	500	General water supply
	250	Drinking water
IN	500	Drinking water
MA	250	Class A waters
MN	250	Drinking water
	500	Class A fishing and recreation
OH	250	Drinking water
SD	250	Drinking water
	100	Fish propagation
VA	250	Drinking water

** Monthly average*

4.13 Conclusion

IC collects and accumulates pollutants deposited from the atmosphere, leaked from vehicles, or derived from other sources. The pollutants build up over time but are washed off quickly during storms and are often efficiently delivered to downstream waters. This can create water quality problems for downstream rivers, lakes and estuaries.

As a result of local and national monitoring efforts, we now have a much better understanding of the nature and impacts of stormwater pollution. The typical sample of urban stormwater is characterized by high levels of many common pollutants such as sediment, nutrients, metals, organic carbon, hydrocarbons, pesticides, and fecal coliform bacteria. Other pollutants that have more recently become a concern in urban areas include MTBE, deicers, and the pathogens *Cryptosporidium* and *Giardia*. Concentrations of most stormwater pollutants can be characterized, over the long run, by event mean storm concentrations. Monitoring techniques have also allowed researchers to identify source areas for pollutants in the urban environment, including stormwater hotspots, which generate higher pollutant loads than normal development.

In general, most monitoring data shows that mean pollutant storm concentrations are higher in urban watersheds than in non-urban ones. For many urban pollutants, EMCs can be used to predict stormwater pollutant loads for urban watersheds, using IC as the key predictive variable. While a direct relationship between IC and pollutant concentrations does not usually exist, IC directly influences the volume of stormwater and hence, the total load. A few exceptions are worth noting. MTBE, deicers, and PAH appear to be related more to traffic or road density than IC. Additionally, MTBE and PAH concentrations may be greater at hotspot source areas, which are not always widely or uniformly distributed across a watershed. Pesticides, bacteria and pathogens are often associated with turf areas rather than IC. Bacteria and pathogen sources also include direct inputs from wildlife and inappropriate sewage discharges that are not uniformly distributed across a watershed and are not directly related to IC.

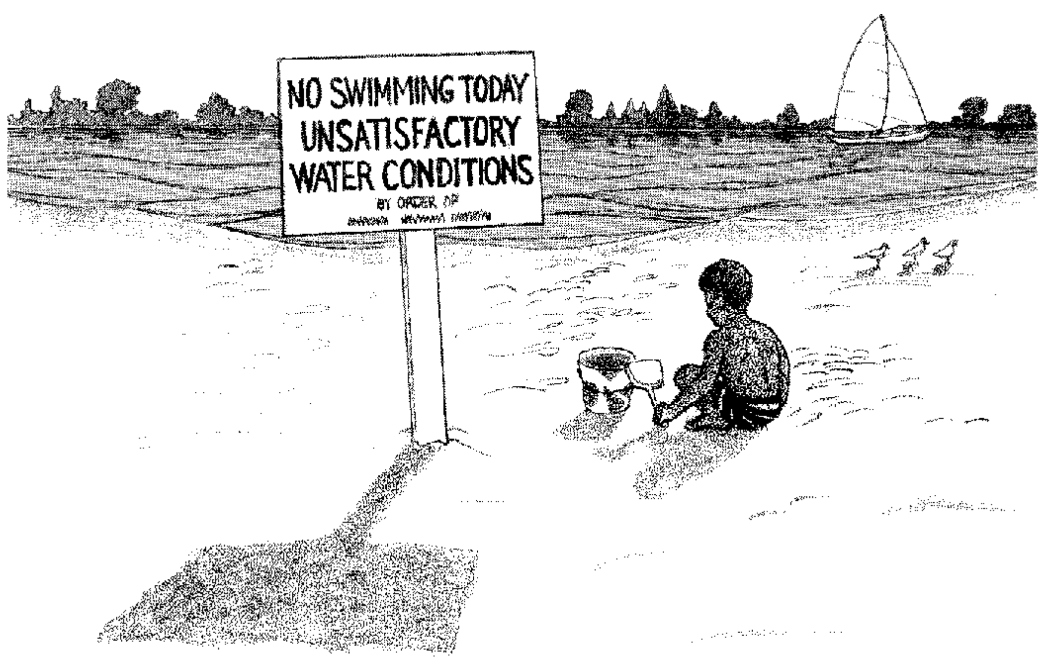
Further research into the relationship between stormwater pollutant loads and other watershed indicators may be helpful. For example, it would be interesting to see if turf cover is a good indicator of stream quality for impacted streams. Other important watershed indicators worth studying are the influence of watershed treatment practices, such as stormwater practices and stream buffers.

The direct effects of stormwater pollutants on aquatic systems appears to be a function of the size of the receiving water and the initial health of the aquatic community. For example, a small urban stream receiving high stormwater pollutant concentrations would be more likely to experience impacts than a large river, which is diluted by other land uses. Likewise, organisms in sensitive streams should be more susceptible to stormwater pollutants than pollution-tolerant organisms found in non-supporting streams.

Overall, the following conclusions can be made:

- Sediment, nutrient and trace metal loads in stormwater runoff can be predicted as a function of IC, although concentrations are not tightly correlated with watershed IC.
- Violations of bacteria standards are indirectly associated with watershed IC.
- It is not clear whether loads of hydrocarbons, pesticides or chlorides can be predicted on the basis of IC at the small watershed level.
- More research needs to be conducted to evaluate the usefulness of other watershed indicators to predict stormwater pollutant loads. For example, traffic, road density or hotspots may be useful in predicting MTBE, deicer and hydrocarbon loads. Also, watershed turf cover may be useful in predicting pesticide and bacterial loads.

- Most research on pollutants in stormwater runoff has been conducted at the small watershed level. Additional research is needed to evaluate the impact of watershed treatment, such as stormwater and buffer practices to determine the degree to which these may change stormwater concentrations or loads.
- Regional differences are evident for many stormwater pollutants, and these appear to be caused by either differences in rainfall frequency or snowmelt.



Chapter 5: Biological Impacts of Impervious Cover

This chapter reviews research on the impact of urbanization on the aquatic community, focusing on aquatic insects, fish, amphibians, freshwater mussels, and freshwater wetlands. Specifically, the relationship between the health of the aquatic community and the amount of watershed IC is analyzed within the context of the Impervious Cover Model (ICM).

The chapter is organized as follows:

5.1 Introduction
5.2 Indicators and General Trends
5.3 Effects on Aquatic Insect[1] Diversity
5.4 Effects on Fish Diversity
5.5 Effects on Amphibian Diversity
5.6 Effects on Wetland Diversity
5.7 Effects on Freshwater Mussel Diversity
5.8 Conclusion

5.1 Introduction

A number of studies, crossing different ecoregions and utilizing various techniques, have examined the link between watershed urbanization and its impact on stream and wetland biodiversity. These studies reveal that a relatively small amount of urbanization has a negative effect on aquatic diversity, and that as watersheds become highly urban, aquatic diversity becomes extremely degraded. As documented in prior chapters, hydrologic, physical, and water quality changes caused by watershed urbanization all stress the aquatic community and collectively diminish the quality and quantity of available habitat. As a result, these stressors generally cause a decline in biological diversity, a change in trophic structure, and a shift towards more pollution-tolerant organisms.

Many different habitat conditions are critical for supporting diverse aquatic ecosystems. For example, streambed substrates are vulnerable to deposition of fine sediments, which affects spawning, egg incubation and fry-rearing. Many aquatic insect species shelter in the large pore spaces among cobbles and boulders, particularly within riffles. When fine sediment fills these pore spaces, it reduces the quality and quantity of available habitat. The aquatic insect community is typically the base of the food chain in streams, helps break down organic matter and serves as a food source for juvenile fish.

Large woody debris (LWD) plays a critical role in the habitat of many aquatic insects and fish. For example, Bisson *et al.* (1988) contend that no other structural component is more important to salmon habitat than LWD, especially in the case of juvenile coho salmon. Loss of LWD due to the removal of stream side vegetation can significantly hinder the survival of more sensitive aquatic species. Since LWD creates different habitat types, its quality and quantity have been linked to salmonid rearing habitat and the ability of multiple fish species to coexist in streams.

The number of stream crossings (e.g., roads, sewers and pipelines) has been reported to increase directly in proportion to IC (May *et al.*, 1997). Such crossings can become partial or total barriers to upstream fish migration, particularly if the stream bed downcuts below the fixed elevation of a culvert or pipeline. Fish barriers can prevent migration and recolonization of aquatic life in many urban streams.

Urbanization can also increase pollutant levels and stream temperatures. In particular, trace metals and pesticides often bind to sediment particles and may enter the food chain, particularly by aquatic insects that collect and filter particles. While in-stream data is rare, some data are available for ponds. A study of trace

[1]*Throughout this chapter, the term "aquatic insects" is used rather than the more cumbersome but technically correct "benthic macroinvertebrates."*

metal bioaccumulation of three fish species found in central Florida stormwater ponds discovered that trace metal levels were significantly higher in urban ponds than in non-urban control ponds, often by a factor of five to 10 (Campbell, 1995; see also Karouna-Renier, 1995). Although typical stormwater pollutants are rarely acutely toxic to fish, the cumulative effects of sublethal pollutant exposure may influence the stream community (Chapter 4).

Table 46 summarizes some of the numerous changes to streams caused by urbanization that have the potential to alter aquatic biodiversity. For a comprehensive review of the impacts of urbanization on stream habitat and biodiversity, the reader should consult Wood and Armitage (1997) and Hart and Finelli (1999).

Table 46: Review of Stressors to Urban Streams and Effects on Aquatic Life

Stream Change	Effects on Organisms
Increased flow volumes/ Channel forming storms	Alterations in habitat complexity Changes in availability of food organisms, related to timing of emergence and recovery after disturbance Reduced prey diversity Scour-related mortality Long-term depletion of LWD Accelerated streambank erosion
Decreased base flows	Crowding and increased competition for foraging sites Increased vulnerability to predation Increased fine sediment deposition
Increase in sediment transport	Reduced survival of eggs and alevins, loss of habitat due to deposition Siltation of pool areas, reduced macroinvertebrate reproduction
Loss of pools and riffles	Shift in the balance of species due to habitat change Loss of deep water cover and feeding areas
Changes in substrate composition	Reduced survival of eggs Loss of inter-gravel fry refugial spaces Reduced aquatic insect production
Loss of LWD	Loss of cover from predators and high flows Reduced sediment and organic matter storage Reduced pool formation and organic substrate for aquatic insects
Increase in temperature	Changes in migration patterns Increased metabolic activity, increased disease and parasite susceptibility Increased mortality of sensitive fish
Creation of fish blockages	Loss of spawning habitat for adults Inability to reach overwintering sites Loss of summer rearing habitat, Increased vulnerability to predation
Loss of vegetative rooting systems	Decreased channel stability Loss of undercut banks Reduced streambank integrity
Channel straightening or hardening	Increased stream scour Loss of habitat complexity
Reduction in water quality	Reduced survival of eggs and alevins Acute and chronic toxicity to juveniles and adult fish Increased physiological stress
Increase in turbidity	Reduced survival of eggs Reduced plant productivity Physiological stress on aquatic organisms
Algae blooms	Oxygen depletion due to algal blooms, increased eutrophication rate of standing waters

5.2 Indicators and General Trends

Stream indicators are used to gauge aquatic health in particular watersheds. The two main categories of stream indicators are **biotic** and **development** indices. **Biotic** indices use stream diversity as the benchmark for aquatic health and use measures, such as species abundance, taxa richness, EPT Index, native species, presence of pollution-tolerant species, dominance, functional feeding group comparisons, or proportion with disease or anomalies. **Development** indices evaluate the relationship between the degree of watershed urbanization and scores for the biotic indices. Common development indices include watershed IC, housing density, population density, and percent urban land use.

5.2.1 Biological Indicators

Biotic indices are frequently used to measure the health of the aquatic insect or fish community in urban streams. Because many aquatic insects have limited migration patterns or a sessile mode of life, they are particularly well-suited to assess stream impacts over time. Aquatic insects integrate the effects of short-term environmental variations, as most species have a complex but short life cycle of a year or less. Sensitive life stages respond quickly to environmental stressors, but the overall community responds more slowly. Aquatic insect communities are comprised of a broad range of species, trophic levels and pollution tolerances, thus providing strong information for interpreting cumulative effects. Unlike fish, aquatic insects are abundant in most small, first and second order streams. Individuals are relatively easy to identify to family level, and many "intolerant" taxa can be identified to lower taxonomic levels with ease.

Fish are good stream indicators over longer time periods and broad habitat conditions because they are relatively long-lived and mobile. Fish communities generally include a range of species that represents a variety of trophic levels (omnivores, herbivores, insectivores, planktivores, and piscivores). Fish tend to integrate the effects of lower trophic levels; thus, their community structure reflects the prevailing food sources and habitat conditions. Fish are relatively easy to collect and identify to the species level. Most specimens can be sorted and identified in the field by experienced fisheries scientists and subsequently released unharmed.

A review of the literature indicates that a wide variety of metrics are used to measure the aquatic insect and fish community. Community indices, such as the Index of Biotic Integrity (IBI) for fish and the Benthic Index of Biotic Integrity (B-IBI) for the aquatic insect community are a weighted combination of various metrics that typically characterize the community from "excellent" to "poor." Common metrics of aquatic community are often based on a composite of measures, such as species richness, abundance, tolerance, trophic status, and native status. Combined indices (C-IBI) measure both fish and aquatic insect metrics and a variety of physical habitat conditions to classify streams. Table 47 lists several common metrics used in stream assessments. It should be clearly noted that community and combined indices rely on different measurements and cannot be directly compared. For a comprehensive review of aquatic community indicators, see Barbour *et al.*(1999).

5.2.2 Watershed Development Indices

Watershed IC, housing density, population density, and percent urban land have all been used as indices of the degree of watershed development. In addition, reverse indicators such as percent forest cover and riparian continuity have also been used. The majority of studies so far have used IC to explore the relationship between urbanization and aquatic diversity. Percent urban land has been the second most frequently used indicator to describe the impact of watershed development. Table 48 compares the four watershed development indices and the thresholds where significant impacts to aquatic life are typically observed.

Table 47: Examples of Biodiversity Metrics Used to Assess Aquatic Communities

Measurement	Applied to:	Definition of Measurement
Abundance	Fish, Aquatic Insects	Total number of individuals in a sample; sometimes modified to exclude tolerant species.
Taxa Richness	Fish, Aquatic Insects	Total number of unique taxa identified in a sample. Typically, an increase in taxa diversity indicates better water and habitat quality.
EPT Index	Aquatic Insects	Taxa belonging to the following three groups: *Ephemeroptera* (mayflies), *Plecoptera* (stoneflies), *Trichoptera* (caddisflies). Typically, species in these orders are considered to be pollution-intolerant taxa and are generally the first to disappear with stream quality degradation.
Native Status	Fish	Native vs. non-native taxa in the community.
Specific Habitat	Fish	<u>Riffle benthic insectivorous individuals.</u> Total number of benthic insectivores. Often these types of individuals, such as darters, sculpins, and dace are found in high velocity riffles and runs and are sensitive to physical habitat degradation.
		<u>Minnow species</u> Total number of minnow species present. Often used as an indicator of pool habitat quality. Includes all species present in the family Cyprinidae, such as daces, minnows, shiners, stonerollers, and chubs.
Tolerant Species	Fish, Aquatic Insects	The total number of species sensitive to and the number tolerant of degraded conditions. Typically, intolerant species decline with decreasing water quality and stream habitat. A common high pollution-tolerant species that is frequently used is Chironomids.
Dominance	Fish, Aquatic Insects	The proportion of individuals at each station from the single most abundant taxa at that particular station. Typically, a community dominated by a single taxa may be indicative of stream degradation.
Functional Feeding Group Comparisons	Fish	<u>Omnivores/ Generalists</u>: The proportion of individuals characterized as omnivores or generalists to the total number of individuals. Typically, there is a shift away from specialized feeding towards more opportunistic feeders under degraded conditions as food sources become unreliable.
		<u>Insectivores:</u> The proportion of individuals characterized as insectivores to the total number of individuals. Typically, the abundance of insectivores decreases relative to increasing stream degradation.
	Aquatic Insects	<u>Others:</u> The proportion of individuals characterized as shredders, scrapers, or filter feeders to the total number of individuals. Typically, changes in the proportion of functional feeders characterized as shredders can be reflective of contaminated leaf matter. In addition, an overabundance of scrapers over filterers can be indicative of increased benthic algae.
Disease/ Anomalies	Fish	Proportion of individuals with signs of disease or abnormalities. This is ascertained through gross external examination for abnormalities during the field identification process. Typically, this metric assumes that incidence of disease and deformities increases with increasing stream degradation.

** This table is not meant to provide a comprehensive listing of metrics used for diversity indices; it is intended to provide examples of types of measures used in biological stream assessments (see Barbour* et al., *1999).*

5.2.3 General Trends

Most research suggests that a decline in both species abundance and diversity begins at or around 10% watershed IC (Schueler, 1994a). However, considerable variations in aquatic diversity are frequently observed from five to 20% IC, due to historical alterations, the effectiveness of watershed management, prevailing riparian conditions, co-occurrence of stressors, and natural biological variation (see Chapter 1).

Figures 40 through 42 display the negative relationship commonly seen between biotic indices and various measures of watershed development. For example, stream research in the Maryland Piedmont indicated that IC was the best predictor of stream condition, based on a combined fish and aquatic insect IBI (MNCPPC, 2000). In general, streams with less than 6% watershed IC were in "excellent" condition, whereas streams in "good" condition had less than 12% IC, and streams in "fair" condition had less than 20%. Figure 40 shows the general boundaries and typical variation seen in MNCPPC stream research.

Figure 41 illustrates that B-IBI scores and Coho Salmon/Cutthroat Trout Ratio are a function of IC for 31 streams in Puget Sound, Washington. The interesting finding was that "good" to "excellent" B-IBI scores (greater than 25) were reported in watersheds that had less than 10% IC, with eight notable outliers. These outliers had greater IC (25 to 35%) but similar B-IBI scores. These outliers are unique in that they had a large upstream wetland and/or a large, intact riparian corridor upstream (i.e. >70% of stream corridor had buffer width >100 feet).

Figure 42 depicts the same negative relationship between watershed urbanization and fish-IBI scores but uses population density as the primary metric of development (Dreher, 1997). The six-county study area included the Chicago metro area and outlying rural watersheds. Significant declines in fish-IBI scores were noted when population density exceeded 1.5 persons per acre.

The actual level of watershed development at which an individual aquatic species begins to decline depends on several variables, but may be lower than that indicated by the ICM. Some researchers have detected impacts for individual aquatic species at watershed IC levels as low as 5%. Other research has suggested that the presence of certain stressors, such as sewage treatment plant discharges (Yoder and Miltner, 2000) or construction sites (Reice, 2000) may alter the ICM and lower the level of IC at which biodiversity impacts become evident.

Table 48: Alternate Land Use Indicators and Significant Impact Levels (Brown, 2000; Konrad and Booth, 2002)			
Land Use Indicator	**Level at which Significant Impact Observed**	**Typical Value for Low Density Residential Use**	**Comments**
% IC	10-20%	10%	Most accurate; highest level of effort and cost
Housing Density	>1 unit/acre	1 unit/acre	Low accuracy in areas of substantial commercial or industrial development; less accurate at small scales
Population Density	1.5 to 8+ people/acre	2.5 people/acre	Low accuracy in areas of substantial commercial or industrial development; less accurate at small scales
% Urban Land Use	33% (variable)	10-100%	Does not measure intensity of development; moderately accurate at larger watershed scales
Road Density	5 miles/square mile	2 miles/square mile	Appears to be a potentially useful indicator

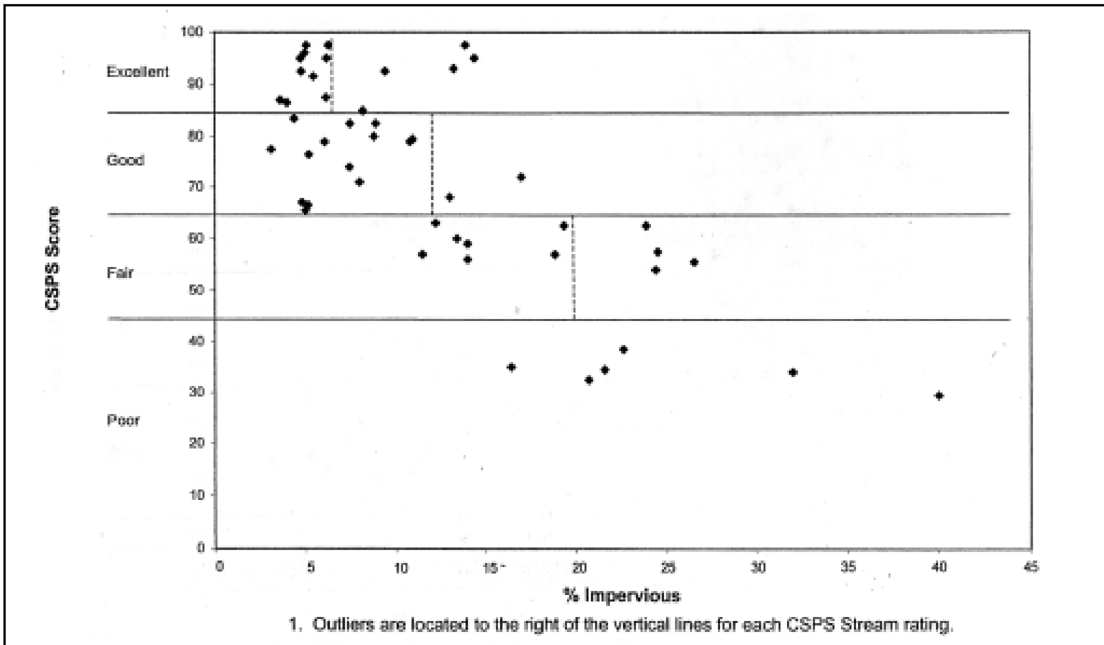


Figure 40: Combined Fish and Benthic IBI vs. IC in Maryland Piedmont Streams (MNCPPC, 2000)

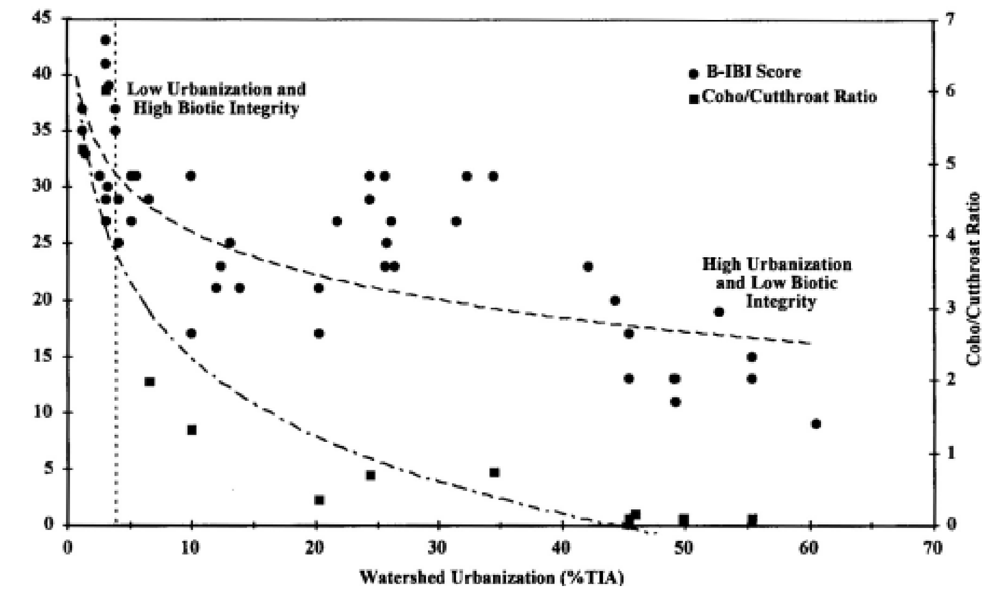


Figure 41: Relationship Between B-IBI, Coho/Cutthroat Ratios, and Watershed IC in Puget Sound Streams (Horner *et al.*, 1997)

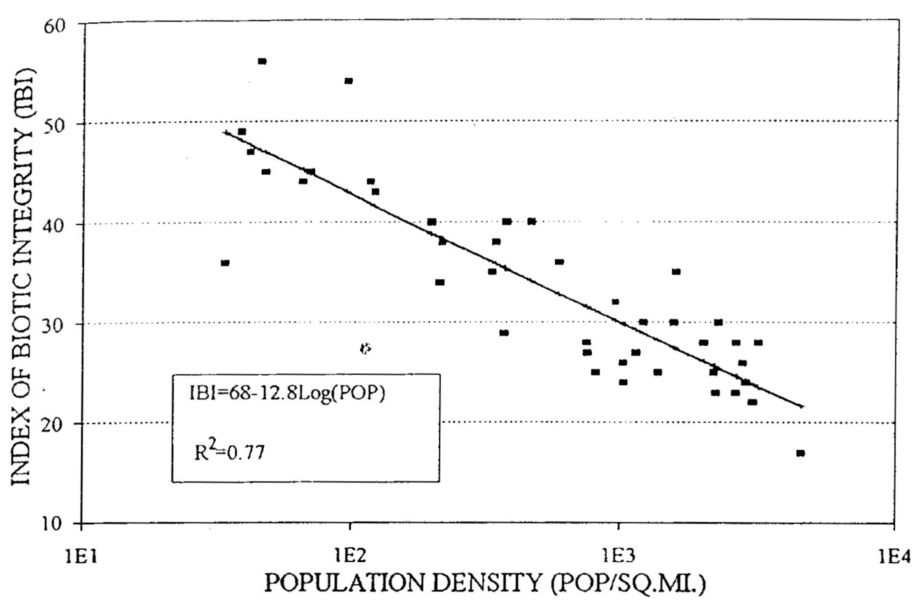


Figure 42: Index for Biological Integrity as a Function of Population Density in Illinois (Dreher, 1997)

5.3 Effects on Aquatic Insect Diversity

The diversity, richness and abundance of the aquatic insect community is frequently used to indicate urban stream quality. Aquatic insects are a useful indicator because they form the base of the stream food chain in most regions of the country. For this reason, declines or changes in aquatic insect diversity are often an early signal of biological impact due to watershed development. The aquatic insect community typically responds to increasing development by losing species diversity and richness and shifting to more pollution-tolerant species. More than 30 studies illustrate how IC and urbanization affect the aquatic insect community. These are summarized in Tables 49 and 50.

5.3.1 Findings Based on IC Indicators

Klein (1979) was one of the first researchers to note that aquatic insect diversity drops sharply in streams where watershed IC exceeded 10 to 15%. While "good" to "fair" diversity was noted in all headwater streams with less than 10% IC, nearly all streams with 12% or more watershed IC recorded "poor" diversity. Other studies have confirmed this general relationship between IC and the decline of aquatic insect species diversity. Their relationships have been an integral part in the development of the ICM. The sharp drop in aquatic insect diversity at or around 12 to 15% IC was also observed in streams in the coastal plain and Piedmont of Delaware (Maxted and Shaver, 1997).

Impacts at development thresholds lower than 10% IC have also been observed by Booth (2000), Davis (2001), Horner *et al.* (1997) and Morse (2001). There seems to be a general recognition that the high levels of variability observed below 10% IC indicate that other factors, such as riparian condition, effluent discharges, and pollution legacy may be better indicators of aquatic insect diversity (Horner and May, 1999; Kennen, 1999; Steedman, 1988; Yoder *et al.*, 1999).

The exact point at which aquatic insect diversity shifts from fair to poor is not known with absolute precision, but it is clear that few, if any, urban streams can support diverse aquatic insect communities with more than 25% IC. Indeed, several researchers failed to find aquatic insect communities with good or excellent diversity in any highly urban stream (Table 52). Indeed, MNCPPC (2000) reported that all streams with more than 20% watershed IC were rated as "poor."

Several good examples of the relationship between IC and B-IBI scores are shown in Figures 43 through 45. Figure 43 depicts the general trend line in aquatic insect diversity as IC increased at 138 stream sites in Northern Virginia (Fairfax County, 2001). The survey study concluded that stream degradation occurred at low levels of IC, and that older developments lacking more efficient site design and stormwater controls tended to have particularly degraded streams. Figures 44 and 45 show similar trends in the relationship between IC and aquatic insect B-IBI scores in Maryland and Washington streams. In particular, note the variability in B-IBI scores observed below 10% IC in both research studies.

Often, shift in the aquatic insect community from pollution-sensitive species to pollution-tolerant species occurs at relatively low IC levels (<10%). This shift is often tracked using the EPT metric, which evaluates sensitive species found in the urban stream community in the orders of *Ephemeroptera* (mayflies), *Plecoptera* (stoneflies), and *Trichoptera* (caddisflies). EPT species frequently disappear in urban streams and are replaced by more pollution-tolerant organisms, such as chironomids, tubificid worms, amphipods and snails.

In undisturbed streams, aquatic insects employ specialized feeding strategies, such as shredding leaf litter, filtering or collecting organic matter that flows by, or preying on other insects. These feeding guilds are greatly reduced in urban streams and are replaced by grazers, collectors and deposit feeders. Maxted and Shaver (1997) found that 90% of sensitive

Table 49: Recent Research Examining the Relationship Between IC and Aquatic Insect Diversity in Streams

Index	Key Finding (s)	Source	Location
Community Index	Three years stream sampling across the state at 1000 sites found that when IC was >15%, stream health was never rated good based on a C-IBI.	Boward *et al.*, 1999	MD
Community Index	Insect community and habitat scores were all ranked as poor in five subwatersheds that were greater than 30% IC.	Black and Veatch, 1994	MD
Community Index	Puget sound study finds that some degradation of aquatic invertebrate diversity can occur at any level of human disturbance (at least as measured by IC). 65% of watershed forest cover usually indicates a healthy aquatic insect community.	Booth, 2000	WA
Community Index	In a Puget Sound study, the steepest decline of B-IBI was observed after 6% IC. There was a steady decline, with approximately 50% reduction in B-IBI at 45% IC.	Horner *et al.*, 1997	WA
Community Index	B-IBI decreases with increasing urbanization in study involving 209 sites, with a sharp decline at 10% IC. Riparian condition helps mitigate effects.	Steedman, 1988	Ontario
Community Index	Wetlands, forest cover and riparian integrity act to mitigate the impact of IC on aquatic insect communities.	Horner *et al.*, 2001	WA, MD, TX
Community Index	B-IBI declines for aquatic insect with increasing IC at more than 200 streams.	Fairfax Co., 2001	VA
Community Index	Two-year stream study of eight Piedmont watersheds reported B-IBI scores declined sharply at an IC threshold of 15-30%.	Meyer and Couch,2000	GA
Community Index	Montgomery County study; subwatersheds with <12% IC generally had streams in good to excellent condition based on a combined fish and aquatic insect IBI. Watersheds with >20% IC had streams in poor condition.	MNCPPC, 2000	MD
Community Index	Study of 1st, 2nd, and 3rd order streams in the Patapsco River Basin showed negative relationship between B-IBI and IC.	Dail *et al.*, 1998	MD
Community Index	While no specific threshold was observed, impacts were seen at even low levels of IC. B-IBI values declined with increasing IC, with high scores observed only in reaches with <5% IC or intact riparian zones or upstream wetlands.	Horner and May, 1999	WA
Community Index	The C-IBI also decreased by 50% at 10-15% IC. These trends were particularly strong at low-density urban sites (0-30% IC).	Maxted and Shaver, 1997	DE
Diversity	In both coastal plain and Piedmont streams, a sharp decline in aquatic insect diversity was found around 10-15% IC.	Shaver *et al.*, 1995	DE
Diversity	In a comparison of Anacostia subwatersheds, there was significant decline in the diversity of aquatic insects at 10% IC.	MWCOG, 1992	DC
Diversity	In several dozen Piedmont headwater streams, aquatic diversity declined significantly beyond 10-12% IC.	Klein, 1979	MD
EPT Value	In a 10 stream study with watershed IC ranging from three to 30%, a significant decline in EPT values was reported as IC increased (r2 = 0.76).	Davis, 2001	MO
Sensitive Species	In a study of 38 wadeable, non-tidal streams in the urban Piedmont, 90% of sensitive organisms were eliminated from the benthic community after watershed IC reaches 10-15%.	Maxted and Shaver, 1997	DE
Species Abundance EPT values	For streams draining 20 catchments across the state, an abrupt decline in species abundance and EPT taxa was observed at approximately 6% IC.	Morse, 2001	ME

Table 50: Recent Research Examining the Relationship of Other Indices of Watershed Development on Aquatic Insect Diversity in Streams			
Biotic	**Key Finding (s)**	**Source**	**Location**
	Percent Urban Land use		
Community Index	Study of 700 streams in 5 major drainage basins found that the amount of urban land and total flow of municipal effluent were the most significant factors in predicting severe impairment of the aquatic insect community. Amount of forested land in drainage area was inversely related to impairment severity.	Kennen, 1999	NJ
Community Index	All 40 urban sites sampled had fair to very poor B-IBI scores, compared to undeveloped reference sites.	Yoder, 1991	OH
Community Index	A negative correlation between B-IBI and urban land use was noted. Community characteristics show similar patterns between agricultural and forested areas the most severe degradation being in urban and suburban areas.	Meyer and Couch, 2000	GA
EPT Value, Diversity, Community Index	A comparison of three stream types found urban streams had lowest diversity and richness. Urban streams had substantially lower EPT scores (22% vs 5% as number of all taxa, 65% vs 10% as percent abundance) and IBI scores in the poor range.	Crawford and Lenat, 1989	NC
Sensitive Species	Urbanization associated with decline in sensitive taxa, such as mayflies, caddisflies and amphipods while showing increases in oligochaetes.	Pitt and Bozeman, 1982	CA
Sensitive Species	Dramatic changes in aquatic insect community were observed in most urbanizing stream sections. Changes include an abundance of pollution-tolerant aquatic insect species in urban streams.	Kemp and Spotila, 1997	PA
Diversity	As watershed development levels increased, the aquatic insect diversity declined.	Richards *et al.*, 1993	MN
Diversity	Significant negative relationship between number of aquatic insect species and degree of urbanization in 21 Atlanta streams.	Benke *et al.*, 1981	GA
Diversity	Drop in insect taxa from 13 to 4 was noted in urban streams.	Garie and McIntosh, 1986	NJ
Diversity	Aquatic insect taxa were found to be more abundant in non-urban reaches than in urban reaches of the watershed.	Pitt and Bozeman, 1982	CA
Diversity	A study of five urban streams found that as watershed land use shifted from rural to urban, aquatic insect diversity decreased.	Masterson and Bannerman, 1994	WI
	Other Land Use Indicators		
Community Index	Most degraded streams were found in developed areas, particularly older developments lacking newer and more efficient stormwater controls.	Fairfax Co., 2001	VA
Diversity	Urban streams had sharply lower aquatic insect diversity with human population above four persons/acre in northern VA.	Jones and Clark, 1987	VA
EPT Value	Monitoring of four construction sites in three varying regulatory settings found that EPT richness was related to enforcement of erosion and sediment controls. The pattern demonstrated that EPT richness was negatively affected as one moved from upstream to at the site, except for one site.	Reice, 2000	NC
Sensitive Species	In a Seattle study, aquatic insect community shifted to chironomid, oligochaetes and amphipod species that are pollution-tolerant and have simple feeding guild.	Pedersen and Perkins,1986	WA

species (based on EPT richness, % EPT abundance, and Hilsenhoff Biotic Index) were eliminated from the aquatic insect community when IC exceeded 10 to 15% in contributing watersheds of Delaware streams (Figure 46). In a recent study of 30 Maine watersheds, Morse (2001) found that reference streams with less than 5% watershed IC had significantly more EPT taxa than more urban streams. He also observed no significant differences in EPT Index values among streams with six to 27% watershed IC (Figure 47).

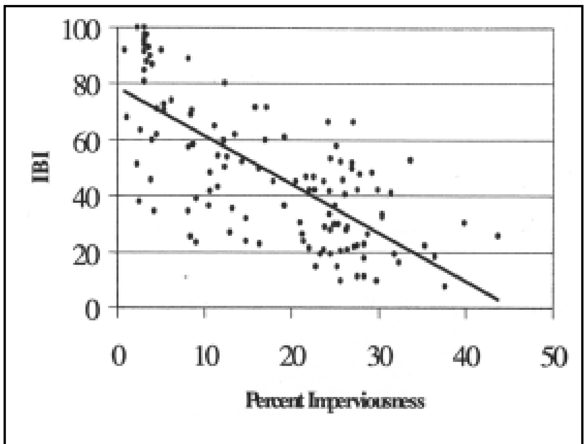


Figure 43: Trend Line Indicating Decline in Benthic IBI as IC Increases in Northern VA Streams (Fairfax County, 2001)

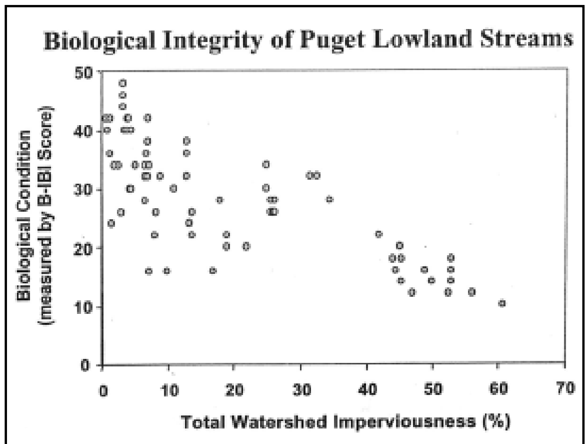


Figure 44: Relationship Between IC and B-IBI Scores in Aquatic Insects in Streams of the Puget Sound Lowlands (Booth, 2000)

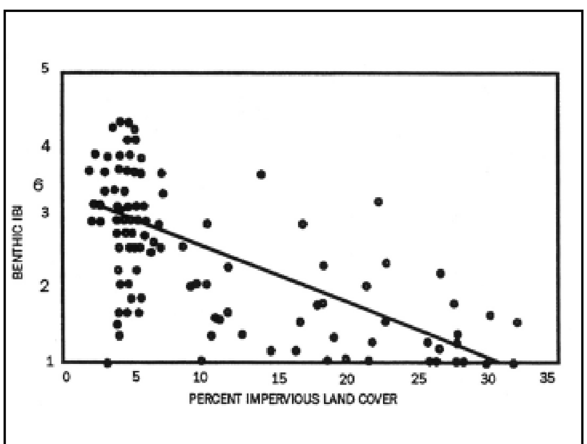


Figure 45: IC and B-IBI at Stream Sites in the Patapsco River Basin, MD (Dail *et al.*, 1998)

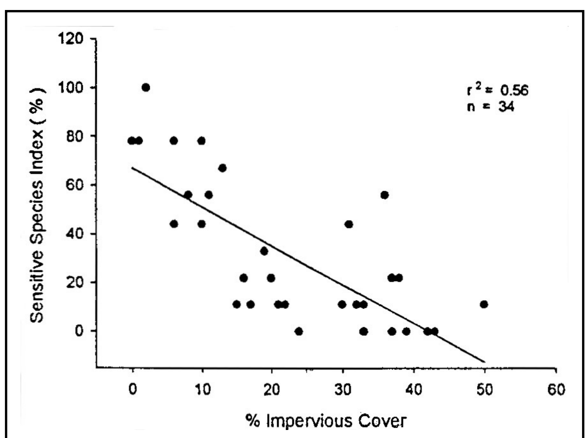


Figure 46: IC vs. Aquatic Insect Sensitivity - EPT Scores in Delaware Streams (Maxted and Shaver, 1997)

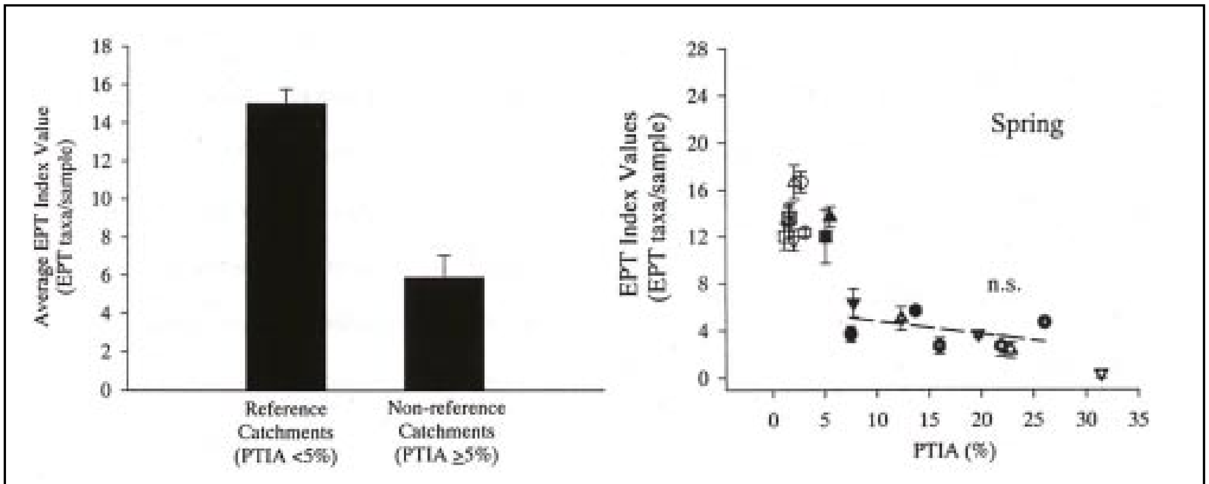


Figure 47: Average and Spring EPT Index Values vs.% IC in 20 Small Watersheds in Maine (Morse, 2001)

5.3.2 Findings Based on Other Development Indicators

Development indices, such as percent urban land use, population density, and forest and riparian cover have also been correlated with changes in aquatic insect communities in urban streams. Declines in benthic IBI scores have frequently been observed in proportion to the percent urban land use in small watersheds (Garie and McIntosh, 1986; Kemp and Spotila, 1997; Kennen, 1999; Masterson and Bannerman, 1994; Richards *et al.*, 1993; USEPA, 1982).

A study in Washington state compared a heavily urbanized stream to a stream with limited watershed development and found that the diversity of the aquatic insect community declined from 13 taxa in reference streams to five taxa in more urbanized streams (Pedersen and Perkins, 1986). The aquatic insect taxa that were lost were poorly suited to handle the variable erosional and depositional conditions found in urban streams. Similarly, a comparison of three North Carolina streams with different watershed land uses concluded the urban watershed had the least taxa and lowest EPT scores and greatest proportion of pollution-tolerant species (Crawford and Lenat, 1989).

Jones and Clark (1987) monitored 22 streams in Northern Virginia and concluded that aquatic insect diversity diminished markedly once watershed population density exceeded four or more people per acre. The population density roughly translates to ½ - 1 acre lot residential use, or about 10 to 20 % IC. Kennen (1999) evaluated 700 New Jersey streams and concluded that the percentage of watershed forest was positively correlated with aquatic insect density. Meyer and Couch (2000) reported a similar cover relationship between aquatic insect diversity and watershed and riparian forest cover for streams in the Atlanta, GA region. A study in the Puget Sound region found that aquatic insect diversity declined in streams once forest cover fell below 65% (Booth, 2000).

5.4 Effects on Fish Diversity

Fish communities are also excellent environmental indicators of stream health. In general, an increase in watershed IC produces the same kind of impact on fish diversity as it does for aquatic insects. The reduction in fish diversity is typified by a reduction in total species, loss of sensitive species, a shift toward more pollution-tolerant species, and decreased survival of eggs and larvae. More than 30 studies have examined the relationship between watershed development and fish diversity; they are summarized in Tables 51 and 52. About half of the research studies used IC as the major index of watershed development, while the remainder used other indices, such as percent urban land use, population density, housing density, and forest cover.

5.4.1 Findings Based on IC Indicators

Recent stream research shows a consistent, negative relationship between watershed development and various measures of fish diversity, such as diversity metrics, species loss and structural changes.

Typically, a notable decline in fish diversity occurs around 10 to 15% watershed IC (Boward *et al.*, 1999; Galli, 1994; Klein, 1979; Limburg and Schmidt, 1990; MNCPPC, 2000; MWCOG, 1992; Steward, 1983). A somewhat higher threshold was observed by Meyer and Couch (2000) for Atlanta streams with 15 to 30% IC; lower thresholds have also been observed (Horner *et al.*, 1997 and May *et al.*, 1997). A typical relationship between watershed IC and fish diversity is portrayed in Figure 48, which shows data from streams in the Patapsco River Basin in Maryland (Dail *et al.*, 1998). Once again, note the variability in fish-IBI scores observed below 10% IC.

Wang *et al.* (1997) evaluated 47 Wisconsin streams and found an apparent threshold around 10% IC. Fish-IBI scores were “good” to “excellent” below this threshold, but were consistently rated as “fair” to “poor.” Additionally, Wang documented that the total number of fish species drops sharply when IC increases (Figure 49). Often, researchers also reported that increases in IC were strongly correlated with several fish metrics, such as increases in non-native and pollution-tolerant species in streams in Santa Clara, California (EOA, Inc., 2001).

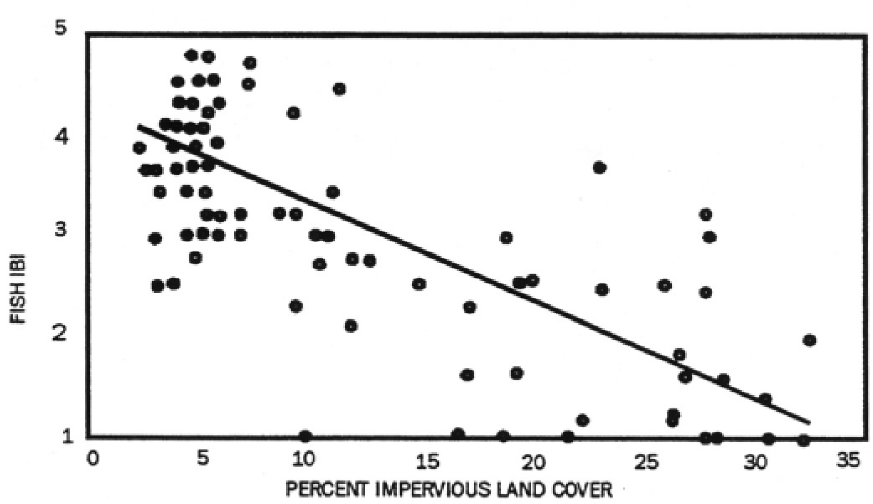


Figure 48: Fish-IBI vs. Watershed IC for Streams in the Patapsco River Basin, MD (Dail *et al.*, 1998)

Table 51: Recent Research Examining the Relationship Between Watershed IC and the Fish Community			
Biotic	**Key Finding (s)**	**Source**	**Location**
Abundance	Brown trout abundance and recruitment declined sharply at 10-15% IC.	Galli, 1994	MD
Salmonids	Seattle study showed marked reduction in coho salmon populations noted at 10-15% IC at nine streams.	Steward, 1983	WA
Anadromous Fish Eggs	Resident and anadromous fish eggs and larvae declined in 16 subwatersheds draining to the Hudson River with >10% IC area.	Limburg and Schmidt, 1990	NY
Community Index	1st, 2nd, and 3rd order streams in the Patapsco River Basin showed negative relationship between IBI and IC.	Dail *et al.*, 1998	MD
Community Index	Fish IBI and habitat scores were all ranked as poor in five subwatersheds that were greater than 30% IC.	Black and Veatch, 1994	MD
Community Index	In the Potomac subregion, subwatersheds with < 12% IC generally had streams in good to excellent condition based on a combined fish and aquatic insect IBI. Watersheds with >20% IC had streams in poor condition.	MNCPPC, 2000	MD
Community Index	In a two-year study of Piedmont streams draining eight watersheds representing various land uses in Chattahochee River Basin, fish community quality dropped sharply at an IC threshold of 15-30%.	Meyer and Couch, 2000	GA
Diversity	Of 23 headwater stream stations, all draining <10% IC areas, rated as good to fair; all with >12% were rated as poor. Fish diversity declined sharply with increasing IC between 10-12%.	Schueler and Galli, 1992	MD
Diversity, Sensitive Species	Comparison of 4 similar subwatersheds in Piedmont streams, there was significant decline in the diversity of fish at 10% IC. Sensitive species (trout and sculpin) were lost at 10-12%.	MWCOG, 1992	MD
Diversity, Community Index	In a comparison of watershed land use and fish community data for 47 streams between the 1970s and 1990s, a strong negative correlation was found between number species and IBI scores with effective connected IC. A threshold of 10% IC was observed with community quality highly variable below 10% but consistently low above 10% IC.	Wang *et al.*, 1997	WI
Diversity	In several dozen Piedmont headwater streams fish diversity declined significantly in areas beyond 10-12% IC.	Klein, 1979	MD
Diversity , Abundance, Non-native Species	IC strongly associated with several fisheries species and individual-level metrics, including number of pollution-tolerant species, diseased individuals, native and non-native species and total species present	EOA, Inc., 2001	CA
Juvenile Salmon Ratios	In Puget Sound study, the steepest decline of biological functioning was observed after six percent IC. There was a steady decline, with approximately 50% reduction in initial biotic integrity at 45% IC area.	Horner *et al.*, 1997	WA
Juvenile Salmon Ratio	Physical and biological stream indicators declined most rapidly during the initial phase of the urbanization process as total IC area exceeded the five to 10% range.	May *et al.*, 1997	WA
Salmonoid	Negative effects of urbanization (IC) with the defacto loss of non-structural BMPs (wetland forest cover and riparian integrity) on salmon ratios	Horner *et al.*, 2001	WA, MD, TX
Salmonoid, Sensitive Species	While no specific threshold was observed (impacts seen at even low levels of IC), Coho/cutthroat salmon ratios >2:1 were found when IC was < 5%. Ratios fell below one at IC levels below 20 %.	Horner and May, 1999	WA
Sensitive species, Salmonid	Three years stream sampling across the state (approximately 1000 sites), MBSS found that when IC was >15%, stream health was never rated good based on CBI, and pollution sensitive brook trout were never found in streams with >2% IC.	Boward *et al.*, 1999	MD
Sensitive Species, Salmonids	Seattle study observed shift from less tolerant coho salmon to more tolerant cutthroat trout population between 10 and 15% IC at nine sites.	Luchetti and Feurstenburg 1993	WA

Sensitive fish are defined as species that strongly depend on clean and stable bottom substrates for feeding and/or spawning. Sensitive fish often show a precipitous decline in urban streams. The loss of sensitive fish species and a shift in community structure towards more pollution-tolerant species is confirmed by multiple studies. Figure 50 shows the results of a comparison of four similar subwatersheds in the Maryland Piedmont that were sampled for the number of fish species present (MWCOG, 1992). As the level of watershed IC increased, the number of fish species collected dropped. Two sensitive species, including sculpin, were lost when IC increased from 10 to 12%, and four more species were lost when IC reached 25%. Significantly, only two species remained in the fish community at 55% watershed IC.

Salmonid fish species (trout and salmon) and anadromous fish species appear to be particularly impacted by watershed IC. In a study in the Pacific Northwest, sensitive coho salmon were seldom found in watersheds above 10 or 15% IC (Luchetti and Feurstenburg, 1993 and Steward, 1983). Key stressors in urban streams, such as higher peak flows, lower dry weather flows, and reduction in habitat complexity (e.g. fewer pools, LWD, and hiding places) are believed to change salmon species composition, favoring cutthroat trout populations over the natural coho populations (WDFW, 1997).

A series of studies from the Puget Sound reported changes in the coho/cutthroat ratios of juvenile salmon as watershed IC increased (Figure 51). Horner *et al.* (1999) found Coho/Cutthroat ratios greater than 2:1 in watersheds with less than 5 % IC. Ratios fell below 1:1 when IC exceeded 20%. Similar results were reported by May *et al.* (1997). In the mid-Atlantic region, native trout have stringent temperature and habitat requirements and are seldom present in watersheds where IC exceeds 15% (Schueler, 1994a). Declines in trout spawning success are evident above 10% IC. In a study of over 1,000 Maryland streams, Boward *et al.* (1999) found that sensitive brook trout were never found in streams that had more than 4% IC in their contributing watersheds.

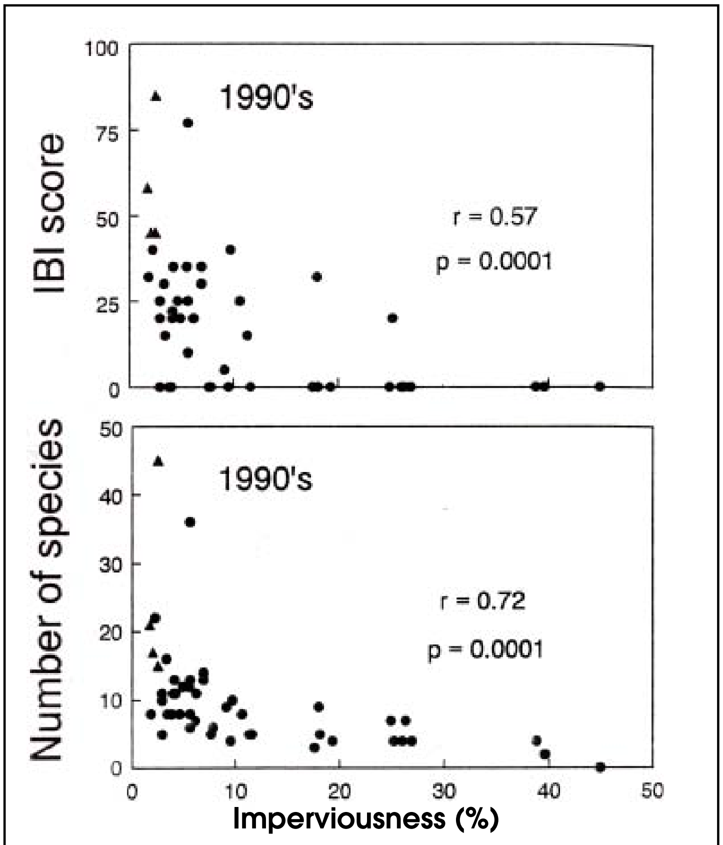


Figure 49: Fish-IBI and Number of Species vs. % IC in Wisconsin Streams (Wang *et al.*, 1997)

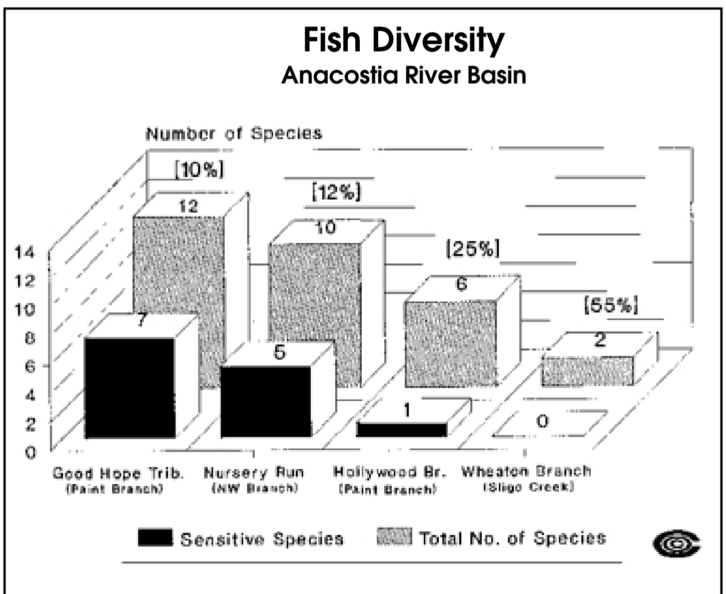


Figure 50: IC and Effects on Fish Species Diversity in Four Maryland Subwatersheds (MWCOG, 1992)

Table 52: Recent Research Examining Urbanization and Freshwater Fish Community Indicators			
Biotic	**Key Finding (s)**	**Source**	**Location**
Urbanization			
Community Index	All 40 urban sites sampled had fair to very poor IBI scores, compared to undeveloped reference sites.	Yoder, 1991	OH
Community Index	Negative correlations between biotic community and riparian conditions and forested areas were found. Similar levels of fish degradation were found between suburban and agricultural; urban areas were the most severe.	Meyer and Couch, 2000	GA
Community Index	Residential urban land use caused significant decrease in fish-IBI scores at 33%. In more urbanized Cuyahoga, a significant drop in IBI scores occurred around 8% urban land use in the watershed. When watersheds smaller than 100mi^2 were analyzed separately, the level of urban land associated with a significant drop in IBI scores occurred at around 15%. Above one du/ac, most sites failed to attain biocriteria regardless of degree of urbanization.	Yoder *et al*., 1999	OH
Community Index, Abundance	As watershed development increased to about 10%, fish communities simplified to more habitat and trophic generalists and fish abundance and species richness declined. IBI scores for the urbanized stream fell from the good to fair category.	Weaver, 1991	VA
Diversity	A study of five urban streams found that as land use shifted from rural to urban, fish diversity decreased.	Masterson and Bannerman, 1994	WI
Diversity, Community Index	A comparison of three stream types found urban streams had lowest diversity and richness. Urban streams had IBI scores in the poor range.	Crawford and Lenat, 1989	NC
Salmon Spawning, Flooding Frequency	In comparing three streams over a 25-year period (two urbanizing and one remaining forested), increases in flooding frequencies and decreased trends in salmon spawning were observed in the two urbanizing streams, while no changes in flooding or spawning were seen in the forested system.	Moscript and Montgomery, 1997	WA
Sensitive Species	Observed dramatic changes in fish communities in most urbanizing stream sections, such as absence of brown trout and abundance of pollution-tolerant species in urban reaches.	Kemp and Spotila, 1997	PA
Sensitive Species, Diversity	Decline in sensitive species diversity and composition and changes in trophic structure from specialized feeders to generalists was seen in an urbanizing watershed from 1958 to 1990. Low intensity development was found to affect warm water stream fish communities similarly as more intense development.	Weaver and Garman, 1994	VA
Warm Water Habitat Biocriteria	25-30% urban land use defined as the upper threshold where attainment of warm water habitat biocriterion is effectively lost. Non-attainment also may occur at lower thresholds given the co-occurrence of stressors, such as pollution legacy, WTPs and CSOs.	Yoder and Miltner, 2000	OH
Community Index, Habitat	The amount of urban land use upstream of sample sites had a strong negative relationship with biotic integrity, and there appeared to be a threshold between 10 and 20% urban land use where IBI scores declined dramatically. Watersheds above 20% urban land invariably had scores less than 30 (poor to very poor). Habitat scores were not tightly correlated with degraded fish community attributes.	Wang *et al.*, 1997	WI
Community Index	A study in the Patapsco Basin found significant correlation of fish IBI scores with percent urbanized land over all scales (catchment, riparian area, and local area).	Roth *et al.*, 1998	MD

Table 52 (continued): Recent Research Examining Urbanization and Freshwater Fish Community Indicators			
Biotic	**Key Finding (s)**	**Source**	**Location**
Urbanization			
Sensitive Species	Evaluated effects of runoff in both urban and non-urban streams; found that native species dominated the non-urban portion of the watershed but accounted for only seven percent of species found in the urban portions of the watershed.	Pitt, 1982	CA
Other Land Use Indicators			
Community Index, Habitat	Atlanta study found that as watershed population density increased, there was a negative impact on urban fish and habitat. Urban stream IBI scores were inversely related to watershed population density, and once density exceeded four persons/acre, urban streams were consistently rated as very poor.	Couch *et al.*, 1997	GA
Community Index	In an Atlanta stream study, modified IBI scores declined once watershed population density exceeds four persons/acre in 21 urban watersheds	DeVivo *et al.*, 1997	GA
Community Index	In a six-county study (including Chicago, its suburbs and outlying rural/agricultural areas), streams showed a strong correlation between population density and fish community assessments such that as population density increased, community assessment scores went from the better - good range to fair - poor. Significant impacts seen at 1.5 people/acre.	Dreher, 1997	IL
Community Index	Similarly, negative correlations between biotic community and riparian conditions and forested areas were also found. Similar levels of fish degradation were found between suburban and agricultural; urban areas were the most severe.	Meyer and Couch, 2000	GA
Community Index	Amount of forested land in basin directly related to IBI scores for fish community condition.	Roth *et al.*, 1996	MD
Salmonid, Sensitive Species	Species community changes from natural coho salmon to cutthroat trout population with increases in peak flow, lower low flow, and reductions in stream complexity.	WDFW, 1997	WA

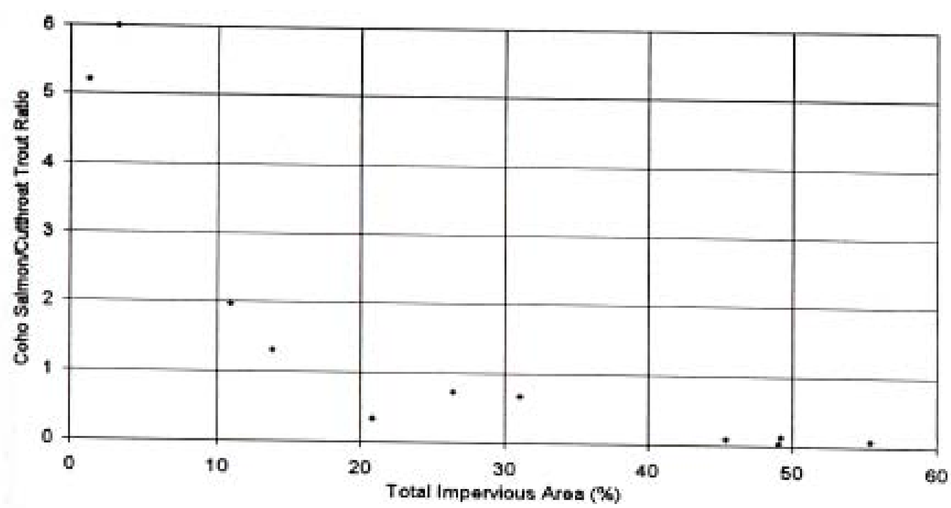


Figure 51: Coho Salmon/Cutthroat Trout Ratio for Puget Sound Streams (Horner *et al.*, 1997)

Many fish species have poor spawning success in urban streams and poor survival of fish eggs and fry. Fish barriers, low intragravel dissolved oxygen, sediment deposition and scour are all factors that can diminish the ability of fish species to successfully reproduce. For example, Limburg and Schmidt (1990) discovered that the density of anadromous fish eggs and larvae declined sharply in subwatersheds with more than 10% IC.

5.4.2 Findings Based on Other Development Indicators

Urban land use has frequently been used as a development indicator to evaluate the impact on fish diversity. Streams in urban watersheds typically had lower fish species diversity and richness than streams located in less developed watersheds. Declines in fish diversity as a function of urban land cover have been documented in numerous studies (Crawford and Lenat, 1989; Masterson and Bannerman, 1994; Roth *et al., 1998;* Yoder, 1991, and Yoder *et al.*, 1999). USEPA (1982) found that native fish species dominated the fish community of non-urban streams, but accounted for only 7% of the fish community found in urban streams. Kemp and Spotila (1997) evaluated streams in Pennsylvania and noted the loss of sensitive species (e.g. brown trout) and the increase of pollution-tolerant species, such as sunfish and creek chub (Figure 52).

Wang *et al.* (1997) cited percentage of urban land in Wisconsin watersheds as a strong negative factor influencing fish-IBI scores in streams and observed strong declines in IBI scores with 10 to 20% urban land use. Weaver and Garman (1994) compared the historical changes in the warm-water fish community of a Virginia stream that had undergone significant urbanization and found that many of the sensitive species present in 1958 were either absent or had dropped sharply in abundance when the watershed was sampled in 1990. Overall abundance had dropped from 2,056 fish collected in 1958 to 417 in 1990. In addition, the 1990 study showed that 67% of the catch was bluegill and common shiner, two species that are habitat and trophic "generalists." This shift in community to more habitat and trophic generalists was observed at 10% urban land use (Weaver, 1991).

Yoder *et al.* (1999) evaluated a series of streams in Ohio and reported a strong decrease in warm-water fish community scores around 33% residential urban land use. In the more urbanized Cuyahoga streams, sharp drops in

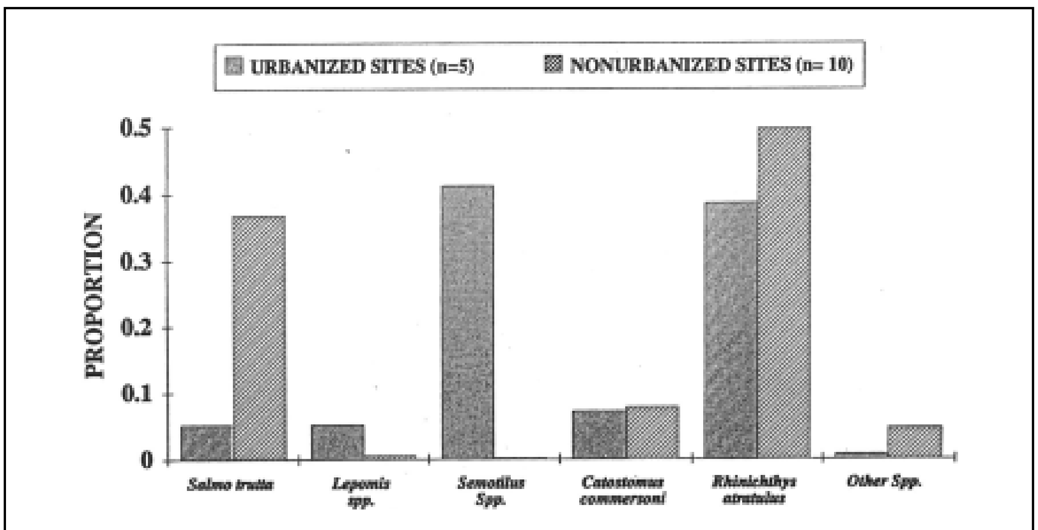


Figure 52: Mean Proportion of Fish Taxa in Urban and Non-Urban Streams, Valley Forge Watershed, PA (Kemp and Spotila, 1997)

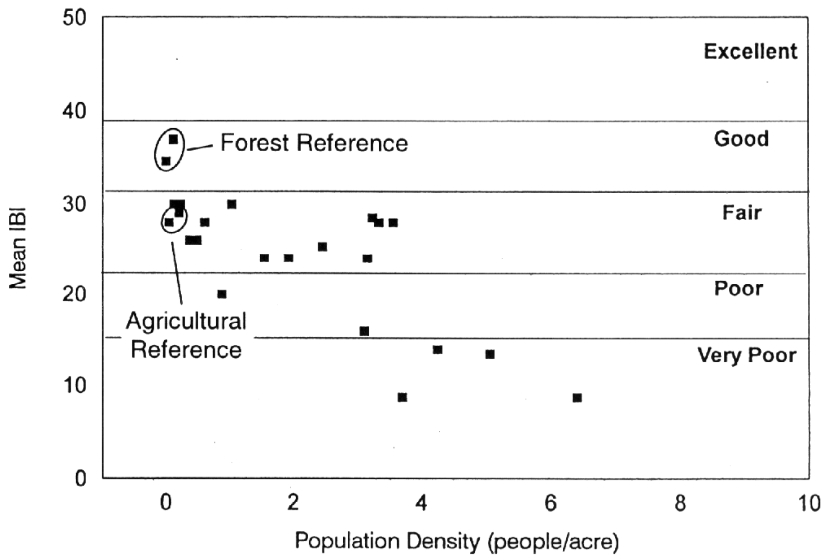


Figure 53: Relationship Between Watershed Population Density and Stream IBI Scores in Georgia Streams (DeVivo *et al.*, 1997)

fish-IBI scores occurred around 8% urban land use, primarily due to certain stressors which functioned to lower the non-attainment threshold. When watersheds smaller than 100mi^2 were analyzed separately, the percentage of urban land use associated with a sharp drop in fish-IBI scores was around 15%. In a later study, Yoder and Miltner (2000) described an upper threshold for quality warm-water fish habitat at 25 to 30% urban land use.

Watershed population and housing density have also been used as indicators of the health of the fish community. In a study of 21 urban watersheds in Atlanta, DeVivo *et al.* (1997) observed a shift in mean fish-IBI scores from "good to fair" to "very poor" when watershed population density exceeded four people/acre (Figure 53). A study of Midwest streams in metropolitan Illinois also found a negative relationship between increase in population density and fish communities, with significant impacts detected at population densities of 1.5 people or greater per acre (Dreher, 1997). In the Columbus and Cuyahoga watersheds in Ohio, Yoder *et al.* (1999) concluded that most streams failed to attain fish biocriteria above one dwelling unit/acre.

5.5 Effects on Amphibian Diversity

Amphibians spend portions of their life cycle in aquatic systems and are frequently found within riparian, wetland or littoral areas. Relatively little research has been conducted to directly quantify the effects of watershed development on amphibian diversity. Intuitively, it would appear that the same stressors that affect fish and aquatic insects would also affect amphibian species, along with riparian wetland alteration. We located four research studies on the impacts of watershed urbanization on amphibian populations; only one was related to streams (Boward *et al.,* 1999), while others were related to wetlands (Table 53).

A primary factor influencing amphibian diversity appears to be water level fluctuations (WLF) in urban wetlands that occur as a result of increased stormwater discharges. Chin (1996) hypothesized that increased WLF and other hydrologic factors affected the abundance of egg clutches and available amphibian breeding habitat, thereby ultimately influencing amphibian richness. Increased WLF can limit reproductive success by eliminating mating habitat and the emergent vegetation to which amphibians attach their eggs.

Taylor (1993) examined the effect of watershed development on 19 freshwater wetlands in King County, WA and concluded that the additional stormwater contributed to greater annual WLF. When annual WLF exceeded about eight inches, the richness of both the wetland plant and amphibian communities dropped sharply. Large increases in WLF were consistently observed in freshwater wetlands when IC in upstream watersheds exceeded 10 to 15%. Further research on streams and wetlands in the Pacific northwest by Horner *et al.* (1997) demonstrated the correlation between watershed IC and diversity of amphibian species. Figure 54 illustrates the relationship between amphibian species abundance and watershed IC, as documented in the study.

Table 53: Recent Research on the Relationship Between Percent Watershed Urbanization and the Amphibian Community

Indicator	Key Finding(s)	Reference Year	Location
% IC			
Reptile and Amphibian Abundance	In a three-year stream sampling across the state (approximately 1000 sites), MBSS found only hardy pollution-tolerant reptiles and amphibians in stream corridors with >25% IC drainage area.	Boward *et al.*, 1999	MD
Amphibian Density	Mean annual water fluctuation inversely correlated to amphibian density in urban wetlands. Declines noted beyond 10% IC.	Taylor, 1993	WA
Other Studies			
Species Richness	In 30 wetlands, species richness of reptiles and amphibians was significantly related to density of paved roads on lands within a two kilometer radius.	Findlay and Houlahan, 1997	Ontario
Species Richness	Decline in amphibian species richness as wetland WLF increased. While more of a continuous decline rather than a threshold, WLF = 22 centimeters may represent a tolerance boundary for amphibian community.	Horner *et al.*, 1997	WA
Amphibian Density	Mean annual water fluctuation inversely correlated to amphibian density in urban wetlands.	Taylor, 1993	WA

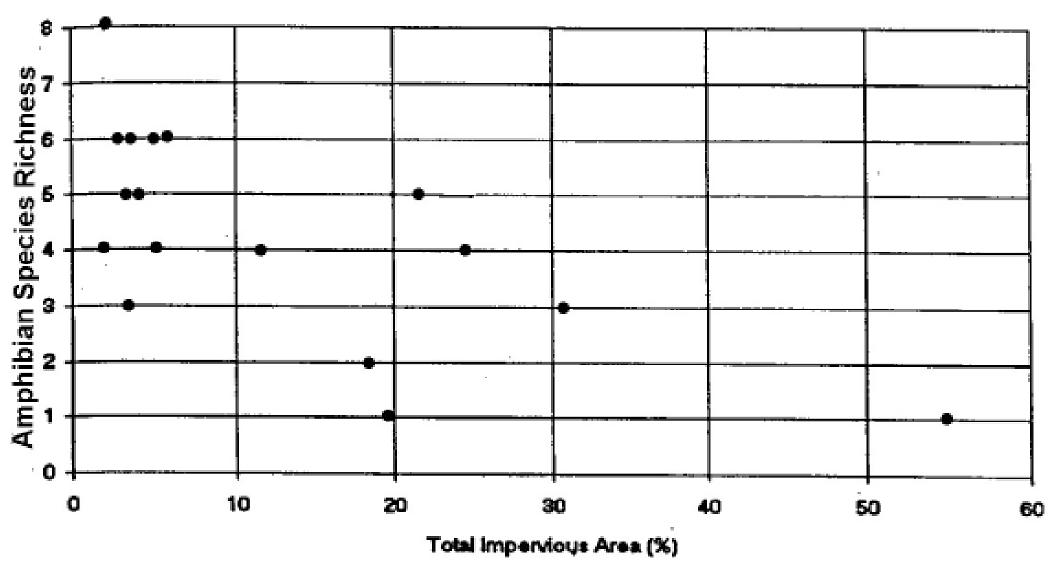


Figure 54: Amphibian Species Richness as a Function of Watershed IC in Puget Sound Lowland Wetlands (Horner *et al.*, 1997)

5.6 Effects on Wetland Diversity

We found a limited number of studies that evaluated the impact of watershed urbanization on wetland plant diversity (Table 54). Two studies used IC as an index of watershed development and observed reduced wetland plant diversity around or below 10% IC (Hicks and Larson, 1997 and Taylor, 1993). WLF and road density were also used as indicators (Findlay and Houlahan, 1997; Horner *et al.*, 1997; Taylor, 1993).

Horner *et al.* (1997) reported a decline in plant species richness in emergent and scrub-shrub wetland zones of the Puget Sound region as WLF increased. They cautioned that species numbers showed a continuous decline rather than a threshold value; however, it was indicated that WLF as small as 10 inches can represent a tolerance boundary for wetland plant communities. Horner further stated that in 90% of the cases where WLF exceeded 10 inches, watershed IC exceeded 21%.

Table 54: Recent Research Examining the Relationship Between Watershed Development and Urban Wetlands

Watershed Indicator Biotic	Key Finding(s)	Reference	Location
% IC			
Insect Community	Significant declines in various indicators of wetland aquatic macro-invertebrate community health were observed as IC increased to 8-9%.	Hicks and Larson, 1997	CT
WLF, Water Quality	There is a significant increase in WLF, conductivity, fecal coliform bacteria, and total phosphorus in urban wetland as IC exceeds 3.5%.	Taylor *et al.*, 1995	WA
Plant Density	Declines in urban wetland plant density noted in areas beyond 10% IC.	Taylor, 1993	WA
Other Watershed Indicators			
Plant Density	Mean annual water fluctuation inversely correlated to plant density in urban wetlands.	Taylor, 1993	WA
Plant Species Richness	Decline in plant species richness in emergent and scrub-shrub wetland zones as WLF increased. While more of a continuous decline, rather than a threshold, WLF=22 centimeters may represent a tolerance boundary for the community	Horner *et al.*, 1997	WA
Plant Species Richness	In 30 wetlands, species richness was significantly related to density of paved roads within a two kilometer radius of the wetland. Model predicted that a road density of 2kilometers per hectare in paved road within 1000 meters of wetland will lead to a 13% decrease in wetland plant species richness.	Findlay and Houlahan,1997	Ontario

5.7 Effects on Freshwater Mussel Diversity

Freshwater mussels are excellent indicators of stream quality since they are filter-feeders and essentially immobile. The percentage of imperiled mussel species in freshwater ecoregions is high (Williams *et al.*, 1993). Of the 297 native mussel species in the United States, 72% are considered endangered, threatened, or of special concern, including 21 mussel species that are presumed to be extinct. Seventy mussel species (24%) are considered to have stable populations, although many of these have declined in abundance and distribution. Modification of aquatic habitats and sedimentation are the primary reasons cited for the decline of freshwater mussels (Williams *et al.,* 1993).

Freshwater mussels are very susceptible to smothering by sediment deposition. Consequently, increases in watershed development and sediment loading are suspected to be a factor leading to reduced mussel diversity. At sublethal levels, silt interferes with feeding and metabolism of mussels in general (Aldridge *et al.*, 1987). Major sources of mortality and loss of diversity in mussels include impoundment of rivers and streams, and eutrophication (Bauer, 1988). Changes in fish diversity and abundance due to dams and impoundments can also influence the availability of mussel hosts (Williams *et al.*, 1992).

Freshwater mussels are particularly sensitive to heavy metals and pesticides (Keller and Zam, 1991). Although the effects of metals and pesticides vary from one species to another, sub-lethal levels of PCBs, DDT, Malathion, Rotenone and other compounds are generally known to inhibit respiratory efficiency and accumulate in tissues (Watters, 1996). Mussels are more sensitive to pesticides than many other animals tested and often act as “first-alerts” to toxicity long before they are seen in other organisms.

We were unable to find any empirical studies relating impacts of IC on the freshwater mussel communities of streams.

5.8 Conclusion

The scientific record is quite strong with respect to the impact of watershed urbanization on the integrity and diversity of aquatic communities. We reviewed 35 studies that indicated that increased watershed development led to declines in aquatic insect diversity and about 30 studies showing a similar impact on fish diversity. The scientific literature generally shows that aquatic insect and freshwater fish diversity declines at fairly low levels of IC (10 to 15%), urban land use (33%), population density (1.5 to eight people/acre) and housing density (>1 du/ac). Many studies also suggest that sensitive elements of the aquatic community are affected at even lower levels of IC. Other impacts include loss of sensitive species and reduced abundance and spawning success. Research supports the ICM, although additional research is needed to establish the upper threshold at which watershed development aquatic biodiversity can be restored.

One area where more research is needed involves determining how regional and climatic variations affect aquatic diversity in the ICM. Generally, it appears that the 10% IC threshold applies to streams in the East Coast and Midwest, with Pacific Northwest streams showing impacts at a slightly higher level. For streams in the arid and semi-arid Southwest, it is unclear what, if any, IC threshold exists given the naturally stressful conditions for these intermittent and ephemeral streams (Maxted, 1999). Southwestern streams are characterized by seasonal bursts of short but intense rainfall and tend to have aquatic communities that are trophically simple and relatively low in species richness (Poff and Ward, 1989).

Overall, the following conclusions can be drawn:

- IC is the most commonly used index to assess the impacts of watershed urbanization on aquatic insect and fish diversity. Percent urban land use is also a common index.
- The ICM may not be sensitive enough to predict biological diversity in watersheds with low IC. For example, below 10% watershed IC, other watershed variables such as riparian continuity, natural forest cover, cropland, ditching and acid rain may be better for predicting stream health.
- More research needs to be done to determine the maximum level of watershed development at which stream diversity can be restored or maintained. Additionally, the capacity of stormwater treatment practices and stream buffers to mitigate high levels of watershed IC warrants more systematic research.
- More research is needed to test the ICM on amphibian and freshwater mussel diversity.

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Glossary

1st order stream: The smallest perennial stream. A stream that carries water throughout the year and does not have permanently flowing tributaries.

2nd order stream: Stream formed by the confluence of two 1st order streams.

3rd order stream: Stream formed by the confluence of two 2nd order streams.

Acute toxicity: Designates exposure to a dangerous substance or chemical with sufficient dosage to precipitate a severe reaction, such as death.

Alluvial: Pertaining to processes or materials associated with transportation or deposition by running water.

Anadromous: Organisms that spawn in freshwater streams but live most of their lives in the ocean.

Annual Pollutant Load: The total mass of a pollutant delivered to a receiving water body in a year.

Bankfull: The condition where streamflow just fills a stream channel up to the top of the bank and at a point where the water begins to overflow onto a floodplain.

Baseflow: Stream discharge derived from ground water that supports flow in dry weather.

Bedload: Material that moves along the stream bottom surface, as opposed to suspended particles.

Benthic Community: Community of organisms living in or on bottom substrates in aquatic habitats, such as streams.

Biological Indicators: A living organism that denotes the presence of a specific environmental condition.

Biological Oxygen Demand (BOD): An indirect measure of the concentration of biologically degradable material present in organic wastes. It usually reflects the amount of oxygen consumed in five days by bacterial processes breaking down organic waste.

Carcinogen: A cancer-causing substance or agent.

Catchment: The smallest watershed management unit. Defined as the area of a development site to its first intersection with a stream, usually as a pipe or open channel outfall.

Chemical Oxygen Demand (COD): A chemical measure of the amount of organic substances in water or wastewater. Non-biodegradable and slowly degrading compounds that are not detected by BOD are included.

Chronic Toxicity: Showing effects only over a long period of time.

Combined Sewer Overflow (CSO): Excess flow (combined wastewater and stormwater runoff) discharged to a receiving water body from a combined sewer network when the capacity of the sewer network and/or treatment plant is exceeded, typically during storm events.

Combined Indices (C-IBI or CSPS): Combined indices that use both fish and aquatic insect metrics and a variety of specific habitat scores to classify streams.

Cryptosporidium parvum: A parasite often found in the intestines of livestock which contaminates water when animal feces interacts with a water source.

Deicer: A compound, such as ethylene glycol, used to melt or prevent the formation of ice.

Dissolved Metals: The amount of trace metals dissolved in water.

Dissolved Phosphorus: The amount of phosphorus dissolved in water.

Diversity: A numerical expression of the evenness and distribution of organisms.

Ecoregion: A continuous geographic area over which the climate is uniform to permit the development of similar ecosystems on sites with similar geophysical properties.

Embeddedness: Packing of pebbles or cobbles with fine-grained silts and clays.

EPT Index: A count of the number of families of each of the three generally pollution-sensitive orders: Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies).

Escherichia coli (E. coli): A bacteria that inhabits the intestinal tract of humans and other warm-blooded animals. Although it poses no threat to human health, its presence in drinking water does indicate the presence of other, more dangerous bacteria.

Eutrophication: The process of over-enrichment of water bodies by nutrients, often typified by the presence of algal blooms.

Fecal coliform: Applied to E. coli and similar bacteria that are found in the intestinal tract of humans and animals. Coliform bacteria are commonly used as indicators of the presence of pathogenic organisms. Their presence in water indicates fecal pollution and potential contamination by pathogens.

Fecal streptococci: Bacteria found in the intestine of warm-blooded animals. Their presence in water is considered to verify fecal pollution.

Fish Blockages: Infrastructures associated with urbanization, such as bridges, dams, and culverts, that affect the ability of fish to move freely upstream and downstream in watersheds. Can prevent re-colonization of resident fish and block the migration of anadromous fish.

Flashiness: Percent of flows exceeding the mean flow for the year. A flashy hydrograph would have larger, shorter-duration hydrograph peaks.

Geomorphic: The general characteristic of a land surface and the changes that take place in the evolution of land forms.

Giardia lamblia: A flagellate protozoan that causes severe gastrointestinal illness when it contaminates drinking water.

Herbicide: Chemicals developed to control or eradicate plants.

Hotspot: Area where land use or activities generate highly contaminated runoff, with concentrations of pollutants in excess of those typically found in stormwater.

Hydrograph: A graph showing variation in stage (depth) or discharge of a stream of water over a period of time.

Illicit discharge: Any discharge to a municipal separate storm sewer system that is not composed entirely of storm water, except for discharges allowed under an NPDES permit.

Impervious Cover: Any surface in the urban landscape that cannot effectively absorb or infiltrate rainfall.

Impervious Cover Model (ICM): A general watershed planning model that uses percent watershed impervious cover to predict various stream quality indicators. It predicts expected stream quality declines when watershed IC exceeds 10% and severe degradation beyond 25% IC.

Incision: Stream down-cuts and the channel expands in the vertical direction.

Index of Biological Integrity (IBI): Tool for assessing the effects of runoff on the quality of the aquatic ecosystem by comparing the condition of multiple groups of organisms or taxa against the levels expected in a healthy stream.

Infiltration: The downward movement of water from the surface to the subsoil. The infiltration capacity is expressed in terms of inches per hour.

Insecticide: Chemicals developed to control or eradicate insects.

Large Woody Debris (LWD): Fundamental to stream habitat structure. Can form dams and pools; trap sediment and detritus; provide stabilization to stream channels; dissipate flow energy and promote habitat complexity.

Mannings N: A commonly used roughness coefficient; actor in velocity and discharge formulas representing the effect of channel roughness on energy losses in flowing water.

Methyl Tertiary-Butyl Ether: An oxygenate and gasoline additive used to improve the efficiency of combustion engines in order to enhance air quality and meet air pollution standards. MTBE has been found to mix and move more easily in water than many other fuel components, thereby making it harder to control, particularly once it has entered surface or ground waters.

Microbe: Short for microorganism. Small organisms that can be seen only with the aid of a microscope. Most frequently used to refer to bacteria. Microbes are important in the degradation and decomposition of organic materials.

Nitrate: A chemical compound having the formula NO_3. Excess nitrate in surface waters can lead to excessive growth of aquatic plants.

Organic Matter: Plant and animal residues, or substances made by living organisms. All are based upon carbon compounds.

Organic Nitrogen: Nitrogen that is bound to carbon-containing compounds. This form of nitrogen must be subjected to mineralization or decomposition before it can be used by the plant community.

Overbank Flow: Water flow over the top of the bankfull channel and onto the floodplain.

Oxygenate: To treat, combine, or infuse with oxygen.

Peak Discharge: The maximum instantaneous rate of flow during a storm, usually in reference to a specific design storm event.

Pesticides: Any chemical agent used to control specific organisms, for example, insecticides, herbicides, fungicides and rodenticides.

Piedmont: Any plain, zone or feature located at the foot of a mountain. In the United States, the Piedmont (region) is a plateau extending from New Jersey to Alabama and lying east of the Appalachian Mountains.

Pool: A stream feature where there is a region of deeper, slow-moving water with fine bottom materials. Pools are the slowest and least turbulent of the riffle/run/pool category.

Protozoan: Any of a group of single-celled organisms.

Rapid Bioassessment Protocols (RBP): An integrated assessment, comparing habitat, water quality and biological measures with empirically defined reference conditions.

Receiving Waters: Rivers, lakes, oceans, or other bodies of water that receive water from another source.

Riffle: Shallow rocky banks in streams where water flows over and around rocks disturbing the water surface; often associated with whitewater. Riffles often support diverse biological communities due to their habitat niches and increased oxygen levels created by the water disturbance. Riffles are the most swift and turbulent in the riffle/run/pool category.

Roughness: A measurement of the resistance that streambed materials, vegetation, and other physical components contribute to the flow of water in the stream channel and flood-plain. It is commonly measured as the Manning's roughness coefficient (Manning's N).

Run: Stream feature characterized by water flow that is moderately swift flow, yet not particularly turbulent. Runs are considered intermediate in the riffle/run/pool category.

Runoff Coefficient: A value derived from a site impervious cover value that is applied to a given rainfall volume to yield a corresponding runoff volume.

Salmonid: Belonging to the family Salmonidae, which includes trout and salmon.

Sanitary Sewer Overflow (SSO): Excess flow of wastewater (sewage) discharged to a receiving water body when the capacity of the sewer network and/or treatment plant is exceeded, typically during storm events.

Semi-arid: Characterized by a small amount of annual precipitation, generally between 10 and 20 inches.

Simple Method: Technique used to estimate pollutant loads based on the amount of IC found in a catchment or subwatershed.

Sinuosity: A measure of channel curvature, usually quantified as the ratio of the length of the channel to the length of a straight line along the valley axis. It is, in essence, a ratio of the stream's actual running length to its down-gradient length.

Soluble Phosphorus: The amount of phosphorus available for uptake by plants and animals.

Stormwater: The water produced as a result of a storm.

Subwatershed: A smaller geographic section of a larger watershed unit with a drainage area of between two to 15 square miles and whose boundaries include all the land area draining to a point where two 2nd order streams combine to form a 3rd order stream.

Total Dissolved Solids (TDS): A measure of the amount of material dissolved in water (mostly inorganic salts).

Total Kjeldhal Nitrogen (TKN): The total concentration of nitrogen in a sample present as ammonia or bound in organic compounds.

Total Recoverable Metals: The amount of a metal that is in solution after a representative suspended sediment sample has been digested by a method (usually using a dilute acid solution) that results in dissolution of only readily soluble substances).

Total Maximum Daily Load (TMDL): The maximum quantity of a particular water pollutant that can be discharged into a body of water without violating a water quality standard.

Total Nitrogen (Total N): A measure of the total amount of nitrate, nitrite and ammonia concentrations in a body of water.

Total Organic Carbon (TOC): A measure of the amount of organic material suspended or dissolved in water.

Total Phosphorous (Total P): A measure of the concentration of phosphorus contained in a body of water.

Total Suspended Solids (TSS): The total amount of particulate matter suspended in the water column.

Trophic Level: The position of an organism in a food chain or food pyramid.

Turbidity: A measure of the reduced transparency of water due to suspended material which carries water quality and aesthetic implications. Applied to waters containing suspended matter that interferes with the passage of light through the water or in which visual depth is restricted.

Volatile Organic Compounds (VOC): Chemical compounds which are easily transported into air and water. Most are industrial chemicals and solvents. Due to their low water solubility they are commonly found in soil and water.

April 10 and 11, 2013
Item No. 8
Supporting Document No. 5

United States General Accounting Office

GAO

Report to Congressional Requesters

June 2001

WATER QUALITY

Better Data and Evaluation of Urban Runoff Programs Needed to Assess Effectiveness

GAO
Accountability * Integrity * Reliability

GAO-01-679

April 10 and 11, 2013
Item No. 8
Supporting Document No. 5

Contents

Abbreviations

BMP	best management practices
CSO	combined sewer overflow
DOT	Department of Transportation
DPW	Department of Public Works
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
MCTT	Multi-Chambered Treatment Tank
MDE	Maryland Department of Environment
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
PAH	polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenyls
TEA-21	Transportation Equity Act for the 21^{st} Century
TMDL	total maximum daily load
USGS	U.S. Geological Survey
WDNR	Wisconsin Department of Natural Resources
WPDES	Wisconsin Pollutant Discharge Elimination System

GAO
Accountability * Integrity * Reliability

United States General Accounting Office
Washington, D.C. 20548

June 29, 2001

The Honorable Olympia Snowe
United States Senate

The Honorable Sherrod Brown
The Honorable Martin Meehan
The Honorable James Oberstar
The Honorable Jack Quinn
House of Representatives

Nonpoint source pollution—that is, pollution from contaminants picked up and carried into surface water by water running over land—is known to be one of the leading causes of water quality problems in the United States. Water that runs over developed areas, including paved surfaces such as roads and parking lots, before reaching a water body is known as urban runoff and is an increasingly important category of water pollution. As urban areas have expanded over the past several decades, the amount of urban runoff has also increased. Although the overall quality of the nation's waters has improved since the passage of the Clean Water Act in 1972, a significant number of water bodies still suffer from poor water quality. Because the act brought discharges from "point sources," such as industrial plants and municipal treatment plants, under control, the continuing pollution of these waters suggests that other sources, including urban runoff, are contributing to water quality problems. As a result, the Environmental Protection Agency (EPA) now classifies urban runoff as a significant cause of impairment to water quality. The Water Quality Act of 1987, which amended the Clean Water Act, required EPA, among other things, to regulate as a point source urban runoff that reaches municipal sewer systems. EPA's National Pollutant Discharge Elimination System Program for storm water requires that certain local governments take measures to control storm water runoff.

Concerned about the degradation of water quality in urban areas, you asked us to report on (1) the amount of runoff from urban areas, particularly from roads, highways, and other impervious surfaces,[1] and its effects on water quality and (2) the programs that federal regulations require local governments to develop to address urban runoff, and the costs and effectiveness of those programs. To address these issues, we reviewed federal and other studies and interviewed experts on the relationship between the amount of paved and other impervious surfaces and the amount of runoff, and on the types of materials typically contained in urban runoff. We also reviewed studies and interviewed experts on the sources of these materials and any actual or potential effects on water quality from urban runoff. We visited five urban areas and organizations that are affiliated with their watersheds[2] to obtain site-specific information about urban runoff problems, programs these areas have implemented in response to federal requirements, and the costs and effectiveness of these programs. Finally, we reviewed studies and estimates of the costs and investment requirements associated with implementing storm water management programs. Because this report focuses on local governments' actions, we did not review the portions of the National Pollutant Discharge Elimination System Storm Water Program that address industrial facilities and construction sites.

We performed our review from August 2000 through May 2001 in accordance with generally accepted government auditing standards.

Results in Brief

The volume of urban storm water runoff increased throughout the United States in the last half of the 20th century because of the growth in impervious surfaces that resulted from the development of urban and suburban areas. According to the U.S. Department of Agriculture, between 1945 and 1997, land devoted to urban areas in the United States has increased by about 327 percent; according to EPA, paved road mileage has increased by 278 percent. Because paved surfaces are almost impervious, they allow little storm water to infiltrate the ground; therefore, the storm water runs off into creeks, rivers, and lakes. As storm water runs across these impervious surfaces and land, it picks up pollutants from these surfaces and carries them to receiving bodies of water—either directly or

[1]An impervious surface keeps water from soaking into soils.

[2]A watershed is an area of land in which all surface water drains to a common point.

through conveyances such as gutters, storm sewers, and culverts. EPA's 1998 *National Water Quality Inventory Report to Congress* showed that certain rivers, streams, lakes, and estuaries are impaired in terms of their ability to support such uses as aquatic life, swimming, and fish consumption, and concluded that urban runoff was a major source of this impairment. Studies have shown that urban runoff and the pollutants it carries can cause increases in sedimentation, water temperature, and pathogen levels and decreases in dissolved oxygen levels in bodies of water. These changes can lead to the degradation of habitat in these water bodies and a decline in diversity of aquatic life and can endanger public health. For example, metals, a pollutant typically found in urban runoff, can be toxic to aquatic organisms. Pathogens, such as bacteria from animal waste, another pollutant commonly found in urban runoff, can pose public health problems when present in waters used for recreational purposes. The magnitude and nature of these effects vary by region, depending on the type and concentration of pollutants in storm water, rainfall characteristics, land use, and other factors.

Local governments are required to address urban runoff through EPA's National Pollutant Discharge Elimination System Storm Water Program. Under permits that EPA and states issue through this program, over 1,000 local governments must meet EPA's requirements to implement storm water management programs to reduce contaminants in storm water to the "maximum extent practicable." EPA recommends that these cities use "best management practices" to reduce contaminants in storm water runoff. The most typical practices included controlling runoff through a combination of structural means, such as detention ponds, and nonstructural means, such as increasing the frequency of street sweeping and educating the public about how to prevent pollutants from reaching storm sewers. Cities also used specialized practices to address specific local runoff problems. For example, Baltimore, Maryland, has focused on reducing the level of nutrients, such as fertilizers, in its runoff because of its proximity to the Chesapeake Bay, which suffers from high nutrient levels.

Neither the overall costs of implementing the storm water program nor the program's effectiveness has been determined. EPA estimated in a 1996 report to congress that the potential need for spending on storm water runoff and overflows of sewage resulting from runoff was over $50 billion over 20 years, but the agency also believes this estimate will increase when it issues its next report in 2002. EPA's regulations require that permitted cities annually report the costs of implementing their storm water programs, along with the results of their monitoring of storm water runoff and water quality. However, in part because EPA has not established guidelines for reporting costs, these data have not been calculated or reported consistently and, therefore, are not currently useful in characterizing the program's overall cost. EPA, state, and city officials generally believe that managing storm water runoff will reduce the volume of runoff and concentrations of pollutants in the runoff, as well as improve water quality, but no systematic effort to evaluate the program's results has been started. EPA and the states have generally been unsuccessful in developing measurable program goals and in demonstrating program effectiveness through the review of water quality data reported by local governments.

We believe it is time for EPA to begin evaluating this program, which is directed at one of the nation's most significant water quality problems. Therefore, this report includes a recommendation to EPA to work with states to develop program goals, establish standards for reporting on program costs and effectiveness, and review reported water quality data to determine whether the current storm water management programs are having the intended effect of improving the quality of the nation's waters and how much the programs cost. We provided a draft of this report to EPA and the Department of Transportation (DOT). EPA generally agreed with the report and plans to take action to implement several parts of the recommendation; the agency did not comment on the other parts of the recommendation. DOT generally agreed with the report. (See the Agency Comments and Our Evaluation section of this report.)

Background

Nonpoint source pollution can result when water, such as precipitation, runs over land surfaces and into bodies of water. Significant nonpoint sources of pollution can include paved urban areas, agricultural practices, forestry, and mining. However, in urban and suburban areas, this runoff generally enters a sewer system that can be regulated as a point source of water pollution. For example, precipitation from rain or snowmelt may run into a municipal separate storm sewer system (MS4 or storm sewer) that eventually discharges into a body of water. The precipitation may also run into a combined sewer system, which carries a combination of storm water runoff, industrial waste, and raw sewage in a single pipe to a sewage treatment facility for discharge after treatment. Lastly, the precipitation may run off of land or paved surfaces directly into nearby receiving waters.

EPA's Office of Wastewater Management, which is within the Office of Water, implements the National Pollutant Discharge Elimination System (NPDES) Program. The program was created in 1972 with the passage of the Clean Water Act. Created to control water pollution from point sources—those sources, such as a factory or wastewater treatment plant, that contribute pollutants directly into a body of water from a pipe or other conveyance—the NPDES Program did not specifically address storm water discharges. In 1987, the Congress amended the Clean Water Act with the Water Quality Act, which directed EPA to also control storm water discharges that enter MS4s—essentially requiring EPA to treat such storm water as a point source.[3] MS4s are defined as those sewers that collect and convey storm water; are owned or operated by the federal, state, or local government; and are not part of a publicly owned treatment (sewage) facility.

To regulate urban storm water runoff, EPA published regulations in 1990 that established the NPDES Storm Water Program and described permit application requirements. According to EPA, the program's objective, in part, is to preserve, protect, and improve water quality by, among other things, controlling the volume of runoff from paved surfaces and by reducing the level of runoff pollutants to the maximum extent practicable using best management practices (BMP).[4] The 1987 act also authorized EPA to implement a program that provides federal funds and technical assistance to states to develop their own nonpoint source pollution management programs. States can use the federal funds they receive for nonpoint source programs to address nonpoint sources of pollution as well as urban runoff.

Currently, EPA manages NPDES Storm Water programs in six states (Alaska, Arizona, Idaho, Massachusetts, New Hampshire, and New Mexico) and has delegated authority to the remaining 44 states to manage these programs. The storm water program is being implemented in two phases. Local governments meeting the following criteria must comply with EPA's storm water program regulations. First, Phase I of the program requires that municipalities with a population of 100,000 or more obtain a permit for their MS4 system; second, the program requires that entities obtain a

[3]Section 402(p) of the Clean Water Act.

[4]According to EPA, a best management practice is a device, practice, or method for removing, reducing, retarding, or preventing targeted storm water runoff constituents, pollutants, and contaminants from reaching receiving waters.

permit if they discharge storm water from sites with industrial activities, including construction activities that disturb 5 acres or more of land. In addition, NPDES permitting authorities may also bring other municipalities and industrial entities into the program if they deem it necessary. Municipalities that meet these conditions must submit a permit application to EPA or the governing regulatory state agency. In 1990, the regulations specifically identified 220 municipalities throughout the United States that were required to apply for a Phase I permit. According to EPA, as of April 2001, about 256 Phase 1 MS4 permits had been issued and about 17 more still needed to be issued. Because some permits cover more than one municipality, these permits cover about 1,000 medium and large municipalities nationwide.

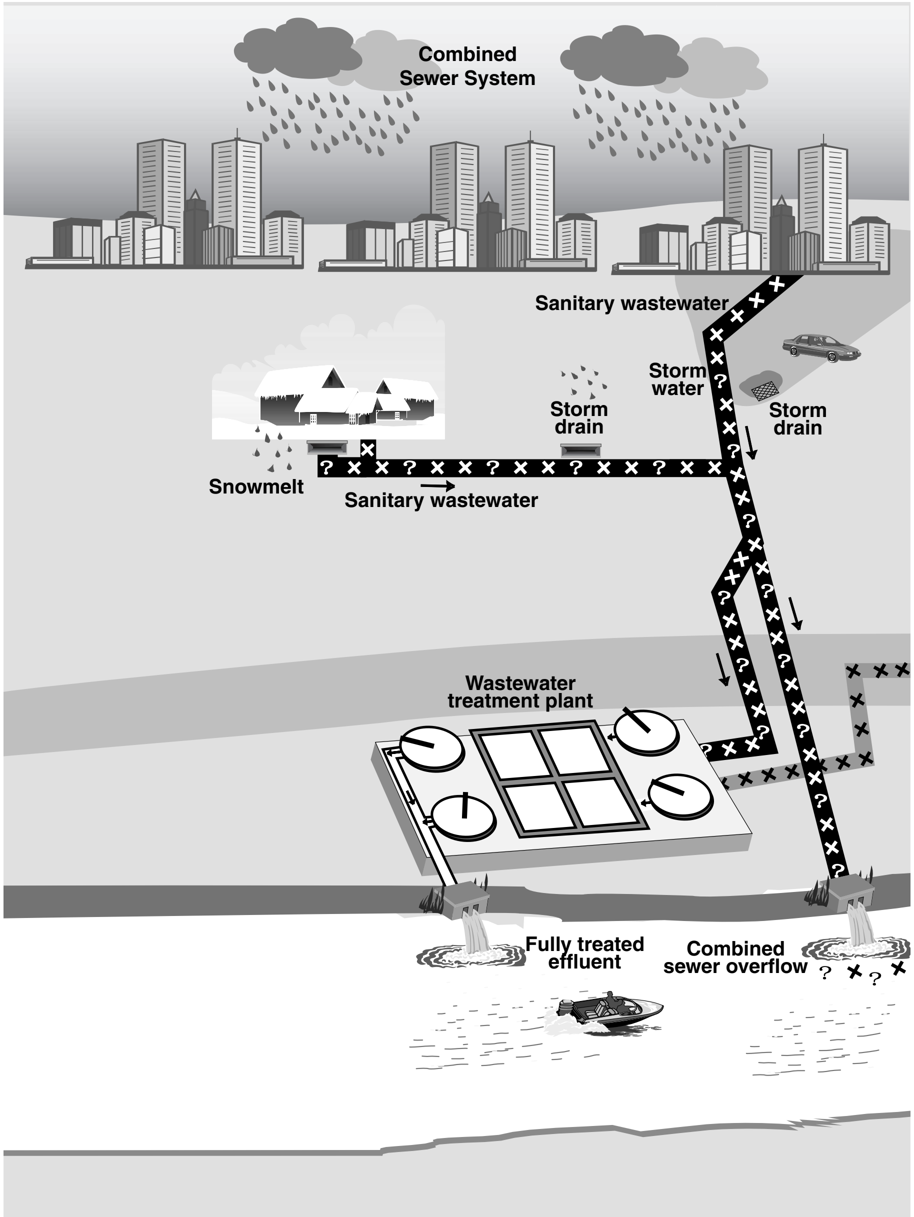
The final rule for Phase II of the program was issued in December 1999. Phase II extends Phase I efforts by requiring that a storm water discharge permit be obtained by (1) operators of all MS4s not already covered by Phase I of the program in urbanized areas[5] and (2) construction sites that disturb areas equal to or greater than 1 acre and less than 5 acres of land. As with Phase I of the program, permitting authorities may require additional small MS4s and construction sites to obtain a permit if they are a significant contributor of pollutants. Currently, EPA anticipates that about 5,000 municipalities may be subject to permitting requirements under Phase II of the storm water program. These municipalities are required to obtain permits no later than March 10, 2003.

[5]The Bureau of the Census generally defines an urbanized area as a land area comprising one or more places—central place(s)—and the adjacent densely settled surrounding area—urban fringe—that together have a residential population of at least 50,000 and an overall population density of at least 1,000 per square mile.

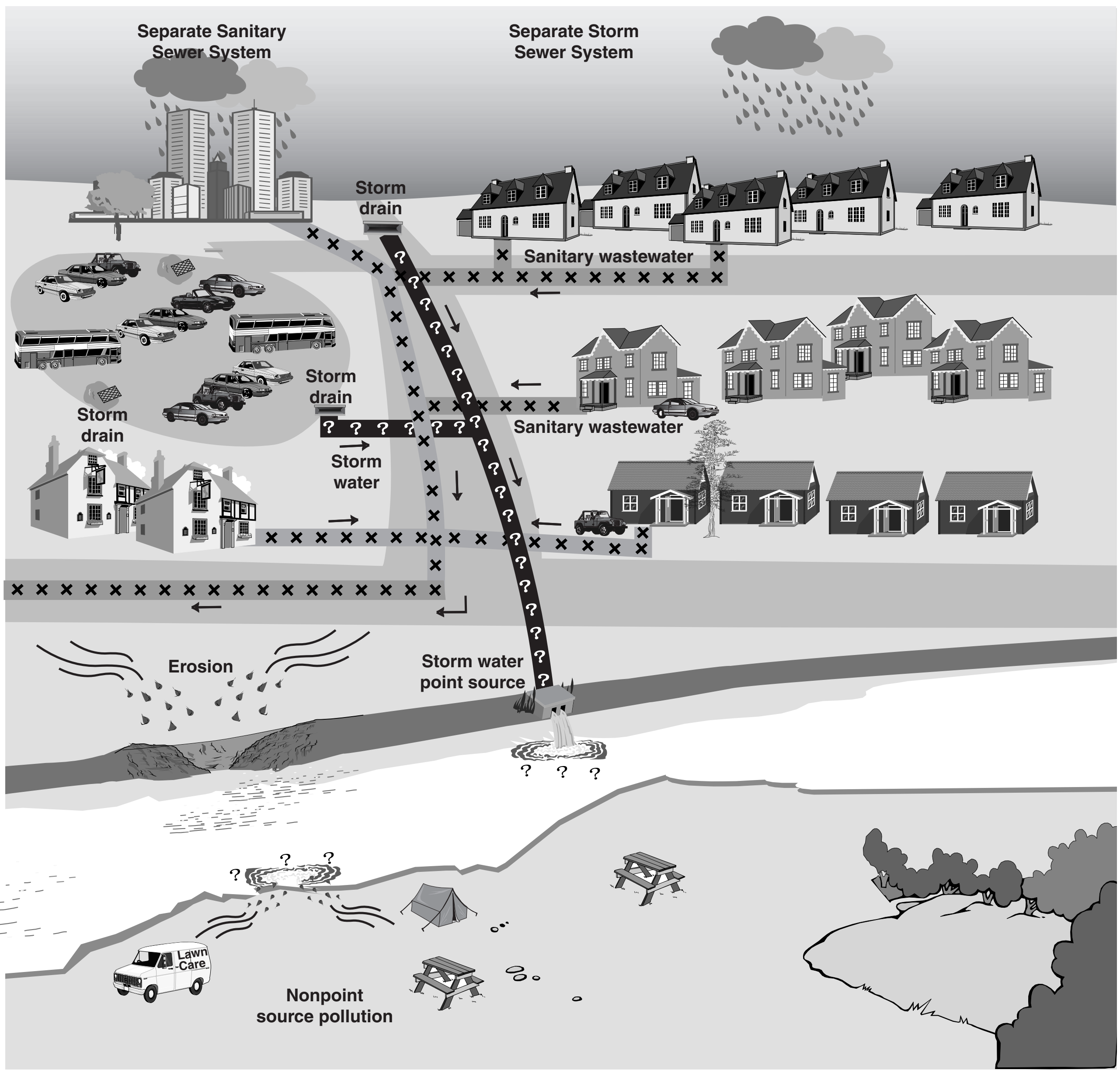
EPA also regulates combined sewer overflows (CSO) that can be caused by urban storm water runoff. Combined sewer systems, in which storm water enters pipes already carrying sewage, may overflow when rain or snowmelt entering the system exceeds the system's flow capacity. In the CSO that results, the mixture of untreated sewage and runoff bypasses the water treatment facility and is diverted directly into receiving waters. (See fig. 1 for an illustration of combined and separate sewer systems.) These combined systems generally serve the older parts of approximately 900 cities in the United States. Pipes carrying sewage and storm water separately generally serve newer parts of cities. EPA's 1994 CSO policy requires communities with combined sewer systems to take immediate and long-term actions to address CSO problems. The policy contains provisions for developing appropriate, site-specific NPDES permit requirements for all combined sewer systems that overflow because of wet-weather events. The Wet Weather Water Quality Act of 2000 requires that any permit, order, or decree issued for a CSO conform to the 1994 policy. Under this act, EPA is also required to submit a report to the Congress by September 2001 on the status of the program.[6]

[6]Sanitary sewer overflows, which are illegal under the Clean Water Act, can also result from rainfall. A sanitary sewer overflow may occur when rainwater or snowmelt leaks into sanitary sewage pipes, thereby exceeding the pipes' capacity and causing them to overflow. This discharge of raw sewage from municipal sanitary sewer systems can release untreated sewage into places such as streams, basements, and streets. EPA proposed regulations to require municipalities to reduce the number of overflows. However, these regulations have been withdrawn for further review.

Figure 1: Urban Runoff Flows in Different Types of Sewer Systems



× Sanitary sewage/wastewater
? Storm water runoff with potential contaminants



Source: GAO illustration based on EPA data.

The Total Maximum Daily Load (TMDL) Program, established under the Clean Water Act, is intended to address water bodies that do not meet water quality standards because of pollutant loadings from point and nonpoint sources. Currently, it is unclear how and when this program will affect EPA's and states' issuance of storm water permits. A TMDL is a calculation of the maximum amount of a pollutant that a body of water can receive and still meet the water quality standard set by the state. Under EPA's regulations, the state is to allocate this "pollutant load" among the point and nonpoint pollutant sources that flow into the water body and then take steps to ensure that no source exceeds its assigned load. In 1996, EPA issued a policy that outlined an interim approach to including water quality standards in storm water permits. The policy promoted the use of BMPs in the first 5-year term permits, followed by a tailoring of BMPs in the second round of permits as necessary to comply with water quality standards. Until recently, few TMDLs had been established, and citizen organizations sued EPA for its lack of action. EPA issued a new set of regulations for the TMDL Program in 2000, but the Congress prevented EPA from spending money to implement the rule in 2000 and 2001. It is possible that establishing a TMDL for a body of water could result in the application of a numeric effluent limit to outfalls[7] that release storm water into that body of water. Some city officials we spoke with generally felt that numeric effluent limits would significantly increase the cost of managing storm water.

Volume of Urban Runoff Increases With the Expansion of Urban Development and Can Affect Water Quality

Since World War II, urban runoff has increased throughout the United States. This increase is directly related to growth in the amount of impervious surfaces due to urban and suburban development and the construction of roads, highways, and other impervious surfaces. Coinciding with this growth in impervious surfaces has been a reduction in wetlands and in the amount of storm water that infiltrates the ground to recharge aquifers. Moreover, the loss of vegetation due to development and related runoff can cause major erosion. Ultimately, much of this runoff is channeled into gutters, storm drains, and paved channels, and vegetation and sediment removed with the runoff may end up in receiving waters. EPA has identified urban storm water runoff as one of the leading sources of pollution to the nation's rivers, streams, lakes, and estuaries. Runoff from impervious surfaces picks up potentially harmful pollutants and

[7]An outfall is an outlet, such as a pipe, that allows storm water to flow into a river, lake, or other body of water.

carries them into receiving waters. Studies have shown that urban runoff and the pollutants it carries can negatively affect water quality, aquatic life, and public health.

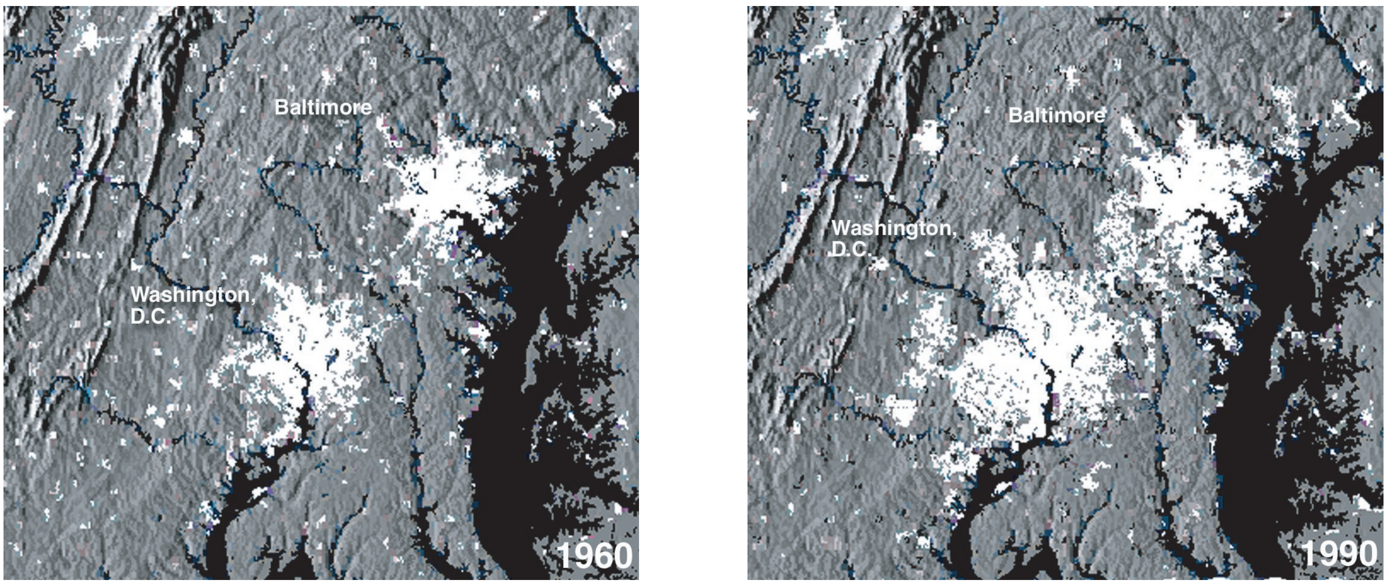
Paved Surfaces Have Increased With Urban and Suburban Expansion and Growth in Automobile Use

According to the U.S. Department of Agriculture, between 1945 and 1997, urban land area increased by almost 327 percent, from 15 million acres to about 64 million acres in the contiguous 48 states. From 1992 through 1997, the annual rate of development averaged about 1 million acres per year. The land developed between 1945 and 1997 came primarily from forestland and pasture and range.[8] For example, according to the Bureau of the Census, between 1960 and 1990, the amount of land used for urban purposes in Baltimore, Maryland, and Washington, D.C., grew by about 170 percent and 177 percent, respectively. As a result, urbanization, with its accompanying expansion of impervious surfaces like sidewalks, roofs, parking lots, and roads, has significantly increased the nation's total developed land and paved surface area.[9] Figure 2 demonstrates the growth in the urbanized areas of Baltimore and Washington, D.C., over the last half of the 20th century.

[8] *Agricultural Resources and Environmental Indicators, 2000,* U.S. Department of Agriculture, Economic Research Service, Resource Economics Division.

[9] *Our Built and Natural Environments, A Technical Review of the Interaction Between Land Use, Transportation and Environmental Quality,* U.S. Environmental Protection Agency (EPA 231-R-00-005, Nov. 2000).

Figure 2: Increase in Urbanized Land in Selected Cities, 1960-90

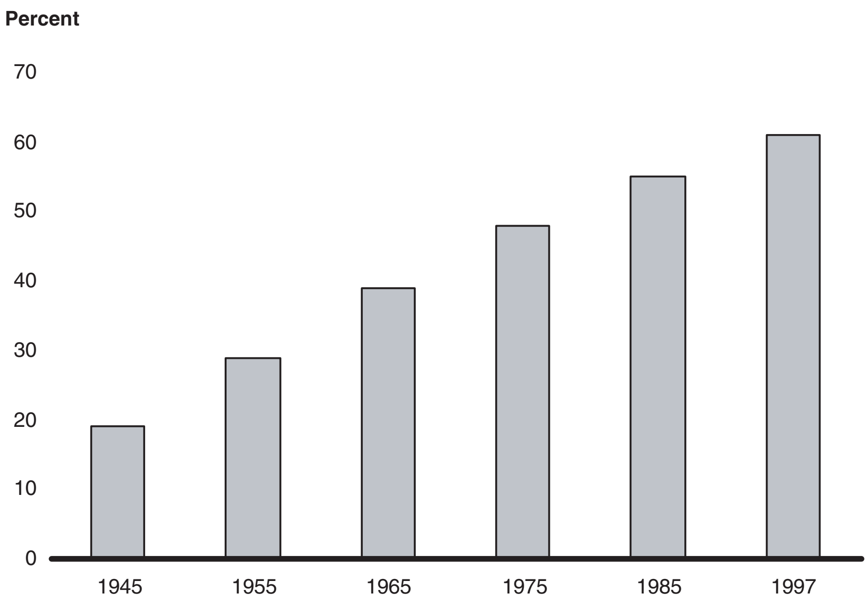


Source: U.S. Geological Survey.

The increase in paved surfaces has been spurred not only by urban and suburban development, but also by a steady increase in the use of automobiles, the primary mode of daily transportation for most Americans. Roads also play an important role in the economy of the United States, since trucks carry about 75 percent of the value of all goods shipped. According to EPA, paved road mileage in the United States increased by 278 percent from 1945 to 1997. In 1945, 19 percent of the public roads in the country were paved; by 1997, that percentage had increased to 61. (See fig. 3.) According to a 1999 study, motor-vehicle infrastructure, such as roads and parking lots, accounts for close to half of the land area in U.S. urban cities.[10]

[10] *Stormwater Strategies, Community Responses to Runoff Pollution,* Natural Resources Defense Council (May 1999).

Figure 3: Percentage of Paved Public Road Miles, 1945-97



Source: EPA.

Increase in Impervious Surfaces Leads to Increased Runoff

The increase in impervious surfaces over the past several decades has led to an increase in storm water runoff. In part, this has occurred because highways and other developments have reduced the amount of wetlands and other undeveloped land. Wetlands mitigate the effects of storm water runoff by acting as a natural form of flood control, facilitating sediment replenishment, and improving water quality by removing excess nutrients and other chemical contaminants before the contaminants can affect receiving waters. According to a 2000 EPA report,[11] of the 12 states that listed wetland losses, six reported that they had significant losses due to highway construction, and 10 reported that they had significant losses due to residential growth and development. However, the effect of road building on wetland loss has been reduced in recent years. According to a Federal Highway Administration (FHWA) official, since 1996, wetlands have been replaced and restored under the Federal-Aid Highway Program

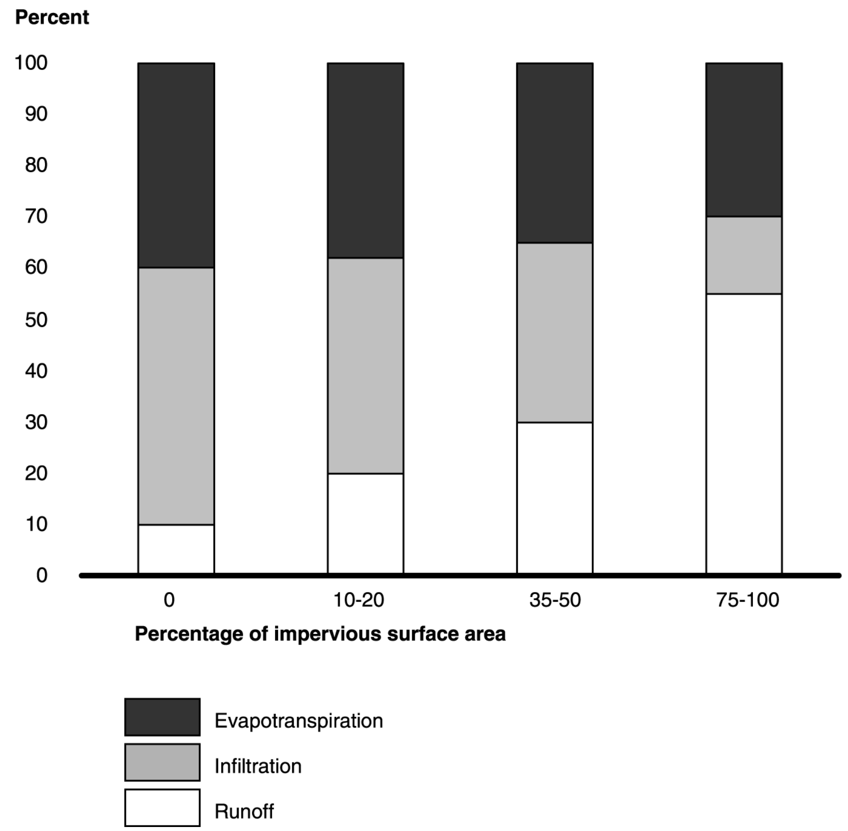
[11] See footnote 9.

at an average rate of 2.7 acres for every acre lost to highway building. Other undeveloped land with vegetation also performs some of the roles that wetlands play in managing runoff, although to a lesser extent.

Furthermore, as impervious surfaces increase, less storm water is able to infiltrate through the soil to groundwater. Impervious areas allow only a very small amount of initial infiltration compared with unpaved areas whose infiltration capacity varies, depending on the soil type. Figure 4 demonstrates EPA's estimates of the impact of impervious surfaces on the percentages of storm water that runs off, infiltrates the ground, and is lost through evapotranspiration.[12] When natural ground cover is present over an entire site, normally 10 percent of precipitation runs off the land into nearby creeks, rivers, and lakes. In contrast, when a site is 75- to 100-percent impervious, 55 percent of the precipitation runs off into these receiving waters. However, according to an FHWA official, the runoff rates can be reduced if developers take mitigating actions to develop and implement BMPs to control flooding or runoff.

[12]Evapotranspiration represents water loss from evaporation and the absorption and eventual release into the atmosphere of water that plants and trees have collected. The extent to which evapotranspiration occurs is dependent primarily on the solar energy available to vaporize the water. As a result, the effect of evapotranspiration varies greatly across the country.

Figure 4: Impact of Impervious Surfaces on the Amount of Storm Water That Runs Off, Infiltrates, and Evapotranspires



Source: EPA.

The decrease in storm water infiltration that accompanies urbanization also reduces the amount of water that is available to recharge groundwater supplies. For this reason, reduced infiltration may lead to problems with the water table in certain urban areas. For example, a Massachusetts Department of Environmental Protection official noted that a low recharge rate affects water quality because it can result in a loss of wetlands and adversely affect aquatic habitat as water-table levels fall during dry weather.[13] In addition, officials from the Charles River Watershed Association in Massachusetts are concerned that the lack of infiltration might cause some communities to run short of drinking water in the next 20 years.

Urban Runoff Has the Potential to Impair Water Quality and Disrupt Biological Integrity

Urban runoff can adversely affect the quality of the nation's waters, and urban storm water runoff has been identified as one of the leading sources of pollution to rivers, streams, lakes, and estuaries.[14] Section 305(b) of the Clean Water Act requires states and other jurisdictions to report on the quality of their waters to EPA every 2 years. The 1998 *National Water Quality Inventory Report to Congress* showed that 35 percent of assessed river and stream miles, 45 percent of assessed lake acres, and 44 percent of assessed estuarine square miles were impaired in terms of their ability to support uses such as aquatic life, swimming, and fish consumption.[15] The report identified urban storm water runoff as one of the leading sources of impairment to the assessed waters.

[13]Dry weather is defined as a period when rainfall measuring at least 0.10 of an inch has not occurred for 72 hours.

[14]Other leading sources of pollution include agricultural runoff, municipal point sources, hydrologic modifications, and atmospheric deposition.

[15]Information contained in the 1998 report reflects only those waters assessed by states and other jurisdictions and cannot be used to characterize nationwide water quality. Furthermore, water quality standards among states are not identical, and the monitoring design used to collect data differed among states.

Studies have shown that as the percentage of impervious cover increases within a watershed, biodiversity also declines. Research conducted by the Center for Watershed Protection found that, generally speaking, when a watershed has 10 percent or less impervious cover, the associated stream can be categorized as sensitive.[16] Sensitive streams are characterized as having high fish diversity and good water quality. Once the percentage of impervious cover exceeds 25 to 30 percent of the watershed, however, streams tend to become nonsupporting. Nonsupporting streams are highly unstable, have poor diversity of fish and aquatic life, and have poor water quality. For example, one study evaluated the relationship between the extent of impervious cover in watersheds to the number and diversity of fish populations in 47 small streams in southeastern Wisconsin between the 1970s and 1990s.[17] The results revealed that the number of fish species per site was highly variable for drainage areas that had less than 10-percent imperviousness. In contrast, sites that had greater than 10-percent imperviousness had consistently low numbers of fish species.

Other studies have associated urban runoff with basic changes in the receiving body of water. Runoff can carry sediment into surface water, and this sediment can carry contaminants, harm aquatic plants, and smother organisms. Runoff can also be warmed by the impervious surfaces it flows across. When sufficient amounts of warmed runoff enter a water body, the water temperature can rise. Less oxygen is then available for aquatic organisms because water holds less oxygen as it becomes warmer. These combined factors lead to the degradation of aquatic habitat. According to EPA, the common effects of these types of pollution on aquatic life include a decline in biodiversity and an increase in invasive species.

An increase in the volume of storm water runoff also increases the likelihood of erosion, which allows for transport of eroded sediment downstream into receiving waters. For example, during a site visit, we observed extensive erosion along the Gingerville Creek Subbasin in Anne Arundel County, Maryland, that was caused by urban runoff channeled into the creek. Figure 5 depicts the eroded banks and channel of this creek.

[16]"The Importance of Imperviousness," *Watershed Protection Techniques*, v.1:3, Fall, 1994. The article reviews 18 studies on the relationship between urbanization and stream quality.

[17]L. Wang and others, "Watershed Urbanization and Changes in Fish Communities in Southeastern Wisconsin Streams," *Journal of the American Water Resources Association,* Oct. 2000, Vol. 36, No. 5.

Figure 5: Damage Caused by Storm Water Runoff From Urbanized Areas in the Gingerville Creek Subbasin

Source: Anne Arundel County, Maryland, Department of Public Works.

Contaminants in Urban Runoff Can Affect Aquatic Life and Human Health

There have been several efforts to characterize the chemicals and other constituents in urban runoff. The Nationwide Urban Runoff Program, conducted by EPA between 1978 and 1983, examined the characteristics of urban runoff. Another federal effort to characterize urban runoff is an ongoing joint project of the U.S. Geological Survey (USGS) and the FHWA to evaluate guidelines for highway runoff. As table 1 indicates, these studies and others have shown that the principal contaminants found in urban runoff include nutrients, solids, pathogens, metals, hydrocarbons, organics, salt, and trash. Water flowing over various surfaces, such as streets, parking lots, construction sites, industrial facilities, rooftops, and lawns, carries these pollutants to receiving waters. The contaminants have the potential to impair water quality, degrade aquatic ecosystems, and pose health risks to swimmers.

Table 1: Storm Water Pollutants in Urban Runoff, Including Sources and Potential Impacts

Contaminant	Source	Potential impact
Nutrients		
Nitrogen, phosphorous	Animal waste, fertilizers, failing septic systems, atmospheric deposition,[a] CSOs	Nutrient enrichment can cause an excessive growth of algae. Nuisance levels of algae are associated with dissolved oxygen deficiencies leading to fish kills, loss of submerged aquatic vegetation that serves as a habitat for aquatic organisms, and loss of natural biodiversity.
Solids		
Sediment	Construction sites, other disturbed and/or nonvegetated lands, eroding banks, road sanding	Sediment can cause infection and disease among fish, scour submerged aquatic vegetation, prevent sunlight from reaching aquatic plants, and bury bottom-dwelling aquatic organisms.
Pathogens		
Bacteria, viruses	Animal waste, failing septic systems, illicit connections and discharges to storm sewer system, CSOs	Pathogens entering waters used for recreational purposes can pose human health risks.
Metals		
Lead, cadmium, copper, zinc, mercury, chromium, aluminum, and others	Industrial processes, normal wear of automobile brake linings and tires, automobile emissions, automobile fluid leaks, metal roofs	Metals can cause acute or chronic toxicity for aquatic organisms.
Hydrocarbons		
Oil and grease, polycyclic aromatic hydrocarbons	Industrial processes, automobile wear, automobile emissions, automobile fluid leaks, waste oil	Hydrocarbons have the potential to be acutely toxic for aquatic organisms and several are suspected carcinogens.
Organics		
Pesticides, polychlorinated biphenyls (PCB), synthetic chemicals	Pesticides (herbicides, insecticides, fungicides, rodenticides, etc.), industrial processes	Low concentrations of some organics have the potential to bioaccumulate in the food chain.

(Continued From Previous Page)

Contaminant	Source	Potential impact
Salt		
Sodium Chlorides	Road salting and uncovered salt storage	Salt can damage roadside vegetation, transport high levels of chlorides to receiving waters, and degrade aquatic ecosystems. Chloride can be harmful to some species of fish.
Trash		
	Street refuse and improperly discarded waste material	Trash impairs water quality by inhibiting the growth of aquatic vegetation and conveys nutrients, toxic substances, and other pollutants to aquatic ecosystems.

[a]Atmospheric deposition occurs when pollutants in the air fall on land or water.

Sources: Massachusetts Department of Environmental Protection Stormwater Policy; EPA reports and guidance, including *Preliminary Data Summary of Urban Storm Water Best Management Practices, Combined Sewer Overflow Control Policy, Innovative Urban Wet-Weather Flow Management Systems*, and the 1998 *National Water Quality Inventory Report to Congress*; the California Regional Water Quality Control Board; the Natural Resources Defense Council's *Stormwater Strategies: Community Responses to Runoff Pollution*; "Accretion of Pollutants in Roadway Snow Exposed to Urban Traffic and Winter Storm Maintenance Activities - Part I," Draft;[18] and USGS' National Water Quality Assessment Program.

[18]J.J. Sansalone and D.W. Glenn, "Accretion of Pollutants in Roadway Snow Exposed to Urban Traffic and Winter Storm Maintenance Activities –Part I," DRAFT.

In our visits to cities with Phase I permits and their watersheds, we identified specific instances in which these contaminants had affected water quality. The Chesapeake Bay, for example, has been polluted with the nutrients nitrogen and phosphorus and with excess sediment caused, in part, by urban runoff. The excess nutrients cause algae blooms that block sunlight from reaching bay grasses—which are a source of food, shelter, and nursery grounds for many aquatic species. In an effort to control nutrient pollution in the Chesapeake Bay, the Executive Council of the Chesapeake Bay Program[19] established a goal to reduce the nitrogen and phosphorus entering the Chesapeake Bay by 40 percent, including through control of runoff from urban areas. In addition, an assessment of the status of chemical contaminant effects on living resources in the bay's tidal rivers found "hot spots" of contaminated sediment. As a result, the Baltimore Harbor and the Patapsco River in Maryland; the Anacostia River in Washington, D.C.; and the Elizabeth River in Virginia were designated as "regions of concern." Urban storm water runoff is a significant source of contaminants in the three regions. The Chesapeake Executive Council has committed to reduce by 30 percent the chemicals of concern in the regions of concern by 2010 through pollution prevention measures and other voluntary means.[20]

Pathogens such as bacteria and viruses, which are often present in urban runoff, can pose public health problems. For example, the Santa Monica Bay Restoration Project conducted a study to identify adverse health effects of untreated urban runoff by surveying over 13,000 swimmers at three bay beaches. [21] The study established a positive association between an increased risk of illness and swimming near flowing storm-drain outlets. Table 2 explains health outcome measures at various distances from storm drains. For example, the study found a 1-in-14 chance of fever for swimmers in front of the drain versus a 1-in-22 chance at 400 or more yards away.

[19]The Chesapeake Executive Council includes the governors of Maryland, Pennsylvania, and Virginia; the Administrator of the U.S. Environmental Protection Agency; the mayor of the District of Columbia; and the chair of the Chesapeake Bay Commission.

[20]Chesapeake Bay Program Office, *Toxics 2000 Strategy: A Chesapeake Bay Watershed Strategy for Chemical Contaminant Reduction, Prevention, and Assessment,* Dec. 2000.

[21]R.W. Haile and others, "The Health Effects of Swimming in Ocean Water Contaminated by Storm Drain Runoff," *Epidemiology,* July 1999, Vol. 10, No. 4.

Table 2: Comparative Health Outcomes for Swimming in Front of Drains Versus 400 or More Yards Away

Health outcomes	0 yards	400 or more yards
Fever	1:14	1:22
Chills	1:26	1:42
Ear discharge	1:68	1:143
Coughing with phlegm	1:20	1:33
Significant respiratory disease (fever and nasal congestion, fever and sore throat, and cough with phlegm)	1:12	1:22

Note: This table includes the statistically significant health outcomes.

Source: GAO analysis of data from "The Health Effects of Swimming in Ocean Water Contaminated by Storm Drain Runoff," *Epidemiology*, July 1999, Vol. 10, No. 4.

Metals and polycyclic aromatic hydrocarbons (PAH) in urban runoff can present a threat to aquatic life. Studies have found the following:

- Storm water runoff from an urban area proved to be toxic to sea urchin fertilization in the Santa Monica Bay, and dissolved zinc and copper were determined to be contributors to this toxicity. [22]
- Brown bullheads (a bottom-dwelling catfish) in the Anacostia River developed tumors that were believed to be caused by PAHs associated in part with urban runoff.[23]
- High PAH and heavy metal concentrations were found in crayfish tissue samples from several urban streams in Milwaukee. The study associated these contaminants with storm water runoff.[24]

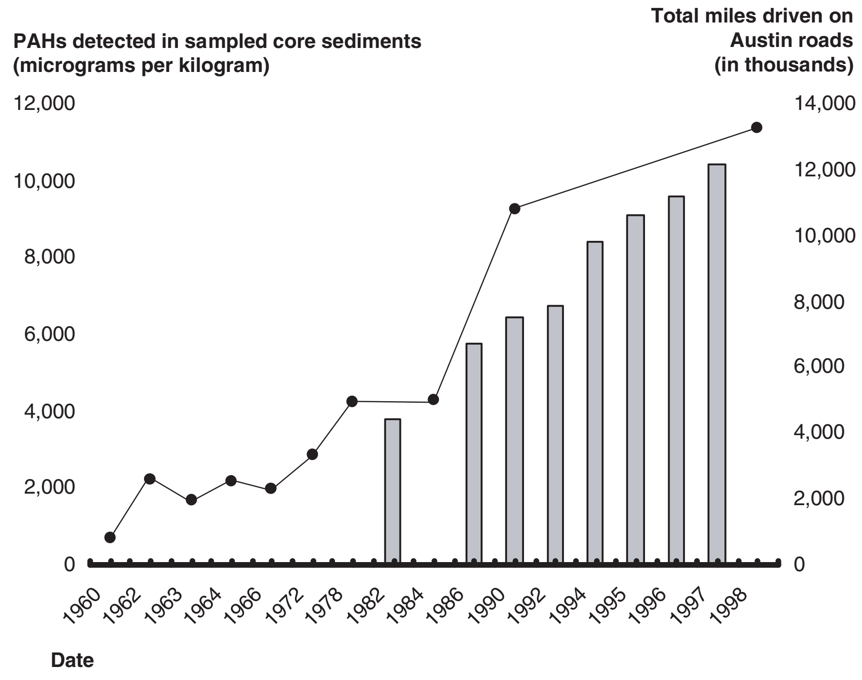
[22]Southern California Coastal Water Research Project, *Study of the Impact of Stormwater Discharge on Santa Monica Bay –Executive Summary,* Nov. 1, 1999.

[23]Chesapeake Bay Program Office.

[24]J.P. Masterson and R.T. Bannerman, "Impacts of Stormwater Runoff on Urban Streams in Milwaukee County, Wisconsin," *National Symposium on Water Quality, American Water Resources Association,* Nov. 1994.

In addition, USGS tracked trends in the concentrations of PAHs found in sediment in 10 lakes and reservoirs in six metropolitan areas over the last several decades. This study found that PAH concentrations in developed watersheds are increasing and that these increases may be linked to the amount of urban development and vehicle traffic in urban and suburban areas.[25] For example, from 1982 to 1996, PAH concentrations in the sediment core in Town Lake (Austin, Texas) and total miles driven in greater Austin both increased by about 2.5 times. Figure 6 illustrates this correlation.

Figure 6: Comparison of Town Lake PAHs and Traffic Trends



Note: According to USGS, irregularities in the date pattern are due to intervals at which sediment samples were collected.

Source: USGS National Water Quality Assessment Reconstructed Trends Program.

[25] P. Van Metre, B. Mahler, and E. Furlong, "Urban Sprawl Leaves Its PAH Signature," *Environmental Science and Technology,* Vol. 34, No. 19, 2000.

Although the studies we reviewed show that certain contaminants are likely to be present in urban runoff, factors such as land development practices, climate conditions, atmospheric deposition, and traffic characteristics all can affect the characteristics of runoff from a particular area. Therefore, given the diffuse nature of many storm water discharges and the variability of other contributing factors, characterizing the concentrations of pollutants contained in storm water runoff has been challenging. Recent USGS reports also suggest that improvements are needed in the methods used to analyze sediment and metals in runoff.[26]

Local Governments Take Actions to Manage Urban Storm Water Runoff, but Information Is Limited on the Cost and Effectiveness of These Actions

To comply with federal and state storm water management for Phase I permitting requirements, permitted municipalities must create and implement storm water management programs. The three primary activities used in these programs include efforts to characterize storm water runoff; BMPs aimed at reducing pollutants in storm water runoff to the maximum extent practicable; and reporting program activities, monitoring results, and costs of implementing the program. Some BMPs are structural—meaning that they are designed to trap and detain runoff until constituents settle or are filtered out. Other BMPs are nonstructural—meaning that they are designed to prevent contaminants from entering storm water through actions like street sweeping and inspections. Many permitted municipalities use specialized BMPs tailored to address particular runoff problems in their locations. Over 1,000 cities are undertaking these efforts under the NPDES Storm Water Program, but information on the overall costs of managing urban runoff and the effectiveness of the actions taken is limited. EPA's attempts to forecast costs have not encompassed the entire program or are out of date. In addition, the permitted municipal agencies we visited estimated their annual storm water management costs and reported them to state agencies or EPA, but the approaches they used to calculate these estimates varied considerably, making it difficult to draw any conclusions. Although EPA and state agencies believe that the program will be effective in improving water quality, EPA has not made a systematic effort to evaluate the program. Without such an effort, EPA cannot tell what effect the program is having on water quality nationally.

[26]The USGS reports indicate that certain methods used to analyze sediment and metals samples can be unreliable. For example, sample collection and processing methods can have an effect on measured concentrations of metals.

Municipalities Comply With Federal and State Requirements Through Monitoring, Best Management Practices, and Reporting

The NPDES Storm Water Program requires municipalities operating under a Phase I MS4 permit to characterize and monitor storm water runoff, implement BMPs to reduce pollutants to the maximum extent practicable, and report costs and monitoring results to the permitting authorities. Because of these requirements, local governments have generally shifted the focus of their storm water management from water quantity control or flood management to water quality concerns.

Besides following the basic federal requirements, municipalities must follow any additional regulations developed by states that have been delegated the authority to manage the NPDES Storm Water Program. For example, Wisconsin's Department of Natural Resources broadened the requirements for determining which municipalities must get permits. The state requires local governments with storm sewer systems in priority watersheds (based on the significance of storm water runoff as a pollutant source) that serve a populace of 50,000 or more[27] to obtain a permit with requirements similar to those for a Phase I permit. Wisconsin's Department of Natural Resources also requires municipalities that are located in one of the state's five Great Lakes Areas of Concern[28] to obtain a state permit. Furthermore, in line with specific criteria in Wisconsin's Administrative Code, the state requires other municipalities to obtain a permit if the municipality is found to significantly contribute storm water pollutants to waters of the state. These various requirements increased the number of municipalities that must get permits from the two under federal requirements to over 70 under the states' requirements.

The local governments we reviewed were undertaking three primary activities when applying for permits and implementing their storm water management programs. Specifically, these activities were (1) characterizing storm water runoff; (2) developing BMPs to reduce discharges of pollutants to the maximum extent practicable; and (3) reporting program activities, monitoring results, and reporting program costs.

First, to characterize runoff, applicants are to provide quantitative data that describe the volume and quality of discharges from municipal storm

[27]For example, we visited West Allis, Wisconsin, which has a permit even though its population is under 100,000.

[28]Areas of concern have persistent water quality problems, which impair beneficial uses.

sewers. For example, cities must map all storm sewer outfalls—an undertaking that one group representing cities described as significant. After the permit application is approved, additional monitoring is required throughout the life of the permit to facilitate the design of effective storm water management programs and to document the nature of the storm water. The local governments we visited were all monitoring for a variety of purposes, including characterizing runoff from different types of land use in order to target their BMPs, testing the effectiveness of a particular BMP, or establishing a baseline for their storm water quality evaluations.

Second, the storm water management programs that local governments develop focus on implementing BMPs. While active treatment, such as sending storm water through a treatment facility, is a possible BMP, the cities we visited were generally not using active treatment. EPA's February 2000 report[29] on the Phase I program described the program as based on the "use of low-cost, common-sense solutions." The five cities we visited were generally using similar types of structural and nonstructural BMPs, as follows:

- Structural BMPs are designed to separate contaminants from storm water. For example, detention ponds temporarily hold storm water runoff to allow solids and other constituents in the runoff to settle before the water is released at a predetermined rate into receiving waters. In addition, catch-basin inserts, placed in a storm drain, catch trash and other debris, and particle separators, placed beneath the surface of an impervious area such as a parking lot, separate oils from runoff and allow sediment and debris to settle. Structural devices such as these require regular maintenance to function properly and remain effective.
- Nonstructural BMPs are primarily designed to minimize the contaminants that enter storm water. These nonstructural BMPs include
  - "good housekeeping" practices by the local government, such as oil collection and recycling, spill response, household and hazardous waste collection, pesticide controls, flood control management, and street sweeping;

[29] *Report to Congress on the Phase I Storm Water Regulations*, U.S. Environmental Protection Agency, February 2000. This report includes information on the program for local governments, industries, and construction sites.

- public education programs, such as storm-drain stenciling, to remind the public that trash, motor oil, and other pollutants thrown into storm drains end up in nearby receiving waters;[30]
- new ordinances to control pollution sources, such as prohibiting the disposal of lawn clippings in storm drains and requiring pet owners to clean up after their pets;[31]
- requirements that developers comply with storm water regulations and incorporate erosion and sediment controls at all new development sites;
- requirements that runoff from properties owned or activities sponsored by the municipality be properly controlled; and
- efforts to identify and eliminate illicit connections and illegal discharges to the storm sewer systems, such as those from pipes carrying sewage.

We found that the NPDES Program's requirements allowed local governments to tailor their storm water management efforts to prioritize local concerns, such as a particular type of contaminant, a particular climatic condition, or a particular body of water. Some cities also developed specialized BMPs to address these concerns. The following information highlights specific storm water-related concerns in the five cities we visited and the specialized BMPs these municipalities have developed to address these particular concerns. (See apps. I to V for additional information on these cities' storm water management programs.)

[30]Other public education programs we observed included in-school education programs, partnerships with grassroots organizations concerned with water quality issues, and the identification of commercial businesses and industries to educate owners on methods to control storm water runoff.

[31]According to Worcester, Massachusetts' April 2000 *City of Worcester DPW Stormwater Management Program Annual Report*, the city has proposed ordinances that prohibit the disposal of lawn clippings and other yard waste in catch basins and that require pet owners to clean up after their pets. As of April 2001, neither ordinance had been implemented.

- In **Baltimore, Maryland**, excessive levels of nutrients, particularly phosphorus and nitrogen, are among the city's major water quality concerns because of the city's participation in the Chesapeake Bay Program. Baltimore City agreed to assist the state in reaching the Chesapeake Bay Program's goal to reduce nutrients discharged to the bay by 40 percent by the year 2000. According to a Chesapeake Bay Program Office representative,[32] as of March 2001, the program has not met this goal but expects to reach it within the next several years.
- In **Boston, Massachusetts**, the Boston Water and Sewer Commission, which holds the permit for Boston's storm sewer system, is concerned about runoff from roadways, especially runoff containing salt and sand used in the winter months and dissolved metals (copper and zinc) from automobiles. In September 2000, the commission began a 3-year program to develop and implement a citywide catch-basin inspection, cleaning, and preventive maintenance program. The program will also include the development of a database and map that can be linked to the commission's Geographic Information System.
- **Los Angeles County, California**, is responding to a TMDL for trash in the Los Angeles River Watershed that will require the county, over a 10-year period, to eliminate trash in runoff. The county is testing a variety of devices that remove trash from runoff and specialized catch-basin devices that are designed to prevent trash from ever reaching the storm sewers.
- **Milwaukee, Wisconsin**, changed its monitoring and public education activities in its recent permit to test the effectiveness of a BMP targeting public education efforts to a specific community. The new permit also requires a monitoring program aimed at the community, its associated watershed, and city employees who work in the area.
- **Worcester, Massachusetts**, had a significant problem with illicit connections to its storm sewers and with flow in these sewers during dry weather. Worcester's Department of Public Works (DPW) screened 71 of its storm water outfalls and determined that 32 of them had drainage areas that carried both sanitary sewage and storm drainage in separate conduits through common manholes. DPW has retrofitted over 65 percent of the manholes to prevent sewage from mixing with storm water.

[32]The Chesapeake Bay Program Office, U.S. EPA Region III, was founded in 1983 with the formation of the Chesapeake Bay Program. The program is a voluntary regional partnership that leads and directs restoration of the Chesapeake Bay. Members of the Chesapeake Bay Program include Maryland, Pennsylvania, Virginia, the District of Columbia, the Chesapeake Bay Commission (a tristate legislative body), EPA, and participating citizen advisory groups.

Third, local governments participating in the Phase I program are required to report annually to EPA or the state regulatory agency on their storm water programs. These reports are to include a status report on the program; a summary of data, including monitoring results collected during the reporting year; information on annual expenditures on the program and a budget for the coming year; and a description of any water quality improvements or degradation.

Information on the Costs of Addressing Storm Water Runoff Is Limited

Good information about the cost of implementing federal storm water requirements is limited. EPA conducted a survey to estimate the nation's future water infrastructure needs over a 20-year period—from 1996 to 2016. In its 1996 report,[33] EPA estimated that states would require over $50 billion to meet their current (as of 1996) water infrastructure needs. The estimate consists of storm water management needs (at $7.4 billion) and CSO needs (at $44.7 billion).[34] EPA noted, however, that estimated storm water management needs are likely too low and could increase following an analysis of data collected to prepare the agency's 2000 clean water needs survey—to be released in 2002. According to EPA, many cities have implemented the Phase I program since EPA reported to the Congress in 1996, and municipalities should now be better able to provide documented cost data. As a result, EPA will need to rely less on modeled storm water needs than it did in the 1996 needs survey. EPA did not project the costs and benefits of the program when it was initiated; therefore, no initial cost estimates are available. When EPA promulgated the Phase I program regulations in 1990, the agency decided that the storm water program did not meet the requirements for preparing a benefit/cost analysis.

[33] *1996 Clean Water Needs Survey Report to Congress*, U.S. Environmental Protection Agency (Sept. 1997). EPA's estimate represents the estimated capital costs for water quality projects eligible for state revolving fund support.

[34] EPA also estimates that $81.9 billion of its 20-year water infrastructure needs cost can be attributed to sanitary sewer overflows. These overflows may occur when rainwater or snowmelt leaks into sanitary sewage pipes, exceeding the pipes' capacity and causing them to overflow. This overflow can release untreated sewage from municipal sanitary sewer systems into streams, basements, and streets.

The costs to local governments of complying with the Phase I program have generally been portrayed as high. However, because of inconsistencies in cost accounting and reporting practices, we could not determine the cost of the program to several of the cities we visited. Although municipalities are required to provide information on the expenditures that they anticipate will be needed to implement their storm water management programs for each fiscal year covered by the permit, EPA has not issued any cost reporting guidelines. Consequently, while the reported fiscal year 1999 total cost to manage and treat storm water runoff across the five municipalities in our review ranged from less than $1 million (Milwaukee) to $135 million (Los Angeles County),[35] these numbers are not comparable because the municipalities did not have consistent cost accounting and reporting practices and did not fully express storm water management costs.[36] For example, some cities reported only the costs of activities that were funded by the city department that held the permit. Significant activities funded by other city departments were not reported, even if they were important components of the storm water program. Officials in the Milwaukee Department of Infrastructure Services and the Boston Water and Sewer Commission told us that other city departments perform and fund activities such as street sweeping and flood control. The costs of these activities are not reported as storm water program costs because the activities serve other purposes besides preventing storm water pollution.

In addition, according to some city officials, these activities were in place before the permit was issued and, therefore, cannot be characterized solely as storm water costs. The cost of street sweeping can be significant—for fiscal year 1999, Baltimore City and Worcester, which did include street-sweeping costs in their storm water program's cost estimate, stated that their street-sweeping expenses totaled about $9.5 million and $1.2 million, respectively. Similarly, Milwaukee did not report the cost of a significant project related to storm water runoff because it was mostly funded by the state of Wisconsin.

[35]Los Angeles County's cost was projected by the municipal permit holder and represents the cost of the 85 cities covered by the permit.

[36]We were unable to obtain comprehensive information on the total cost to the Boston Water and Sewer Commission of managing storm water, so their fiscal year 1999 costs could not be included in this range.

An EPA official told us that the agency had not yet made a national effort to analyze the information that Phase I permittees submitted on the costs of their storm water programs. This official cited the inconsistent formats of the annual reports as a reason that the information was not readily available at the national level and also indicated that adequate staff are not available to analyze the data. In addition, other EPA officials informed us that the Office of Wastewater Management must divide its resources among a number of issues that will challenge the agency's water program over the next decade.

Several officials in the cities we visited said that their annual costs are likely to increase. A number of factors could affect the costs. For example, a Baltimore City official explained that the anticipated, future program costs depend on several factors, including (1) requirements in watershed-management plans currently being developed, (2) pollution-reduction goals the city will be required to achieve, (3) requirements of the state regulatory agency in future permits, and (4) requirements the city may have to meet if TMDLs or numeric effluent limits are incorporated into NPDES storm water permits. Other city officials also expressed concern about the extent to which TMDLs could affect their future costs. These city officials are concerned that when and if TMDLs are established, their future storm water permits may require that storm water runoff meet specific water quality standards. For example, Los Angeles County's trash TMDL could potentially drive the county's storm water management costs upward, and the county expects additional TMDLs to be imposed. On the other hand, Worcester officials estimated that their future storm water costs would be about the same as they were at the time of our review—about $4.5 million per year.

In a separate analysis, EPA estimated in 1999 that it will cost Phase II municipalities about $848 million to $981 million per year (in 1998 dollars) to manage storm water runoff. Because Phase II permits have not been issued as of May 2001, we did not gather any cost information on them from these cities.

Funding for Managing Storm Water Runoff Is Available From Local and Federal Sources

The five cities we visited had not generally obtained federal funds for their storm water management efforts. They used local sources, including general revenues, bonds, revenue from specifically created storm water utilities, state grants, and inspection and permit fees.

While several sections of the Clean Water Act provide funding that can be used for municipal storm water control, relatively few federal funds have been directed to these types of projects. The most significant source of funds is the state revolving loan funds administered by states.[37] These revolving loan funds provide loans for eligible storm water control projects. In some cases, nonpoint source projects may also qualify for funding when storm water permits are not required or issued. However, municipal storm water management is generally a low priority in these programs. Specifically, in the year 2000, revolving fund loans were made in the "storm sewers" category in the amount of $38.76 million for 44 different projects. These funds represented less than 1 percent of the amounts loaned from these revolving funds that year. Activities eligible for revolving fund loans include constructing BMPs to control runoff, but support for ongoing operations and maintenance is not eligible. Revolving fund loans can also be used for eligible CSO control projects. In 2000, Clean Water State Revolving Fund Program loans were made in the "CSO Correction" category of a national EPA database in the amount of $411.3 million for 69 different projects and could have been used for CSO or sanitary sewer overflow projects. This amount represented about 9 percent of the funds loaned in 2000.

According to EPA, the agency also issues grants to universities and other research institutions to help implement the storm water program. Some of these grants provide training and guidance to Phase I permittees on watershed protection and the proper selection of BMPs.

Other sources of funding may be available to local governments beginning in 2002. In December 2000, the Congress authorized programs for fiscal years 2002 through 2004 to provide grants to local governments for (1) pilot projects for managing municipal CSOs, sanitary sewer overflows, and storm water discharges on a watershed basis and for testing BMPs and (2) controlling pollutants from MS4s to demonstrate and determine cost-effective, innovative technologies for reducing pollutants from storm water discharge. EPA's proposed budget does not request funds for these programs. In addition, the Congress authorized programs for fiscal years 2002 and 2003 to provide grants to local governments for planning, designing, and constructing treatment works to intercept, transport,

[37]Under the Clean Water State Revolving Fund Program, the federal government provides grants to capitalize states' funds. States provide loans to local governments for wastewater projects.

control, or treat municipal CSOs and sanitary sewer overflows. EPA's proposed budget requested $450 million for this program.

EPA, States, and Local Governments Believe the NPDES Storm Water Program Is Effective, but It Has Not Been Evaluated

EPA, state, and municipal officials generally believe that the NPDES Storm Water Program will improve water quality. These officials believe that the program will result in more bodies of water that meet water quality standards, improved aesthetic conditions, reduced risk from bacterial contamination, and improvements attributable to the discovery and management of pollutants in storm water that otherwise would have gone unnoticed. EPA attempted to put a dollar value on these benefits in its benefit/cost analysis prepared for the Phase II storm water regulations, estimating that such benefits could range from $672 million to $1.1 billion per year (in 1998 dollars).[38]

However, little information is currently available on the benefits of the storm water program or its general effectiveness. There is no doubt that it will take time for the results of the Phase I program to be demonstrated. As EPA notes in its February 2000 report to the Congress, pollution control efforts under water quality management programs produce long-term changes, and the agency expects water quality improvements attributable to the Phase I program to become evident in the future, as the program matures. In this report, EPA concluded that the program has improved storm water management at the local level, improved water quality, and decreased pollutant loads in storm water. However, EPA relied on a survey of only nine Phase I cities in making these conclusions and, therefore, also reported that the agency could not provide national estimates on water quality protection and improvements generated by Phase I of the program. To evaluate the entire program, EPA would have to establish goals for the program that are based on its mission; obtain information about the program's results; compare the results with the goals; and make changes to the program, if warranted, to get closer to achieving the agency's goals.

EPA and the states also have not taken advantage of information that is available to evaluate the program. Each city we visited was regularly monitoring its storm water to establish baseline information on pollutant levels and was reporting this information to EPA or the regulatory state agency each year. Although cities with Phase I permits are required to report on their storm water monitoring results and changes in water

[38]Using another method, EPA estimated the benefits at $1.6 billion per year.

quality, overall, EPA and the states have not successfully developed measurable goals for the program or demonstrated its effectiveness through the review of municipal reports. An EPA official said that some states had requested funding to analyze program data because they did not have the resources to do so, and that EPA had provided the funding in a few cases. EPA also has not established any guidelines for how these data should be reported. Therefore, the reports may be as variable as the cost information we obtained in our five site visits.

EPA has not yet taken any of these data-analysis steps because, according to EPA officials, other program challenges within the Office of Wastewater Management compete with storm water management efforts for priority. For example, EPA officials stressed that available resources within the office must address other significant wet-weather pollution problems, such as CSOs and sanitary sewer overflows, and nonpoint source pollution problems, such as agricultural practices, forestry, and mining. One agency official noted that the highest priority is addressing needs that the agency and local governments have identified for improving wastewater infrastructure, such as sewage treatment facilities. The program also has relatively few staff assigned—about five in the headquarters office and about 10 in the regional offices—for the municipal, industrial, and construction portions of the program. In a program plan recently prepared for the storm water program, EPA estimated that nine to 10 staff would be needed in EPA headquarters to evaluate the program and implement other program requirements.

EPA officials described two efforts that may be the first steps in developing better information about the program. First, EPA intends to issue a grant to the University of Alabama in June 2001 to evaluate monitoring data submitted by a sample of municipalities with Phase I permits. This effort will (1) determine the different types of monitoring being conducted by Phase I municipalities, (2) assess water quality in and around permitted municipalities and determine any correlation between program implementation and impacts on water quality, and (3) recommend approaches for improving the effectiveness of municipal storm water monitoring programs. EPA expects the results of this study in 2003. Second, an EPA official stated that the agency would like to establish a system for analyzing program findings, incorporating necessary changes that are based on these findings, and evaluating the program's effectiveness. The agency plans to implement a pilot project in 2001 in the agency's Atlanta Region IV office for analyzing data reported in annual reports and developing key indicators for the program. If this project is successful and resources are available, the project could be expanded.

Conclusions

EPA regards urban runoff as a significant threat to water quality across the nation and considers it to be one of the most significant reasons that water quality standards are not being met nationwide. Prompted by the Congress, EPA has responded with a variety of programs, including the NPDES Storm Water Program, which requires more than 1,000 local governments to implement storm water management programs. Those municipalities that are currently involved in Phase I of the program have been attempting to reduce pollutants in storm water runoff for several years. It is time to begin evaluating these efforts. However, EPA has not established measurable goals for this program. In addition, the agency has not attempted to evaluate the effectiveness of this program in reducing storm water pollution or to determine its cost. The agency attributes this problem to inconsistent data reporting from permitted municipalities, insufficient staff resources, and other competing priorities within the Office of Wastewater Management. Although Phase I municipalities report monitoring and cost data to EPA or state regulatory agencies annually, these agencies have not reviewed this information to determine whether it can be of use in determining the program's overall effectiveness or cost. Our analysis shows that the reported cost information will be difficult to analyze unless EPA and its state partners set guidelines designed to elicit more standardized reporting. Better data on costs and program effectiveness are needed—especially in light of the Phase II program that will involve thousands more municipalities in 2003. EPA's planned research grant to the University of Alabama and its pilot project in the agency's Region IV to analyze data from annual reports and develop baseline indicators is a step in the right direction and could point the way for a more comprehensive approach.

Recommendation

To determine the extent to which activities undertaken through the NPDES Storm Water Program are reducing pollutants in urban runoff and improving water quality, and the costs of this program to local governments, we recommend that the Administrator, EPA, direct the Assistant Administrator for the Office of Water to

- establish measurable goals for the program;

- establish guidelines for obtaining consistent and reliable data from local governments with Phase I permits, including data on the effects of the program and the costs to these governments;
- review the data submitted by these permittees to determine whether program goals are being met and to identify the costs of the program; and
- assess whether the agency has allocated sufficient resources to oversee and monitor the program.

Agency Comments and Our Evaluation

We provided a draft of this report to EPA and DOT for their review and comment. EPA generally agreed with the report and with the recommendation, although it did not explicitly comment on all parts of it. (EPA's comments appear in app. VI.) In response to our recommendation that EPA set measurable goals for the storm water program, EPA stated that under the second phase of the program, local governments will establish their own goals. Although this is an important activity, EPA will have difficulty evaluating the program's effectiveness at a national level without setting goals that reflect the program's mission of improving water quality. The agency (1) agreed that it should establish guidelines for obtaining consistent and reliable data from local governments about their programs and (2) plans to award grants to two universities for reviews of monitoring data reported by local governments. EPA did not comment on whether local governments should report on the costs of their programs. EPA also agreed that it and its state partners should review data reported by local governments to determine whether the program's goals are being met. In April 2001, EPA officials told us that the agency planned to undertake a project in the Region IV (Atlanta) office to evaluate the methods local governments are using to control storm water. EPA's letter indicates that the agency now plans to implement this project in three regional offices and 10 states. EPA did not comment on the part of our recommendation that the agency review the level of resources devoted to overseeing and monitoring the program. EPA also provided technical comments that we incorporated where appropriate.

DOT generally agreed with the draft report and provided technical comments that we incorporated where appropriate. In particular, DOT suggested that we revise several references in the draft report to paved surface area and its relationship to increases in urban runoff, to emphasize that impervious surfaces, of which paved surfaces are a significant subset, cause increases in runoff. We revised the language in these places.

As agreed with your offices, unless you publicly announce its contents earlier, we plan no further distribution of this report until 7 days after the date of this report. At that time, we will send copies of this report to the Administrator, Environmental Protection Agency, and the Secretary of Transportation. We will make copies available to others on request. If you or your staff have any questions about this report, please call me at (202) 512-2834. Key contributors to this report are listed in appendix VII.

Peter F. Guerrero
Director, Physical Infrastructure Issues

Appendix I

The Storm Water Program in Baltimore City, Maryland

Baltimore City's municipal separate storm sewer system (MS4) is regulated by the Maryland Department of Environment (MDE) and, according to a city official, services the entire city. The city is currently implementing its second, 5-year National Pollutant Discharge Elimination System (NPDES) permit, issued on February 8, 1999. Before obtaining the first NPDES storm water permit in 1993, Baltimore City addressed the adverse affects of storm water runoff by implementing Maryland's Storm Water Management Program and Erosion and Sediment Control Program. According to the 2000 census, Baltimore City's population is about 651,000.

Urban Runoff Problems in Baltimore City

Baltimore City's urban runoff discharges to four major areas—Gwynns Falls, Jones Falls, Herring Run, and the Patapsco River—and then ultimately to the Chesapeake Bay. In 1990, the Environmental Protection Agency's (EPA) 319(a) report[1] implicated urban runoff as the main source of pollution in these waters. Moreover, Baltimore City was one of the areas studied in EPA's Nationwide Urban Runoff Program in the 1980s. This study reported that urban runoff contributed over 60 percent of the total nitrogen, phosphorus, and organic carbon; over 70 percent of the chemical oxygen demand; and over 80 percent of the total suspended solids, lead, and zinc in local water bodies.

An MDE official told us that nutrients, zinc, and suspended solids are among the constituents most commonly found in urban runoff, but the quantitative contribution to water quality impairment in the state's waters was not known. Also, in 1996, the Chesapeake Executive Council designated the Baltimore Harbor as one of three toxic regions of concern in the Chesapeake Bay. The harbor suffers from sediment contaminated by banned substances (such as the termiticide chlordane) and contaminants currently being released (such as metals and organics). Furthermore, according to the Chesapeake Bay Program Office, data collected from Phase I permittees indicate that storm water runoff can be a significant source of metals and organics in the harbor.

A Baltimore City official told us that some portions of Maryland's waters are impaired because of unacceptable levels of nutrients, metals,

[1]Section 319(a) of the Clean Water Act requires, among other things, that states identify and report to EPA the navigable waters that cannot reasonably be expected to maintain water quality standards (e.g., established water body uses) without additional action to control nonpoint source pollution.

suspended sediments, and chlordane. Moreover, this official noted that the state does not consider data that municipalities collect under their NPDES storm water permits during the 303(d) listing process. Therefore, he believes that streams in Maryland are much more impaired than indicated by the listing process.

Baltimore City's Use of Best Management Practices

Like other NPDES storm water permit holders, Baltimore City uses a variety of best management practices (BMP) to reduce the amount of pollutants in runoff to the maximum extent practicable. These BMPs include detention ponds, shallow marshes (which use the biological and naturally occurring chemical processes in water and plants to remove pollutants), sand filter devices, public education programs, and the identification of illicit discharges to the MS4 system. Furthermore, Baltimore City participates in Maryland's effort to reduce nutrient levels in the Chesapeake Bay. Refer to the section of this report describing local government efforts to manage storm water for details concerning this nutrient-reduction goal. One other BMP includes the following:

- Baltimore City has incorporated the *2000 Maryland Storm Water Design Manual's* management policies, principles, methods, and practices into its current NPDES storm water discharge permit. The purpose of the design manual is to (1) protect the waters of the state from the adverse effects of urban storm water runoff; (2) provide design guidance on the most effective structural and nonstructural BMPs for development sites; and (3) improve the quality of BMPs that are constructed in the state, with particular attention to their performance, longevity, safety, ease of maintenance, community acceptance, and environmental benefit.

Costs Associated With Managing Storm Water

We were not able to obtain comprehensive information on the total cost to Baltimore City of managing storm water. Therefore, we do not present that information here.

Funding Sources

Baltimore City funds its storm water management control efforts with city water and sewer user fees and with state funds.

Appendix II

The Storm Water Program in Boston, Massachusetts

The Boston Water and Sewer Commission received a NPDES storm water permit in October 1999. The commission is a separate entity from the city of Boston and, therefore, does not manage some storm water controls that are common in Phase I permits, such as street sweeping, winter deicing, and many of the urban runoff controls required for new developments. Boston has combined sewer systems as well as separate sanitary sewers and storm drains. The commission maintains 206 storm water outfalls and serves approximately 33 percent of the city through its separate MS4 system. In addition to the resident population of about 589,000, this system also almost daily serves 340,000 commuting workers; 70,000 shoppers, tourists, and business people; and 75,000 commuting students. The commission's sanitary and combined flows are transported to the Massachusetts Water Resources Authority at Deer Island. The commission is also the permittee for EPA's Combined Sewer Overflow Program.

Urban Runoff Problems in Boston

The commission considers the identification and elimination of illegal sanitary sewer connections as the most effective means of improving water quality and protecting public health. It is also concerned with the washoff of animal wastes from residential and open land, which is another major contributor to the impairment of water quality because it can cause an increase in coliform levels in the storm water discharges to the receiving waters.

The commission has contracted for various studies to determine the impact of storm water runoff. The following two studies identified sources of bacterial contamination and characterized the quality of storm water discharged from different types of land uses. The studies included metering storm water flows, collecting and analyzing the storm water and receiving water quality samples, and identifying and remediating illegal sewer connections. Observations from the studies include the following:

- A 1996 study determined that pet waste, rather than sanitary sewage, was a key contributor of bacteria to the storm drain system that had possibly led to beach closings in the area.
- A 1998 study identified several illegal connections to the storm drain system. Furthermore, the study showed that deicing and sanding efforts resulted in levels of sodium, chloride, total dissolved solids, and cyanide that exceeded EPA's acute (high dose) toxicity levels.

Boston's Use of Best Management Practices

To meet the NPDES permit's requirements, the commission, like other permittees, continued BMPs, such as identifying illegal connections, and implemented new BMPs aimed at preventing the discharge of pollutants to storm drains and receiving waters. Refer to the section of this report describing local government efforts to manage storm water for details describing the commission's citywide catch-basin inspection cleaning and preventative maintenance program. Other efforts include the following:

- The commission has placed particle separators, which remove oil, grease, and sediments from storm water flows, throughout the city. The commission requires particle separators to be installed by developers on all newly constructed storm drains that serve outdoor parking areas. Fuel-dispensing areas not covered by a canopy or other type of roof enclosure must also have a particle separator.
- The commission requires developers to consider on-site retention of storm water for all new projects, wherever feasible. On-site retention aids in controlling the rate, volume, and quality of storm water discharged to the commission's storm drainage system.

Costs Associated With Managing Storm Water

We were not able to obtain comprehensive information on the total cost to the commission of managing storm water because the commission does not separate the cost of its storm water program from the cost of its sewer operations. Therefore, we do not present that information here.

Funding Sources

The commission funds its storm water management control efforts primarily with city water and sewer user fees and bond proceeds.

Appendix III

The Storm Water Program in Los Angeles County, California

Under the NPDES Storm Water Program, the Los Angeles Regional Water Quality Control Board issues 5-year permits to Los Angeles County for its municipal storm water program. The Los Angeles County permit, issued in July 1996, is the county's second storm water permit. This permit includes Los Angeles County as the principal permittee and 85 cities as permittees. According to the 2000 census, Los Angeles County's population is about 9.5 million.

Urban Runoff Problems in Los Angeles County

The effects of urban runoff on the ocean are of particular concern in southern California. Contaminated sediments, impaired natural resources, and potential human illness could threaten the county's tourism economy, estimated to be about $2 billion a year.

The following three studies have shown that urban runoff can pose health risks to swimmers near storm drains and contribute toxic metals to receiving water sediments:

- The Santa Monica Bay Restoration Project conducted a study to assess the possible adverse health effects of swimming in waters contaminated by urban runoff.[1] This study revealed that there is an increased risk of illness associated with swimming near flowing storm drain outlets and an increased risk of illness associated with swimming in areas with high concentrations of bacteria indicators. Furthermore, illnesses were reported more frequently on days when the samples were positive for enteric viruses. Refer to the section of this report describing the effects of runoff on aquatic life and human health for more details.
- The Southern California Coastal Water Research Project coordinated a study that assessed microbiological water quality and found that the majority of shoreline waters exceeded water quality standards during wet-weather conditions. Furthermore, the ocean waters near storm water outlets demonstrated the worst water quality regardless of the weather.[2]
- The Southern California Coastal Water Research Project also compared the runoff from an urban area and a nonurban area in the Santa Monica

[1]R.W. Haile and others, "The Health Effects of Swimming in Ocean Water Contaminated by Storm Drain Runoff," *Epidemiology,* July 1999, Vol. 10, No. 4.

[2]Southern California Coastal Water Research Project, *Southern California Bight 1998 Regional Monitoring Program, Volume 3: Storm Event Shoreline Microbiology,* 2000.

Bay Watershed.[3] The results of the study indicated that storm water plumes extended up to several miles offshore and persisted for a few days. Furthermore, the runoff from the urban area proved to be toxic to sea urchin fertilization, and dissolved zinc and copper were determined to be contributors to the toxicity. The study also found that in urban areas, sediments offshore generally had higher concentrations of contaminants such as lead and zinc.

Los Angeles County's Use of Best Management Practices

As in the other sites we visited, the county is managing its runoff through the use of conventional BMPs. These BMPs include the elimination of illicit connections and discharges to the storm sewer system, construction control measures, routine inspections, staff training, pollution prevention plans for public vehicle maintenance and material storage facilities, sweeping and cleaning public parking facilities, street sweeping, catch-basin cleaning, and public education.

The Los Angeles Regional Water Quality Control Board recently adopted a Total Maximum Daily Load (TMDL) Program to reduce trash loads to the Los Angeles River. As a result, the county is exploring a number of trash reduction BMPs, which are discussed in the section of this report describing local government efforts to manage storm water.

Costs Associated With Managing Storm Water

Table 3 indicates that the county and the other permittees have allocated significant funding for storm water management activities over the years. For example, for fiscal year 1999,[4] projected funding for storm water management activities for the county and the other permittees amounted to over $134 million.[5] The largest projections for both went toward public agency activities. For example, during fiscal year 1999, the principal permittee and the permittees together projected almost 67 percent of storm water management funds to public agency activities. The activities in this

[3]Southern California Coastal Water Research Project, *Study of the Impact of Stormwater Discharge on Santa Monica Bay–Executive Summary,* Nov. 1, 1999.

[4]The county's fiscal year begins July 1 and ends June 30.

[5]According to an official with the Los Angeles Regional Water Quality Control Board, this figure may also include activities that are outside the scope of the permit.

program include staff training, inspections of construction projects, street sweeping, and catch-basin cleaning.

Table 3: Summary of Fiscal Resources Projected for Los Angeles County and Its Co-permittees, Fiscal Years 1997-99

(Dollars in thousands)[a]

	Fiscal year 1997		Fiscal year 1998		Fiscal year 1999	
Activity	**County**	**Others[b]**	**County**	**Others[b]**	**County**	**Others**
Program Management	$2,225	$6,195	$1,856	$4,874	$1,466	$6,187
Illicit Connection, Illicit Discharge Program	1,620	3,515	1,017	3,075	764	2,901
Development planning and construction	784	6,208	1,300	3,769	1,452	5,743
Public agency activities	38,544	40,915	40,256	31,992	43,316	46,657
Public information and participation	2,840	5,538	4,360	3,856	4,629	6,177
Monitoring	2,018	619	1,768	729	1,598	737
Other	187	13,991	490	8,656	1,318	11,834
Total	**$48,218**	**$76,981**	**$51,048**	**$56,950**	**$54,543**	**$80,237**

[a]Totals may not add up because of rounding.

[b]Does not include 17 permittees for fiscal year 1998 and 13 permittees for fiscal year 1997 for the following reasons: The permittee operated on a different budget cycle, the final document was not available at the time of the annual report, or the information submitted by the permittee was not complete.

Source: GAO's analysis of cost data provided by the Los Angeles County Department of Public Works.

As shown in table 3, the county maintains primary responsibility for monitoring activities, having projected over $2 million for storm water monitoring activities in fiscal year 1997, almost $2 million in fiscal year 1998, and over $1.5 million in fiscal year 1999. Conversely, the permittees' projected funding levels for monitoring activities amounted to only $619,000 in fiscal year 1997, $729,000 in fiscal year 1998, and $737,000 in fiscal year 1999. According to an official with the Los Angeles Regional Water Quality Control Board, the County has consistently maintained primary responsibility for monitoring activities required under the permit.

Funding Sources

The primary source of funds for the county's storm water program is flood control assessments collected throughout the district. Although the county has not applied for any state revolving funds, it has applied for and received approval for federal funds through the Transportation Equity Act for the 21st Century (TEA-21) for a pilot study of an engineering device that would remove trash from storm water. Additionally, the county has received partial funding through Proposition A of the Safe Neighborhood Parks of 1992 and 1996[6] for two Vortex Separation Systems—a Continuous Deflective Separation unit and a Stormceptor unit. Additionally, the county received grant money from the Metropolitan Transit Authority, which partially funded catch-basin screens, a Continuous Deflective Separation unit, and 120 catch-basin inserts.[7]

[6]The Los Angeles County Regional Park and Open Spaces District (a district within the Parks Department) received this funding from Proposition A and, in turn, made grants to the Los Angeles County Department of Public Works for the BMP devices.

[7]The Metropolitan Transit Authority receives TEA-21 funds from the California Department of Transportation.

Appendix IV

The Storm Water Program in Milwaukee, Wisconsin

The Wisconsin Department of Natural Resources (WDNR) has the authority to regulate the discharge of storm water from municipalities, construction sites, and industries under Natural Resources Code 216. This rule identifies Wisconsin municipalities that are required to obtain a storm water discharge permit under the Wisconsin Pollutant Discharge Elimination System (WPDES). Milwaukee completed its application process in 1994, and WDNR issued a WPDES permit to the city in October 1994. This was the first municipal storm water permit issued to a municipality in EPA's Region 5 covering the midwest. In July 2000, WDNR reissued Milwaukee's storm water permit. According to the 2000 census, Milwaukee's population is about 597,000.

Urban Runoff Problems in Milwaukee

Milwaukee has a combined sewer system as well as a separate sanitary sewer system. The Milwaukee Metropolitan Sewerage District implemented a rehabilitation program that cost over $2 billion to reduce the number of combined sewer overflow (CSO) events each year. The rehabilitation program involved the construction of deep tunnels to store untreated wastewater and rainwater for later treatment at a wastewater treatment plant. Since 1996, the deep tunnels have significantly reduced the number of overflow events from an average of 50 to 60 per year before the construction to an average of two per year afterwards.

Urban runoff has been identified as a leading source of pollution to the Milwaukee River basin's streams, lakes, and wetlands and the Milwaukee River estuary. To address pollution from urban runoff, WDNR issues storm water permits to municipalities with MS4s serving areas with populations of 100,000 or more, municipalities in Great Lakes "areas of concern" where water quality has been identified as a serious problem, municipalities with populations of 50,000 or more that are located in priority watershed planning areas, and designated municipalities that contribute to the violation of a water-quality standard or are significant contributors of pollutants to state waters.

Milwaukee's Use of Best Management Practices

In addition to BMPs such as the elimination of illicit connections and discharges to the storm sewer system, the reduction of pollutants in storm water runoff from construction sites, public education, catch-basin cleaning, street sweeping, and the use of detention basins, Milwaukee has explored the use of innovative BMPs. Refer to the section of this report describing local government efforts to manage storm water for more details about an educational campaign directed at a specific watershed. Additional BMPs include the following:

- An innovative storm water control device was installed in a parking lot at a heavily used municipal public works yard that was found to discharge significant amounts of storm water pollutants. Termed the Multi-Chambered Treatment Tank (MCTT), this device is suitable for areas with limited space, cleans up polluted runoff close to its source, removes pollutants that are not susceptible to other treatment methods, and is hidden from view. The MCTT consists of a catch basin, a settling chamber, and a filter. Although the results of the monitoring studies have revealed that the device has a positive effect on water quality, officials with the Department of Public Works explained that it is cost-prohibitive and suitable only for sites with limited space.
- The permittee has also been working with WDNR, the Department of Transportation, the U.S. Geological Survey, and a neighborhood association in a joint effort to develop a storm water monitoring assessment program consisting of two innovative storm water treatment devices. One device removes grit, contaminated sediments, heavy metals, and oily floating pollutants from surface runoff. The other device removes a broad range of pollutants from runoff, such as bacteria, heavy metals, nutrients, petroleum hydrocarbons, and suspended solids. The devices are to be installed along a new reach of the Milwaukee Riverwalk through the third ward of Milwaukee.

Costs Associated With Managing Storm Water

Reliable data on the total cost to manage storm water in Milwaukee were not available and cannot be presented here because certain activities are not reported as program costs in the city's annual report. These activities include street sweeping; leaf collection; catch-basin and inlet cleaning; maintenance of public boulevards, parks, and public green spaces; and the recycling of waste oil and antifreeze. Therefore, the program costs reflected in the annual report do not take into account many of the nonstructural BMPs employed by the city nor do the totals include activities funded through grants. The storm water management activities that were included in the city's 2000 budget request were estimated to cost $460,000.

Funding Sources

Milwaukee's storm water program is primarily funded through the city's sewer maintenance fund. Unlike the general revenue account, which is based on property taxes, the sewer maintenance fund is based on water consumption. The city has also received supplemental funding from the Wisconsin Nonpoint Source Water Pollution Abatement Program in the form of WDNR grants. The city has received over $1 million since 1991 for a wide variety of storm water management activities.

Appendix V

The Storm Water Program in Worcester, Massachusetts

Worcester's Department of Public Works (DPW) received a NPDES permit on November 1, 1998. The Sewer Operations Division, within the DPW, is directly responsible for operating and maintaining the city's separate storm sewer system, along with the sanitary and combined sewer system. Since 1993, the Sewer Operations Division has had a full-time storm water coordinator, reflecting Worcester's increased emphasis on meeting NPDES program requirements. Worcester has a population of about 173,000. Its water system covers an extensive area, including 371 miles of sanitary sewers, 340 miles of storm sewers, 56 miles of combined sewers, 27,000 manholes, over 14,000 catch basins, and 263 outfalls. Worcester's separate storm drain systems consist of 93 main drainage areas covering approximately 6,680 acres.

Urban Runoff Problems in Worcester

The constituents that are typically found in urban runoff in Worcester are the same as those normally found in urban runoff in older cities. Because virtually all of the paved surfaces in the Worcester area are devoted to the city's transportation infrastructure, the constituents generated include automobile-related petroleum products, such as total petroleum hydrocarbons, oil and grease, along with total suspended solids. Also, coliform, silt, and sediment have been identified in the city's runoff.

Worcester's Use of Best Management Practices

Like other permittees, the DPW has implemented BMPs under the major areas of education outreach, pollution prevention and source controls, storm-drainage system maintenance, regulatory efforts, and storm-drainage system infrastructure. Additionally, to reduce storm water pollution, the DPW has retrofitted a number of twin manholes in the city as discussed below. BMPs that are specific to Worcester include the following:

- The DPW implemented a demonstration project to determine the effectiveness of an oil and grit separator installed on a street drain. The drain is a major surface sewer main that services approximately 226 acres of heavily urbanized area with a typical mix of residential, commercial, and industrial use. The drain discharges into Lake Quinsigamond, which is a large lake used for recreational purposes such as swimming and boating. In its April 2000 annual plan submitted to EPA, the DPW noted that because of drought conditions, it currently did not have sufficient sampling data to determine the effectiveness of the project.

- The DPW has embarked on a comprehensive program to minimize the possibility that sewage and storm water will be mixed in its twin invert manholes. Since the program began, the DPW has installed hold-down devices on over 1,680 of the approximately 2,580 twin invert manholes in the city. The DPW expects to continue the program until all of the manholes have been retrofitted.
- The DPW is also working closely with the Massachusetts Department of Environmental Protection in its ongoing tracking efforts to ensure that industries in Worcester are doing their part to reduce storm water pollution.
- To improve its storm-drainage infrastructure, the city has established a voluntary plan to reduce the number of unpaved private roads. The dirt from these roads, especially after rain storms, causes sediment to build up in the drainage system. The DPW has developed a plan to pave the streets at a lower grade than would be necessary to meet the legal requirements for a public street. Under this plan, residents would not have to pay the additional betterment taxes that are now required to cover the costs of sediment removal and less sediment would be transported in runoff.

Costs Associated With Managing Storm Water

Since 1993, the DPW has allocated significant funding from the water and sewer utility fees it collects for controlling the effects of runoff, especially through catch-basin cleaning, street sweeping, and correcting illegal connections. For example, its fiscal year 1993 budget for storm water programs included about $1.6 million for specific programs and another $1 million for capital improvement programs, such as inflow/infiltration and flood control. The DPW also spent $500,000 to develop and submit its permit application. Furthermore, as shown in table 4, Worcester made extensive capital expenditures during fiscal years 1994 through 1999 on pertinent storm water projects to improve the quality of storm water runoff emanating from the city's storm water sewer system.

Table 4: City of Worcester's Capital Expenditures for Storm Water Management

(Dollars in thousands)

	Fiscal year					
Activity	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**
Sewer construction	$0	$500	$500	$300	$300	$300
Infiltration control	0	400	400	100	100	100
Pump station rehabilitation	200	200	200	200	200	200
Sewer rehabilitation	300	750	300	750	750	1,500
Landfill closeout	150	1,200	200	500	0	0
Belmont Drainage project	0	100	600	100	0	0
Beaver Brook Culvert project	0	500	100	100	300	100
Surface drain control	40	150	200	200	200	200
Geographic Information System	0	0	0	125	125	125
Other	0	70	10	0	0	0
Total	**$690**	**$3,870**	**$2,510**	**$2,375**	**$1,975**	**$2,525**

Note: The Belmont Drainage project involved enlarging the drain to eliminate surcharging and siltation and moving the outfall to eliminate stagnation. The Beaver Brook Culvert project involved repairing the culvert and conducting a study that included a detailed hydraulic analysis of the drainage basin.

Source: Worcester Department of Public Works.

Furthermore, during fiscal year 1999, the DPW spent approximately another $2.1 million to operate and maintain storm water activities. Key expenditures included about $1.2 million for street sweeping, about $617,000 for catch-basin maintenance, $52,000 for root control, and another $48,000 for street paving. Also included was $40,000 per year for sampling five outfalls around the city three times per year as required by the permit. According to a DPW official, in previous fiscal years, the DPW funded the same or similar operation and maintenance activities to help control storm water runoff. As a result, the costs since 1994 were similar to those for 1999, except for annual adjustments for inflation. Therefore, the annual operation and maintenance expenditures ranged from about $1.7 million for 1994 to about $2.1 million for 1999.

According to a DPW official, the department expects to spend from $3 million to $4.5 million annually over the next several years on storm water-related activities. The amount of the cost increase will depend on whether EPA asks the city to increase its spending.

Funding Sources

The DPW funds its storm water management controls effort from the water and sewer user fees it assesses to homes and businesses.

Comments From the Environmental Protection Agency

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JUN 14 2001

OFFICE OF WATER

Mr. Peter F. Guerrero
Director, Physical Infrastructure Issues
United States General Accounting Office
Washington, DC 20548

Dear Mr. Guerrero:

Thank you for the opportunity to review your draft report entitled "Better Data and Evaluation of Urban Runoff Needed to Assess Effectiveness." We appreciate the difficulty that assimilating and interpreting such information on an extremely complex subject must have presented. Your report provides a fair and balanced depiction of the Agency's efforts, with the assistance of our State and local partners, to implement a national urban storm water runoff control program.

As the report correctly acknowledges, the Environmental Protection Agency (EPA) believes that urban runoff is a significant threat to water quality and is actively working to control the discharge of pollutants in storm water runoff. EPA's urban storm water control program has been a very successful undertaking to date and we are taking steps to address several of the recommendations identified in the report.

One of the challenges of controlling urban storm water runoff is to be able to address a wide array of complex environmental issues, even within the boundaries of one municipality. EPA's urban storm water program is developed with the understanding that a "one size fits all" approach will not work. For example, existing municipal separate storm sewer system (MS4) permits are tailored to suit the needs of each individual municipality. In fact, the municipalities select the majority of the measures that will be implemented to control storm water runoff. Similarly, EPA's Phase II regulatory framework for small MS4s requires the municipality to identify appropriate BMPs to control runoff and establish measurable goals against which program effectiveness will be measured. These BMPs and measurable goals then become the enforceable permit conditions for that municipality. EPA expects that approximately 5,000 small MS4s will each have a unique set of measurable goals that will define expectations of a successful storm water control program.

While EPA has developed a sound regulatory basis for urban storm water control, competing initiatives have limited our ability to invest sufficient resources to fully evaluate the effectiveness of the program and the associated implementation costs. We believe that the flexibility afforded MS4 permittees provides some assurance that permit requirements do not become onerous or unjustified. Additionally, with the MS4 permits reissued every five years,

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EPA expects that dialogue between MS4s and permitting authorities will better focus on those activities found to be most beneficial.

Over the next year, we will address challenges relating to evaluating the effectiveness of municipal storm water programs. Consistent with the first recommendation, EPA will evaluate storm water monitoring data that has been collected since program inception. Two grantees (UCLA and the University of Alabama) will review monitoring data that has been submitted as part of routine discharge monitoring reports and annual reports. EPA expects these efforts will evaluate the correlation between storm water discharges and trends in water quality impairment. Another anticipated finding from these grants is a compilation of the range of monitoring activities required of municipalities in storm water permits and the identification of the monitoring that appears to be most effective in demonstrating program results.

To meet another challenge, we are evaluating MS4 permit requirements and annual reports to identify the types of storm water control activities in place and the environmental and programmatic results of these activities. Initially, this effort will evaluate MS4s in at least three EPA Regions and 10 states to gather information on the range of methods employed by permitted MS4s to control storm water discharges. Through this effort, EPA expects to determine whether program goals are being met and establish meaningful indicators of program performance. Should this effort prove useful, EPA will expand the evaluation to a national effort that will evaluate MS4 permits and annual reports in all affected EPA Regions and states. In either case, results of this effort will be disseminated nationally to ensure that findings are incorporated into other MS4 programs, as appropriate.

Enclosed are additional comments on terminology and regulatory citations provided in the report. Again, we appreciate the opportunity to review and comment on the draft report. If you have any questions about these comments or would like to discuss urban storm water runoff issues, please contact me or call Jeff Lape, Acting Director of the Water Permits Division, at (202) 564-9545.

Sincerely,

Michael Cook

Michael B. Cook
Director
Office of Wastewater Management

Enclosure

Enclosure

Below are several additional comments for your consideration that address terminology and regulatory citations provided in the report:

- The term "nonpoint source" throughout the report, when referring to storm water runoff, is somewhat misleading in that the federal definition of "point source" includes many of the types of storm water discharges discussed in the draft report as "nonpoint source pollution." We recommend clarifying that EPA's NPDES storm water permits regulate point source discharges that includes storm water runoff from small, medium, and large municipal separate storm sewer systems. In fact, to avoid confusion between point sources and nonpoint sources in an NPDES context, we recommend that you consider using the term "wet weather discharges" when referring to storm water runoff.

- The third sentence in the first full paragraph on page 3 states that "EPA requires cities to use 'best management practices' to reduce contamination in storm water runoff." We recommend that you change the word "requires" to "recommends." While best management practices are common for reducing storm water contamination, EPA regulations allow MS4s to reduce the discharge of pollutants to the maximum extent practicable using management practices, control techniques, and system, design, and engineering methods, and such other provisions which are appropriate.

- The last sentence in the second full paragraph on page 3 states that "managing storm water runoff will reduce runoff and improve water quality." We recommend changing this sentence to indicate that "managing storm water runoff will reduce the volume and concentration of pollutants in runoff and improve water quality.

- The last sentence of the same paragraph indicates that "Neither EPA nor states have developed measurable program goals or reviewed municipal reports on the results of storm water programs to determined whether the reports provide information that could demonstrate the program's effectiveness." A similar statement is made in the first full paragraph on page 31. We recommend that these two sentences be revised to indicate that "EPA and states have generally been unsuccessful in developing measurable program goals and in demonstrating program effectiveness through the review of municipal reports." EPA and some states have attempted to determine program effectiveness through the review of municipal reports but, to date, these efforts have been unsuccessful in making this determination.

Appendix VII

GAO Contacts and Staff Acknowledgments

GAO Contacts

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Staff Acknowledgments

In addition to those named above, Jennifer Clayborne, Richard LaMore, Sally Coburn, Elizabeth McNally, Charles Bausell, and Timothy Guinane made key contributions to this report.

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Effects of Lawn Fertilizer on Nutrient Concentration in Runoff from Lakeshore Lawns, Lauderdale Lakes, Wisconsin

Introduction

Transport of nutrients (primarily forms of nitrogen and phosphorus) to lakes and resulting accelerated eutrophication are serious concerns for planners and managers of lakes in urban and developing suburban areas of the country. Runoff from urban land surfaces such as streets, lawns, and rooftops has been noted to contain high concentrations of nutrients; lawns and streets were the largest sources of phosphorus in residential areas (Waschbusch, Selbig and Bannerman, 1999). The cumulative contribution from many lawns to the amount of nutrients in lakes is not well understood and potentially could be a large part of the total nutrient contribution.

Why study runoff from lawns?

The shorelines of many lakes are already highly developed, and the potential water-quality effects of this development are increasing. Many lawn-care professionals and homeowners hold a common belief that runoff from lawn surfaces is minimal and that phosphorus movement from lawns is not a problem (Barth, 1995). The homeowners' goal to maintain lush green lawns may conflict with the lake manager's goal to minimize nutrient inputs. In cooperation with the Lauderdale Lakes Lake Management District and the Wisconsin Department of Natural Resources, the U.S. Geological Survey (USGS) conducted a study during 1999–2000 to determine the magnitude of nutrient runoff from nearshore residential lawns surrounding a lake and to determine whether fertilizer application and the type of fertilizer (regular or nonphosphorus types) affect the amount of nutrients in runoff from lawns. Such information is important for developing stormwater best-management practices and for developing or improving shoreland zoning ordinances and other local regulations to protect or improve the water quality of lakes (Wisconsin Department of Natural Resources, Wisconsin Shoreland Management Program, http://www.dnr.state.wi.us/org/water/wm/dsfm/shore/title.htm, accessed February 8, 2002).

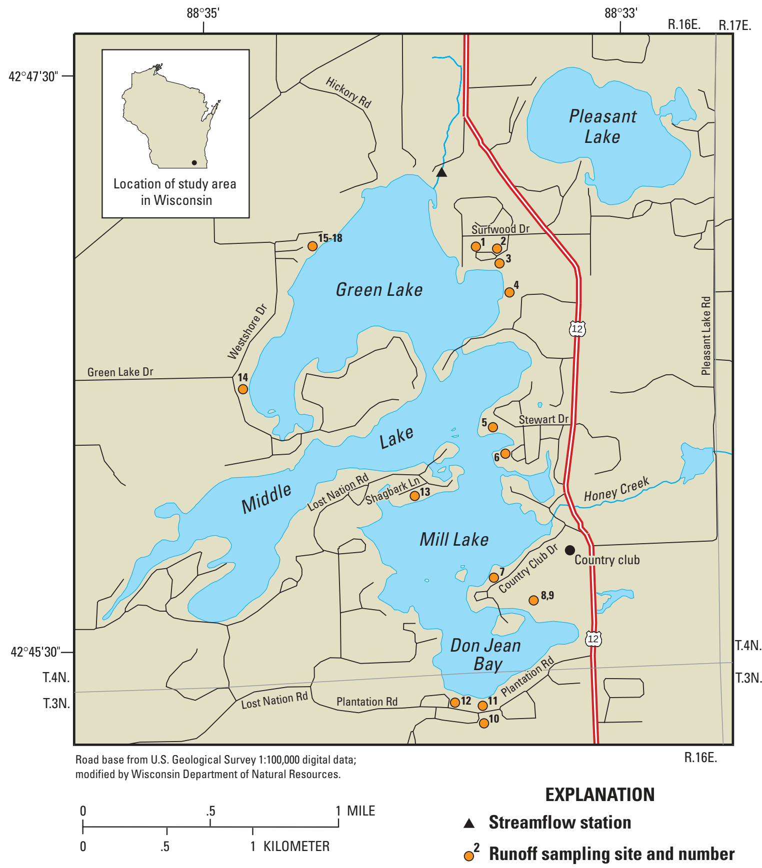

Figure 1. Site locations surrounding Lauderdale Lakes, Wis.

The study area was located at Lauderdale Lakes in Walworth County, a chain of lakes in the more populated southeastern part of Wisconsin (fig. 1). The 15-mile shoreline of the lakes is about 70 percent developed, primarily as single-family housing, and is the focus for additional residential development. Most of the lakefront homes have sloping lawns that are maintained to the water's edge (fig. 2). Information about the specific sources and amounts of phosphorus entering the lakes was needed to develop a plan for reducing the input of phosphorus. The lakes are phosphorus limited, meaning that phosphorus is the nutrient limiting plant growth and affecting lake productivity. A previous study (Garn and others, 1996) found that surface-water inflow from the small nearshore contributing drainage area accounted for only 4 percent of the water inflow to the lake but represented 51 percent of the total annual phosphorus input from all sources. The Lake Management District is in the process of installing

Figure 2. Lakeshore development and lawns at Lauderdale Lakes, Wis.

Figure 3. Tube-type lawn sampler (site 2).

and implementing various measures to reduce the phosphorus input to the lakes, among which is a “lake-friendly” fertilizer program that encourages residents to apply nonphosphorus turf fertilizer. The Lake Management District has been supplying residents with phosphorus-free fertilizer for purchase for about 3 years, and data were needed to evaluate the effectiveness of the program.

Equipment and Methods

In 1999 and spring 2000, lawn samplers designed to collect surface runoff were installed using methods described in Waschbusch, Selbig, and Bannerman (1999, p. 7). The samplers collect runoff through two 5-foot pieces of 1/2-inch-diameter PVC tubing placed flush with the surface of the ground, on a sloping lawn, with an angle of about 150 degrees between the two tubes (fig. 3). Runoff entered the tubing through a 1/8-inch slot cut at intervals along the length of the tube; each tube was then wrapped with fiberglass screen to prevent insects and large debris from entering. The tube was held in place on the lawn surface with wire staples. At the end of each tube, a connecting piece of 1/2-inch silicone tubing directed the collected runoff into a covered 1-quart glass jar placed in the ground in a 4-inch-diameter protective PVC sleeve with a cover.

During the summer of 2000, the original sampler design was modified to increase sample volumes at sites that did not generate sufficient runoff samples and to minimize contamination problems caused by insects and earthworms entering the samples despite the fiberglass screen. One variation to increase runoff-collection efficiency was to enlarge the slots cut in the pipes to 1/4-inch. Another technique used at sites with the least runoff production was to replace the tubing with two lengths of 4-foot-long plastic lawn edging that directed runoff toward the collecting jar (fig. 4); this solution was more effective at increasing captured runoff and minimizing contamination than increasing the slot size.

Clean sample bottles were placed in the lawn samplers before each expected storm or at about 2-week intervals when sites were inspected if there was no rain. Samplers were cleaned and rinsed with deionized water during each visit to remove any accumulated dirt or debris. Notes were kept on volume of runoff in the collection bottle; color and noticeable sediment, debris, or insects in the bottle; and site condition. Sample bottles were collected as soon as possible after each storm (usually within 1 to 5 days) and brought to Madison, where the contents were filtered with a 0.45-micrometer filter, preserved with sulfuric acid, and then delivered to the Wisconsin State Laboratory of Hygiene for nutrient analyses. Samples were analyzed according to standard laboratory methods (Wisconsin State Laboratory of Hygiene, written commun., 2001) for concentrations of total phosphorus (TP), total dissolved phosphorus, total Kjeldahl nitrogen (TKN), dissolved ammonia nitrogen, and dissolved nitrate plus nitrite nitrogen. When insufficient sample volume was collected from a storm to analyze for all nutrients, analyses were done first for total phosphorus.

Figure 4. Edging-type lawn sampler (site 5).

Description of Sampling Sites

The Lauderdale Lakes are a chain of three interconnected lakes with a surface area of 807 acres. The lakes are ground-water drainage lakes in which more than 90 percent of the water inflows are from ground water and direct precipitation. Some surface water enters the lakes by way of a few ephemeral drainageways or as overland flow from the nearshore area. Lake and drainage-basin characteristics are described in detail by Garn and others (1996). Lakeshore developments include about 1,010 single-family homes, of which about 30 percent are year-round residences. Other developments include a golf course, a boat marina, and two recreational camps.

In the lakeshore area within 300 feet of the shoreline, soils consist primarily of the Casco-Rodman Complex (60 percent of the area), Rodman-Casco Complex (12 percent of the area), and Casco-Fox Silt Loam (6 percent of the area). The Casco-Rodman Complex is found on 20–30 percent slopes; surface textures range from loam to silt loam, and subsoils are clay loam to sandy loam. The Rodman-Casco Complex is found on slopes of 30 to 45 percent formed in loamy deposits over sand and gravel. The Casco-Fox soils are found on slopes of 6 to 12 percent and have a silt loam texture (Haszel, 1971). Soil disturbance can be severe during building construction in suburban areas, commonly resulting in subsoil compaction by heavy equipment followed by layering with topsoil. Such disturbance has the potential for greatly increasing runoff and nutrient losses.

Samplers were installed at 18 locations along the lakeshore (fig.1), representing different types of lawn-fertilizer use, undeveloped areas, and one area of mixed land use (part agricultural, ditched paved roads, and lawns). Sites were grouped into three categories: regular-fertilizer sites, nonphosphorus-fertilizer sites, and unfertilized sites. Samplers were installed at 12 sites and operated during the growing season in 1999. In 2000, six additional sites were installed, including two samplers in a swale. Samplers were installed at seven lawn sites where traditional fertilizer was applied, three sites where nonphosphorus fertilizer was applied, and six control sites where no fertilizer was applied (three steep, wooded sites; two lawns; and an undeveloped grass field). Much of the area is wooded, and many of the lawns have an overhead canopy of hardwood trees. Two samplers were installed in a swale area on the south side of Mill Lake (Don Jean Bay) that collected mixed runoff from an agricultural field, lawns, and streets. The drainage area of the upgradient sampler was 8 acres and of the downgradient sampler was 38 acres, of which about 25 percent was cropland.

Property owners were asked to participate in the runoff study. It was assumed that most lawn fertilizer users followed usual manufacturer recommendations of four applications per season made in about April–May, June–July, August–September, and October at 3 to 3.5 pounds per 1,000 square feet. Homeowners applying regular fertilizer fertilized their lawns two or more times per year. Each participant’s property was inspected to ensure that lawn slope was at least 20 feet long, grade was at

Table 1. Physical characteristics of sampling sites at Lauderdale Lakes, Wis. [P, phosphorus; ppm, parts per million; %, percent, turf-quality values are defined in text; ft^2, square feet; --, no data]

Site ID	Station number	Site type	Soil type/texture[a]	Soil P concentration[b] (ppm)	Slope (%)	Vegetative cover density (%)	Turf quality	Runoff area (ft^2)	Number of samples	Percentage of storm events
Regular fertilizer application sites										
2	424652088333901	Wooded lawn	Hebron loam, gravelly	68	21	65	6	150	10	67
3	424650088333501	Lawn	Hebron loam	32	9	90	8.5	180	8	80
5	424616088334201	Wooded lawn	Casco-Rodman loam-silt loam	66	20	100	9	114	8	33
8	424541088334602	Golf course lawn	Casco-Rodman loam-silt loam	35	20	100	9.5	250	15	63
9	424541088334601	Golf course lawn	Casco-Rodman loam-silt loam	78	24	100	9.5	186	9	54
10	424514088334001	Swale	Casco-Fox silt loam	--	5	--	--	8 acres	9	69
11	424518088334301	Swale	Casco-Fox silt loam	--	4	--	--	38 acres	10	77
12	424519088334101	Lawn	Casco-Fox silt loam	28	16	100	10	104	1	8
15	424654088343103	Lawn	Fox silt loam	11	11	60	6	152	5	24
Nonphosphorus-fertilizer application sites										
6	424611088334001	Wooded lawn	Casco-Rodman loam-silt loam	20	14	80	7.5	250	18	67
13	424603088340201	Wooded lawn	Casco-Rodman loam-silt loam	21	34	60	5	140	15	54
14	424623088345101	Wooded lawn	Casco-Rodman loam-silt loam	70	14	85	8	225	8	30
Unfertilized sites										
1	424652088334401	Grass field	Fox sandy loam	65	9	100	7	128	2	13
4	424643088333601	Wooded lawn	Casco-Rodman loam-silt loam	38	12	85	8	188	6	47
7	424543088334001	Wooded lawn	Casco-Rodman loam-silt loam	14	22	70	6	209	12	46
16	424654088343101	Wooded	Rodman-Casco loam/sand,gravel	28	41	95	1	200	9	33
17	424654088343102	Wooded	Rodman-Casco loam/sand,gravel	24	33	95	1	300	13	48
18	424654088343104	Wooded	Rodman-Casco sandy, gravelly	16	30	65	2	140	7	28

[a] From Haszel, 1971.

[b] 50–75 ppm P optimum recommendation for turfgrass. Analysis by Soil and Plant Laboratory, University of Wisconsin, Madison.

least 5 percent, and sample catchment area was not affected by runoff from rain gutters, driveways, or other lawns or sources. A soil sample collected at the time of sampler installation was analyzed for soil texture, pH, and phosphorus content by the University of Wisconsin Soil and Plant Analysis Laboratory. A visual vegetative soil-cover density, in percent, and a turf-quality rating were assigned to each lawn during visits. Turf quality was based on a 1 to 10 scale: for example, a score of 10 represented 100 percent best-quality green grass cover, 5 represented 50 percent grass cover with bare spots, weeds, and dead grass providing additional cover, and 1 indicated no turfgrass cover, with dead grass, weeds, and other vegetation providing primary soil cover. The more heavily fertilized sites (5, 8, 9, 12) had the best turf-quality ratings. Various physical characteristics of the sampling sites are summarized in table 1.

Nutrient Concentration in Runoff

Rainfall and Runoff

Long-term precipitation records from the National Weather Service stations at Whitewater (about 9 miles northwest of Lauderdale Lakes) and Lake Geneva (about 13 miles southeast) were used to estimate rainfall at Lauderdale Lakes (National Oceanic and Atmospheric Administration, 1999–2000). Data from a recording rain gage at a USGS streamflow-gaging station at Jackson Creek near Elkhorn (9 miles south) was used after the rain gage was installed on May 25, 1999. Rainfall was above the 1961-90 average for April, May, and June 1999 and near or below average the remainder of the season. In 2000, rainfall amounts for May, June, and September were substantially above average (fig. 5). Ten runoff events occurred from 12 storms in the 1999 sampling season and 13 runoff events occurred from 15 storms in 2000; generally, the storms in 2000 were larger than those in 1999. A storm event was defined as more than 0.3 inches of rain, and a runoff event as one that resulted in at least two runoff samples with sufficient volume for analysis (about 100 ml). A summary of the storm dates and precipitation amounts is given in table 2.

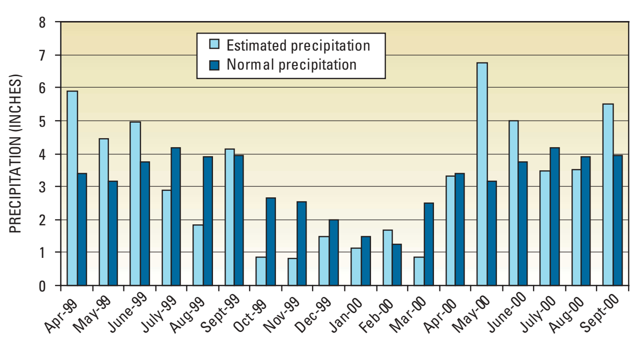

Figure 5. Estimated monthly precipitation at Lauderdale Lakes, Wis., during 1999–2000 compared to normal monthly precipitation.

Although measurement of quantity of runoff was not part of this study, a qualitative evaluation of runoff may be obtained by comparing the

Table 2. Storm information and number of sites with runoff samples at Lauderdale Lakes, Wis., 1999–2000 [est, estimated]

Storm number	Storm start date	Total precip amount (inches)	Number of sites with runoff samples
99S1	4/9/1999	0.86 [a]	4
99S2	4/22/1999	3.73 [a]	9
99S3	5/12/1999	0.63 [a]	3
99S4	5/16/1999	0.80 [a] est	4
99S5	5/17/1999	0.66 [a] est	3
99S6	6/1/1999	0.70	8
99S7	6/10/1999	3.35	6
99S8	7/17/1999	1.11	4
99S9	8/13/1999	0.37	5
99S10	9/27/1999	3.66	11
00S1	2/21/2000	2.0 [b]	11
00S2	4/19/2000	2.59	2
00S3	5/9/2000	1.36	9
00S4	5/18/2000	1.95	5
00S5	5/27/2000	3.85	14
00S6	6/11/2000	1.95	9
00S7	7/2/2000	1.40	12
00S8	7/10/2000	1.33	5
00S9	7/31/2000	1.62	3
00S10	8/5/2000	1.17	16
00S11	8/17/2000	0.70	5
00S12	9/11/2000	1.94	17
00S13	9/22/2000	1.89	9

[a] Measured at Whitewater.

[b] From 6 inches snowmelt and light rain.

Figure 6. Site 12 at Lauderdale Lakes, Wis.—an example of high-quality turfgrass.

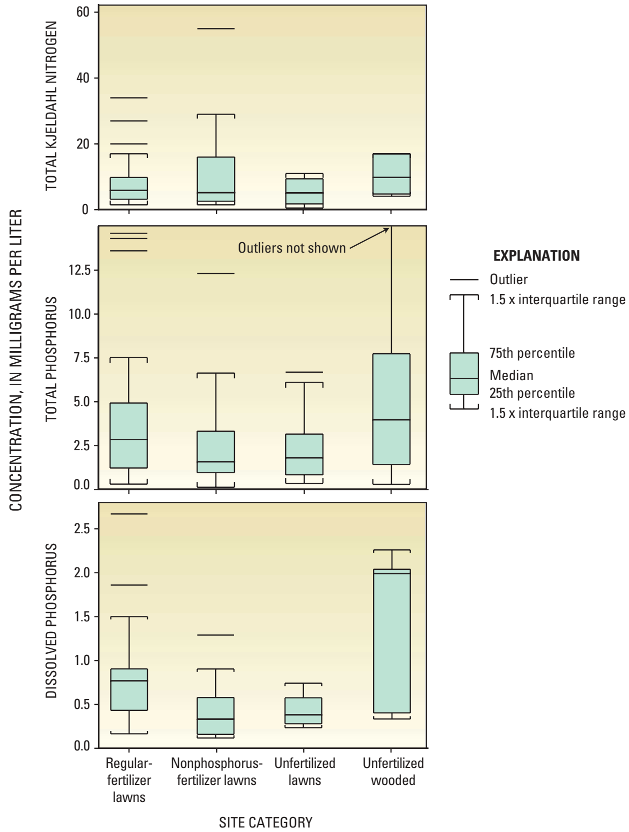

Figure 7. Nutrient concentrations in runoff from different categories of sampling sites at Lauderdale Lakes, Wis.

number of sites where runoff was sampled for each storm (table 2) and the number of storms sampled at each site (table 1). The magnitude of runoff is dependent on a combination of factors including rainfall amount and intensity, soil-surface storage and detention, and infiltration rate. Infiltration is affected by soil type, vegetative cover, slope, and other factors (Haan, Barfield, and Hayes, 1994, p. 52–54). In general, sites with dense vegetative cover and coarse soils with high infiltration rates produced less runoff. Specifically, site 12 of the fertilized sites (fig. 6), which had the best-quality turf and fertilizer applications of 4 times per year, produced the least runoff (only 8 percent of all storms). Other sites (5, 8, 9) with high turf quality and density produced more frequent runoff samples, possibly because of steeper slopes or other factors. At six of the lawn sites, more than 50 percent of the storm events produced runoff.

The phenomenon of soil-water repellency, or hydrophobicity, was observed at many of the lawn sites, especially after dry periods. Water repellency of soils reduces affinity to water so that the soil resists wetting, thus reducing infiltration capacity, decreasing plant growth, and increasing surface runoff. The phenomenon has been widely accepted as a problem for many soils in seasonally dry climates. Soils with grass cover in temperate climates have recently been found to develop resistance to wetting—a common problem known as "localized dry spot" on golf courses (Doerr, Shakesby and Walsh, 2000; Kostka, 2000). Therefore, water repellency could be an additional factor influencing runoff from residential lawn soils (L.F. DeBano, University of Arizona, oral commun., 2001). At Lauderdale Lakes, there was also some indication that lawn shading by trees and less frequent use of fertilizer (sites 6, 7, and 13) resulted in less dense and patchy turf cover, increasing runoff. In ongoing turf studies at the University of Wisconsin (W.R. Kussow, Department of Soil Science, written commun., 2000), researchers found that not fertilizing turfgrass caused thinning of the turf, increased the amount of runoff, and increased nitrogen and phosphorus loss. Generally, the percentage of storms resulting in surface runoff from many of the lawns was higher than expected. Runoff from lawns may occur more frequently than previously thought because of the complex interaction of many factors.

Nutrient Concentrations in Runoff and Effects of Fertilizer Use

Summary statistics of nutrient concentrations measured in runoff from different site categories are given in table 3 and compared in figure 7. Detailed data for each of the sites were published annually in the U.S. Geological Survey Water-Data Reports (Holmstrom and others, 2000; Garn and others, 2001). There was a wide range in concentration of most nutrients among storms during the study period. Given this variability, geometric means or medians are more meaningful for comparison because they are better estimates of central tendency than arithmetic means. The nonparametric Kruskal-Wallis test was used to test for overall differences in concentration distributions, and the Wilcoxon rank sum test was used to test for differences in medians between pairs of lawn categories (P.W. Rasmussen, Wisconsin Department of Natural Resources, written commun., 2001). A confidence level of 10 percent ($p = 0.10$) was chosen to evaluate the results of the statistical tests. The difference in medians for samples from two different lawn categories was considered statistically significant if p values were less than 0.10.

A quality-control study was done to determine nutrient-concentration effects of grass clippings, earthworms, and insects that managed to get into water samples. All of these contamination sources had a large effect by increasing nitrogen and phosphorus concentrations. Samples that were affected by these contamination sources, identified from field notes, were excluded from data analysis, but the exclusions did not significantly change the overall results.

No significant differences in concentration among lawn categories were found for any of the nitrogen species. Fertilizer use did not affect total nitrogen concentrations in runoff. In addition, nitrite plus nitrate concentrations in runoff were generally low.

Dissolved phosphorus concentrations were significantly different ($p = 0.02$) among the lawn categories. Moreover, the median concentration of dissolved phosphorus from regular-fertilizer sites (0.77 milligram per liter (mg/L)) was significantly greater than that from nonphosphorus-fertilizer sites (0.33 mg/L) and unfertilized lawn sites (0.38 mg/L). Total phosphorus in runoff from regular-fertilizer sites compared to nonphosphorus-fertilizer and to unfertilized-lawn sites had p-values of 0.11 and 0.14, respectively. Thus, median total phosphorus concentrations were not significantly different at $p < 0.1$. Dissolved phosphorus was a fraction of total phosphorus, and its concentrations ranged from 22 to 45 percent of total phosphorus for all lawn categories.

Figure 8. Dense understory vegetation on wooded slope of sites 16 and 17 at Lauderdale Lakes, Wis.

The median dissolved phosphorus concentration in lawn runoff from regular-fertilizer sites was twice that for unfertilized and nonphosphorus-fertilizer sites. Runoff from lawn sites with nonphosphorus-fertilizer applications had a median dissolved phosphorus and total phosphorus concentration that was similar to unfertilized sites. Dissolved phosphorus in runoff is important because it is readily available for plant growth. Although not significant at $p < 0.1$, lawn sites with regular fertilizer applications had a median total phosphorus concentration in runoff that was 1.6 times that for unfertilized sites and 1.8 times that for nonphosphorus-fertilizer sites.

In comparison with other studies, phosphorus concentrations in lawn runoff at Lauderdale Lakes were slightly higher than concentrations found in runoff from urban lawns in Madison, Wis. (Waschbusch, Selbig and Bannerman, 1999), but were similar to those in lawn runoff from suburban lawns in Minneapolis/St. Paul, Minn. (Barten and Jahnke, 1997). Surprisingly, nutrient concentrations in runoff from the unfertilized, steep, wooded hillsides (sites 16, 17, and 18) were higher than those from the lawn sites and thus were separated from the unfertilized lawn sites in the data comparisons. These wooded sites (fig. 8) may be different from other wooded sites because of their steep slopes, thick surface organic and litter layer, and dense understory vegetation (crown vetch) planted for erosion control. Waschbusch, Selbig, and Bannerman (1999) found a direct relation between phosphorus concentration and percentage of overhead tree canopy that could affect source-area concentrations. In the Lauderdale Lakes study, however, all lawn categories contained sites with overhead tree canopy, and the lawn sites treated with regular fertilizer had the fewest trees; therefore, differences between regular-fertilizer sites and the other lawn sites could be even greater if there was an effect from tree cover.

Total phosphorus concentration in lawn runoff had a significant ($p = 0.08$) relation to soil-phosphorus concentration (table 1); total dissolved phosphorus had no significant relation. The low category of soil-phosphorus concentration (0 to 24 parts per million (ppm)) had a significantly lower median concentration of total phosphorus in lawn runoff (about half) than the medians from medium (25-65 ppm) or high (66 ppm or more) soil-phosphorus concentration lawns. There was no significant difference between runoff concentrations from medium and high soil-phosphorus concentration lawns. Barten and Jahnke (1997) also found a significant difference in concentration of phosphorus in runoff from different categories of lawn soil fertility. In their study, total and soluble reactive phosphorus concentrations in runoff from high soil-phosphorus concentration lawns were twice as large as the concentrations in runoff from low soil-phosphorus concentration lawns.

Median nutrient concentrations from the Don Jean Bay swale area with mixed land use were more similar to those from the unfertilized wooded sites and fertilized lawn sites than to those from other lawn sites (table 3). The range in concentrations for ammonia nitrogen and total Kjeldahl nitrogen in runoff from the swale, however, was greater than those for the other sites.

Although it was not within the scope of this study to measure runoff volumes from each of the sites and quantify the mass of nutrients transported offsite, the concentration data will be useful for future computations of unit-area loads (that is, mass of a particular nutrient species per unit contributing area). Concentrations of nutrients from lawns observed in this

Table 3. Statistical summary of nutrient concentrations in runoff from different site categories, Lauderdale Lakes, Wis. [n, number of samples; TKN, total Kjeldahl nitrogen; NO_2, nitrite nitrogen; NO_3, nitrate nitrogen; TP, total phosphorus; Diss P, dissolved phosphorus; all concentrations in milligrams per liter]

	Ammonia N	TKN	$NO_2 + NO_3$	TP	Diss P
Regular-fertilizer lawn sites					
Geometric mean	1.11	5.9	0.09	2.57	0.7
Median	1.07	5.9	0.12	2.85	0.77
Mean	2.18	8.6	0.17	4.02	0.93
Max	14.5	34	0.56	23.2	3.32
Min	0.05	1.5	0.01	0.31	0.17
n	23	23	23	58	23
Nonphosphorus-fertilizer lawn sites					
Geometric mean	1	6.5	0.14	1.89	0.34
Median	0.93	5.2	0.14	1.58	0.33
Mean	3.95	12.2	0.57	3.3	0.45
Max	36.2	55	5.22	23.5	1.29
Min	0.04	1.5	0.14	0.14	0.12
n	14	14	14	38	15
Unfertilized lawn sites					
Geometric mean	0.76	4.08	0.12	1.73	0.4
Median	0.63	5.1	0.14	1.81	0.38
Mean	1.12	5.85	0.17	2.33	0.43
Max	2.98	11	0.4	6.69	0.74
Min	0.22	0.53	0.01	0.36	0.23
n	9	9	9	19	8
Unfertilized wooded sites					
Geometric mean	2.95	12.7	0.16	3.52	1.04
Median	4.38	9.8	0.24	3.98	1.99
Mean	5.33	29.3	0.9	6.78	1.4
Max	11.6	130	2.24	30.6	2.26
Min	0.41	4.1	0.01	0.3	0.33
n	5	6	5	28	5
Don Jean Bay swale sites					
Geometric mean	3.48	14.5	0.06	2.46	0.49
Median	3.96	19	0.04	2.66	0.41
Mean	11.91	31.3	0.15	3.55	0.91
Max	88.1	160	0.6	9.07	3.33
Min	0.56	2	0.01	0.37	0.18
n	11	11	10	19	9

study are much greater (by 3 to 5 times) than the estimated concentrations used to calculate total phosphorus load from surface runoff to Lauderdale Lakes in a previous study by Garn and others (1996, p. 16). All of the nutrient load from lawn runoff may not actually reach or be deposited in the lake because of varying flowpaths, soil permeability, breaks in slope, vegetative buffers, and other obstructions; however, in many cases, lawns extend and slope continuously to the water's edge to provide a direct source of loading.

The annual phosphorus load from the nearshore area of Lauderdale Lakes may be greater than the 430 pounds previously estimated. Using a revised median concentration of 2.3 mg/L for surface runoff from an estimated 220 acres of developed shoreline (67 percent of shoreline) within 200 feet from the edge of water, annual total phosphorus load from residential lawns could be as much as 370 pounds (assuming all of the phosphorus reaches the lake). If a delivery of 50 percent of the load is assumed, and the total surface-water load is recomputed using the surface runoff values from the previous study, the total annual surface-water load from the nearshore drainage area would be 620 pounds, which represents 60 precent of the total annual phosphorus input from all sources. Studies at Lauderdale Lakes and several other ongoing studies by the USGS in Wisconsin will provide additional information on the effects of lawns and shoreline development on nutrient loads to lakes.

Limitations of Results

- Many runoff samples (about 30 percent) overflowed the collecting bottle and may not be truly representative of the mean concentration from each storm. According to T.D. Stuntebeck (U.S. Geological Survey, unpub. data, 2002), overflow samples for suspended solids and total phosphorus had higher concentrations than those from samples that did not overflow the container, but the opposite was true for dissolved phosphorus. Barten and Jahnke (1997) also found that overflow samples had lower concentrations for some constituents. Overflow occurred, however, for all categories of sites, and differences noted could potentially be even greater.
- The number of samples for some categories was relatively small for rigorous statistical analysis, and the small numbers could lead to inconsistencies among comparisons for different pairs of categories.
- Nutrient-concentration data are for onsite runoff and should be used with caution when making offsite interpretations. Not all of the nutrient load from lawn runoff may actually enter the lake.
- Some changes in nutrient species composition affecting dissolved constituents may have occurred in those samples that were not collected within 2 days after a storm.

Conclusions

- A high percentage of storms resulted in surface runoff from many of the lawns. Runoff from lawns may occur relatively frequently, more than 50 percent of the storms for many lawns.
- Fertilizer use did not affect nitrogen concentrations in runoff. Nitrite plus nitrate concentrations in runoff were generally low.
- Total phosphorus concentration in lawn runoff was directly related to the phosphorus concentration of lawn soils.
- Dissolved phosphorus concentrations were significantly different among the lawn categories; the median from regular-fertilizer sites was twice that from unfertilized or nonphosphorus-fertilizer sites.
- Runoff from lawn sites with nonphosphorus fertilizer applications had a median total phosphorus concentration that was similar to that of unfertilized sites, an indication that nonphosphorus fertilizer use may be an effective, low-cost practice for reducing phosphorus in runoff.

Acknowledgments

Thanks are extended to Scott Mason of the Lauderdale Lakes Lake Management District for his assistance in this study; to the lakeshore homeowners that allowed us to install sampling equipment in their lawns; and to the Wisconsin Department of Natural Resources, Lake Protection Grant Program.

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Information

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Layout and illustrations: Michelle Greenwood and James Kennedy

Printed on recycled paper

From:	Mark Olson
To:	Chiu, Wayne@Waterboards
Subject:	Comment Tentative Order No.R9-2013-0001, Regional MS4 Permit, Place ID: 786088Wchiu
Date:	Friday, January 11, 2013 12:57:56 PM
Importance:	High

Dear Mr. Chiu:

As a member of the San Diego Regional Chamber of Commerce, I am responding to the San Diego Regional Water Quality Control Board's Tentative Order R9-2012-0011 ("Permit") dated October 31, 2012. After reviewing and speaking with people involved with the proposed Permit, I am concerned it will impose expensive, onerous, and untested regulations on local governments, businesses and residents. These new regulations will impact the region's economy without improving its water quality.

Everyone understands the importance of clean, safe water to the region. As a member of the business community, I too am interested in improving San Diego's water. It is important, however, that we use our limited resources wisely and ensure that our efforts produce the desired outcome of improving water quality.

I applaud the Board's inclusion of Water Quality Improvement Plans (WQIP) as a first step in developing a cost-effective approach to improving our water. Analysis remains a critical component of a successful strategy, and I am glad to see that the Board is committed to finding the best possible solution to water quality improvement.

I am concerned, however, that the costs associated with enforcing and implementing the permit will have a negative impact on my business and San Diego's economy. The four primary areas of concern include: 1) the strict liability for exceeding water quality objectives; 2) the additional and changing requirements for development projects, impacting items such as storm water retention and discharge; 3) the preemption of WQIPs by new and changing regulatory requirements prior to allowing the WQIPs to be developed and implemented; and 4) the lack of reliable funding sources to implement these regulatory changes.

It is necessary to hold individuals, businesses and governments accountable, but it is critical that the accountability measures can be reasonably achieved and are likely to have a significant and positive impact on San Diego's water. Because of these concerns, I respectfully request that the Permit focus on the timely development of effective and enforceable WQIPs, and that each of the WQIPs be developed through a process that ensures public participation. I ask also that the designation of appropriate Best Management Practices in each watershed be determined through the WQIP process rather than the one size fits all strategy currently being proposed in the Permit. I ask further that until the Board adopts a WQIP for a watershed that the provisions of the existing Permit remain in place for that watershed. Finally, in order to avoid unnecessary litigation I request that the Board adopt the WQIPs as Orders implementing the proposed Permit.

I urge you to adopt final permit language that is evidence-based and both environmentally and economically sustainable. Thank you for your consideration. Please contact me at (858) 354-1441, if you have any questions.

Sincerely,

Mark Olson

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April 10 and 11, 2013
Item No. 8
Supporting Document No. 5

ORANGE COUNTY
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January 11, 2013

By E-Mail and Delivery

Wayne Chiu, P.E.
California Regional Water Quality Control Board, San Diego region
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

Subject: Comment – Tentative Order No. R9-2013-0001, Regional MS4 Permit, Place ID: 786088Wchiu.

Dear Mr. Chiu:

The County of Orange, as Principal Permittee of the Orange County Stormwater Program (Program), appreciates the opportunity to provide comments on *Tentative Order No. R9-2013-0001, NPDES No. CAS0109266, National Pollutant Discharge Elimination System (NPDES) Permit and Waste Discharge Requirements for Discharges of Urban Runoff from the Municipal Separate Storm Sewer Systems (MS4s) Draining the Watersheds within the San Diego Region (Tentative Order)* issued on October 31, 2012. The south Orange County Permittees (Permittees) were involved in the development of these comments and the Cities of Aliso Viejo, Dana Point, Laguna Hills, Laguna Niguel, Lake Forest, Mission Viejo, Rancho Santa Margarita, San Clemente, and San Juan Capistrano have directed that they be recognized as concurring entities on this letter. We have also coordinated our review with permittees in Riverside and San Diego Counties, who have identified many of the same issues with the Tentative Order. We support their comments except where noted otherwise in the attachments to this letter.

The Permittees have been actively engaged in discussions of the prior Administrative Draft of Tentative Order No. R9-2012-0011 (and subsequently on Tentative Order R9-2013-0001). Since April 9, 2012 the Permittees have participated with Board staff in two Orange County-specific meetings, an initial public workshop (April 25), four "focused meetings" (June 27, July 11, July 25 and August 22), a hydromodification workshop (August 30), and a final public workshop (September 5). We also conveyed in writing our concerns regarding the scheduling and appropriateness of this effort (see prior correspondence dated May 10, 2012, May 17, 2012 and July 3, 2012) and submitted extensive comments on the Administrative Draft on September 14, 2012 (all of which are incorporated by reference).

We recognize the significant efforts of Regional Board staff to engage the Permittees and key stakeholders in the development of a regional permit in a collaborative manner. We also recognize that Tentative Order No. R9-2013-0001 reflects a number of changes directly in response to Permittee comments. The Tentative Order, however, still contains many issues of significant concern and does not, in our view, achieve at this time what Board staff laid out as its intended purpose and approach during the workshop process. Our extensive comments on the Tentative Order are organized and submitted as follows:

- A summary of our overarching concerns with the Tentative Order are included below in this letter
- Attachment A presents detailed comments on the entire permit
- Attachment B presents a redline/strikeout version of recommended changes to the Tentative Order.

The County is aware that Regional Board staff has held a number of meetings and discussions with San Diego Permittees since the release of the Tentative Order R9-2013-0001 on changes they are proposing. The Orange County Permittees would similarly request the opportunity to meet with you and other Regional Board staff to review in detail the changes requested in this comment submittal.

Overarching Issues of Concern with the Tentative Order

I. Failure to Consider Orange County Permittee Programs and Accomplishments

The Orange County Stormwater Program has been regulated under municipal NPDES stormwater permits since the first permit was issued in 1990. Subsequent permits were issued in 1996, 2002, and 2009. Since the inception of the Program the County of Orange and the other 12 Permittees have developed a comprehensive Drainage Area Management Plan (DAMP) that serves as the principal policy and guidance document for the entire Program, Local Implementation Plans (LIPs) that are developed by each Permittee to identify how the program is implemented on a city/jurisdiction basis, and through a series of watershed workplans for each watershed in the San Diego Region. These workplans detail the Permittee efforts to prevent and control pollutants on a watershed level.

The Orange County Stormwater Program is one of the few programs to date to have actively defined a series of performance metrics (headline measures) and use an assessment framework to define the relationships between compliance actions and, ultimately, positive changes in water quality. This assessment process is important because, in the end, the goal of the Program is to reduce urban pollutants and assist in attaining water quality standards.

Looking at the achievements that the Program has had since 1990, several major themes emerge:

- The Orange County Stormwater Program is proactive and a leader within the State
- The Permittees are engaged in the Program and provide valuable input into the process
- The Program uses several separate, but highly inter-related water quality planning processes to address urban sources of pollutants

- The Program recognizes the benefits of watershed-based planning and regional controls and has an increased emphasis to support this as foundational to the success of the Stormwater Program
- The Permittees adaptively manage the Program - the iterative process is actively employed and necessary modifications are proposed, reviewed and incorporated into the Program. Collaborative research is a key tool to understand and characterize sources of pollutants
- The existing framework and implementation of the Program meets or exceeds the permit requirements
- The Program receives significant funding and resources to ensure that it is successful
- Improvements in water quality have been realized including delistings from the 303(d) list

Specific successes include:

- With the 2010 303(d) List, Dana Point Harbor was delisted for indicator bacteria and several shoreline segments were delisted for *Enterococcus*, Fecal Coliform and/or Total Coliform
- In 2012, water quality in Orange County was excellent with 89% A grades and 94% B or better grades as reported by Heal the Bay in their annual beach water quality report card. Wet weather grades were fair (69% A or B grades) but bested the five-year average by 15%. Furthermore, for almost ten months (June 21, 2011 to April 6, 2012) Orange County did not have any beach closures, which is unprecedented. This is the longest stretch of time the county has gone without a single beach closure.
- The Permittees' public education program has changed public awareness as shown by surveys and is clearly promoting behaviors in our residents that are protective of water quality. In 2006 this effort – Project Pollution Prevention – was formally recognized for its excellence on a statewide basis by CASQA. In 2012, the American Public Works Association recognized our Project Pollution Prevention Public Education website as a "model practice." Results from the 2012 Public Awareness Survey of Orange County Residents indicate increased overall knowledge of stormwater issues and willingness to participate in stormwater pollution preventative behaviors in some key areas.
- With respect to land development, in 2012 the OC Engineering Council awarded the County with an Engineering Project Achievement Award for the Technical Guidance Document, which is the companion document to the Model Water Quality Improvement Plan.

There is concern that these achievements and the significant local engagement in the Program are not considered and approaches developed by the Permittees are sometimes overridden by the Tentative Order without support. For example, provisions dealing with land development, Low Impact Development (LID) and hydromodification control are significantly ratcheted up while award-winning permit programs are only just being implemented and/or pending approval and the programmatic successes as demonstrated with the annual effectiveness assessments are not recognized.

II. Lack of Authority to Include the Orange County Permittees in a Regional Permit

The Regional Board lacks the authority to include Orange County Permittees in a Regional Permit because there is no system-wide, jurisdiction-wide, watershed or other basis to do so. Orange County's MS4 does not interconnect with Riverside and San Diego Counties. There is no shared jurisdiction or other regional stormwater management authority that is applying for one permit. Orange County does not drain into a shared watershed, and the County is not adjacent to either county due to large federal lands that isolate Orange County from Riverside and San Diego. In addition, the quantity and nature of pollutants are different between the three counties. Therefore, the Regional Board cannot under federal and state regulations impose a Regional Permit without the Permittees expressly consenting to the Board's jurisdiction, as was done in the San Francisco Bay Area Regional Permit.

When preparing for the next iteration of each permit, the Permittees spend a significant amount of time and energy developing a Report of Waste Discharge (ROWD). The ROWD discusses the Permittee's compliance activities and includes a description of accomplishments, an assessment of program effectiveness using the California Stormwater Quality Program Effectiveness Assessment (CASQA) guidance in conjunction with the iterative process, the necessary programmatic changes that are evident as a result of the assessment, and, finally, a proposed new management program in the form of a draft updated DAMP. In the case of the current Tentative Order, new requirements are being proposed and will be adopted for south Orange County in the absence of a ROWD, since the Permittees are still covered by an existing permit and have not been required to submit one. As noted in previous correspondence, inclusion of south Orange County in a regional permit and in the absence of a ROWD is inappropriate.

III. Consistency in MS4 Permitting

In 2009, your staff committed in the last permit renewal to look at consistency with the State's other MS4 permits, notably those being promulgated by the Santa Ana Regional Board. This commitment represented recognition of the Little Hoover Commission's conclusions on the lack of consistency in MS4 permits as a critical area of concern and USEPA's interest in seeing greater permitting consistency. Nonetheless, while Regional Board staff has stated that the Tentative Order is meant to be a modest incremental update of the current south Orange County permit, it nevertheless escalates the regulatory requirements in many key areas, creates greater variance with the north Orange County permit, and appears to represent a singular rather than statewide vision of the future of MS4 permitting. The Fact Sheet (Attachment F) points to two similarities between the current Santa Ana Regional Board MS4 permit and the Tentative Order, but fails to identify the numerous other areas of inconsistency.

To the extent that the Tentative Order may ease the regulatory burden for your staff, there will be a commensurate increase in the burden for the County other Permittees that are dealing with multiple Regional Board jurisdictions if permitting in California continues to be defined by divergent rather than convergent approaches. We have therefore proposed many changes to the Tentative Order supportive of a more cogent alignment of our countywide Program. This consistency is important to the credibility of our respective efforts to manage urban runoff and is vital to sustaining the obvious cost effectiveness of a coordinated countywide program in

Orange County with promising synergies in other regions at a time of widespread economic distress for many communities.

It should also be noted that the Tentative Order provides no consideration at all for the five Permittees whose jurisdictional area is regulated under separate permits from the Santa Ana and San Diego Regional Boards. Fundamentally different requirements between our two permits, particularly within the same city, damage the credibility of the regulatory framework and confound the ability of local government to cost effectively address key environmental mandates.

IV. Prohibitions and Limitations

The Prohibitions and Limitations language in MS4 permits statewide was recently the subject of a State Water Resources Control Board workshop on November 20, 2012. The County provided testimony at this workshop expressing concern that the new iteration of permit language could expose the Permittees to State and federal enforcement actions, as well as to third party actions under the federal Clean Water Act's citizen suit provisions. This was the case with the recent Ninth Circuit Court of Appeals decision in the case of *Los Angeles County Flood Control District v. Natural Resources Defense Council*, No. 11-460, slip op. (Jan. 8, 2013). The proposed Prohibitions and Limitations provisions in the Tentative Order, as written, could be construed as standalone provisions that could expose the Permittees to Clean Water Act liabilities for discharges that cause or contribute to an exceedance of a water quality standard. Receiving water limitations must provide a compliance mechanism for exceedances of effluent limitations, water quality standards or TMDLs if the Permittees are diligently following an iterative process and implementing BMPs to the MEP standard

The Tentative Order should then reaffirm the iterative process in that compliance is to be achieved over time using improved BMPs. The iterative process is a fundamental aspect of MS4 programs, as envisioned by State Water Board Order 99-05 and later reconfirmed in Order WQ 2001 15 (BIA Order), and is the mechanism by which MS4 Permittees should demonstrate compliance. The County supports this approach and believes that the Regional Board has discretion on the receiving water limitations language beyond what is required to be included per Water Board Order 99-05.

The Permittees envision Water Quality Improvement Plans (WQIPs) as the foundation for an iterative BMP-based compliance approach for the discharge prohibitions and limitations and have provided detailed comments and recommended redline permit language in Attachment A.

V. New Requirements for Land Development

The evolution of MS4 permitting has largely been defined by a focus on land development. In 2009, MS4 programs on a statewide basis started to transition requirements for land development from "treat and release" runoff management to onsite retention with a new emphasis on LID, and hydromodification. Currently, while there is recognition of an emerging paradigm that the future management of urban landscapes should be based upon the principal of seeking to restore of natural hydrologic processes, there is absolutely no clear consensus on how and where this approach should be effected.

The comments and proposed redline permit language in Attachments A and B are intended to shift the land development program toward an approach based upon nationally accepted LID principles, recognize the uncertainties and need for greater flexibility in hydromodification requirements, and offer a mitigative approach to urban land development that will produce meaningful environmental outcomes. Our revisions would recognize biofiltration as an equal LID BMP; ensure that the significantly more challenging requirements related to hydromodification are not imposed for discharges to channels that are engineered, concrete lined, significantly hardened, and/or are regularly maintained as part of a regional flood control program; and incorporate USEPA green street guidance to provide greater flexibility for land-constrained street, road, and highway projects consistent with other adopted MS4 permits in the State.

Additionally, the County has continued concern that the provisions dealing with land development, LID and hydromodification controls are significantly ratcheted up in the Tentative Order while existing Fourth Term Permit programs are only just being implemented and/or pending approval. The fact sheet and findings provide no foundation for the changes being proposed.

VI. TMDL Incorporation

The Regional Board has adopted two Basin Plan Amendments to establish Total Maximum Daily Loads (TMDLs) where the Permittees are assigned wasteload allocations: (1) Indicator Bacteria in Baby Beach in Dana Point Harbor and (2) Indicator Bacteria, Project I - Twenty Beaches and Creeks in the San Diego Region (including Tecolote Creek).

There are several fundamental and substantive discrepancies between the adopted TMDL Basin Plan Amendments and the provisions of the Tentative Order. These inconsistencies negate the Basin Plan Amendment process that occurred to establish the TMDLs and clearly contradict the Board's intent for how the TMDLs would be incorporated into the MS4 Permit. The Tentative Order should be revised to ensure that the TMDLs are properly incorporated as mass-based WLAs and not as concentration-based limits and that BMP-based compliance is established for the TMDL provisions. The Tentative Order should also provide an explicit re-opener provision to ensure that any revision to the TMDL is included in the adopted Order.

VII. Complimentary Watershed and Jurisdictional Planning

The WQIP approach represents a significant advance in the development and implementation of stormwater programs. The WQIP framework allows for the identification and development of a program built around the highest priority water quality conditions within a specific watershed. The WQIP also allows for the integration of all program elements and focuses the efforts on the highest priorities for each watershed through the customization of actions and strategies. If positioned correctly, the WQIP can be a significant advance in making the

Tentative Order and corresponding compliance programs truly strategic, adaptive, and synergistic.

The County believes the Tentative Order provisions, especially Provision E, JRMP, deviate from the strategic and adaptive approach to the anachronistic "one-size fits all" approach. For example, the Existing Development provisions dictate that specific BMPs that must be implemented, regardless of the high priority water quality concerns within a watershed. These provisions become "additive" instead of "prioritized" and are not supportive of the overarching WQIP. The Tentative Order should be modified so that the WQIPs and related Jurisdictional Runoff Management Plans can be streamlined and focus on the highest priorities within each watershed.

Thank you for your attention to our comments. Please contact the undersigned directly if you have any questions. For technical questions, please contact Chris Crompton at (714) 955-0630 or Richard Boon at (714) 955-0670.

Very truly yours,

Mary Anne Skorpanich, Manager
OC Watersheds

Ryan M. F. Baron
Senior Deputy County Counsel
Office of County Counsel

Attachments: A – Detailed Comments
B – Redline Version of the Tentative Order

Cc: (Electronic copies only)
David Gibson, San Diego Regional Board
Tony Felix, San Diego Regional Board
South Orange County Permittees
Orange County Technical Advisory Committee
Tony Olmos, Orange County Public Works
Todd Snyder, County of San Diego
Jason Uhley, Riverside County Flood Control and Water Conservation District
Andrew Kleis, City of San Diego

ATTACHMENT A

**ORANGE COUNTY DETAILED COMMENTS ON
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION
TENTATIVE ORDER No. R9-2013-0001
NPDES NO. CAS0109266**

This document, Attachment A, contains the detailed legal and technical comments of the County of Orange and the Orange County Flood Control District (collectively, the "**County**") on Tentative Order No. R9-2013-0001 dated October 31, 2012 ("**Tentative Order**"). These comments are divided into three sections (*General*, *Findings*, and *Permit Provisions*) and address issues relating to specific parts of the Tentative Order. At times, the issues and concerns raised will pertain to more than one section of the Tentative Order. In addition to the recommended language changes identified below, Attachment B (the recommended changes to the Tentative Order) also includes some minor edits in order to provide additional clarification where necessary.

The County of Orange, as the Principal Permittee, and the cities of Aliso Viejo, Dana Point, Laguna Beach, Laguna Hills, Laguna Niguel, Laguna Woods, Lake Forest, Mission Viejo, Rancho Santa Margarita, San Clemente, and San Juan Capistrano collectively refer to themselves as "San Diego Region Permittees" or "Permittees." The Tentative Order refers to the County and incorporated cities of South Orange County as the "Copermittees." As such, the comments below use the term "Copermittees" to be consistent with the terminology of the Tentative Order.

GENERAL

1. Permitting Consistency Is Critical Since Several Copermittees Are Regulated Under Multiple Regional Boards

Although the County of Orange is very supportive of the overall approach that the San Diego Regional Water Quality Control Board (Regional Board) is proposing with the development of the Water Quality Improvement Plans (WQIPs) to guide the Copermittees' jurisdictional runoff management programs (JRMPs) towards the high priority water quality conditions within a watershed to achieve improvements, it is critical that consistency be maintained between Regional Boards, where feasible.

The Orange County stormwater program operates a unified countywide program of 36 Permittees, with five (5) Copermittees split between two (2) Regional Boards. Consequently, a number of our comments are aimed at creating greater uniformity and implementability between the two permits that we operate under. Fundamentally different requirements between our two permits, particularly within the same city, damage the credibility of the regulatory framework and confound the ability of local government to cost effectively address key environmental mandates. To this end, the County of Orange (County) has provided some recommended language changes within this document and Attachment B in order to try to preserve that consistency.

2. Many of the New or Modified Requirements within the Tentative Order Do Not Have Adequate Findings of Fact and/or Technical Justification

In many instances the Findings and/or Fact Sheet provide little or no justification of the need for the new requirement. Although Finding 35 states that the Fact Sheet "contains background information, regulatory and legal citations, references and additional explanatory information and data in support of the requirements of this Order", many of the new or modified requirements within the Tentative Order do not have adequate findings of fact and/or technical justification. In addition, they do not identify the "program deficiency" that warrants the modification. The comments provided herein identify many of the areas where new or modified provisions of the Tentative Order lack factual or technical support in the Findings and/or Fact Sheet. Examples of this include, but are not limited to, the following:

- Basis for including Orange County in the regional municipal stormwater permit;
- Basis for the 10 year timeline to achieve the final numeric goals identified within the Water Quality Improvement Plans (WQIPs);
- Basis for requiring uncontaminated pumped ground water, foundation drains, water from crawl space pumps, and footing drains to obtain coverage under the San Diego Region groundwater extraction permits;
- Basis for including single family residential projects as a category requiring coverage as a Priority Development Project;
- Basis for including U.S. Green Building Council (USGCB) Leadership in Energy and Environmental Design (LEED) as exemption criteria for single family residential projects and for alternative compliance for hydromodification management;
- Basis for requiring conventional BMPs onsite in addition to alternative compliance;
- Basis for hydromodification requirements not considering existing Hydromodification Management Plans and being a one size fits all approach;
- Basis for biofiltration BMPs required to be sized at 1.5 times the design capture volume;
- Basis for biofiltration BMPs not being an effective LID and treatment measure per the requirement to size them at 1.5 times the design capture volume and also require conventional BMPs when they are used.
- Basis for offsite regional BMPs required to be sized at 1.1 times the design capture volume;
- Basis for verification of coverage under all related permits for construction sites;
- Basis for evaluation and retrofit/rehabilitation of stream channel systems;
- Basis for including residential driveways as a category requiring coverage as a Priority Development Project;
- Basis for not incorporating the Total Maximum Daily Load (TMDL) waste load allocations (WLAs) into the Tentative Order; and
- Basis for establishing Water Quality Based Effluent Limits (WQBELs) expressed as numeric effluent limitations, in lieu of WQBELs expressed as BMPs, for the TMDL provisions.

3. The Numbering in the Tentative Order Should Explicitly Identify the Major Sections to Help Guide the Reader

The County is recommending that the Regional Board explicitly identify the numbering system within the Tentative Order subsections in order to assist and orient the reader. For example, within the Provisions (Section II of the Tentative Order):

- The sub-sections within Provision A should be listed as:
  - *A.1 Discharge Prohibitions* instead of *1. Discharge Prohibitions*
  - *A.2 Receiving Water Limitations* instead of *2. Receiving Water Limitations*

- The sub-sections within Provision B should be listed as:
  - *B.1 Watershed Management Areas* instead of *1. Watershed Management Areas*
  - *B.2 Priority Water Quality Conditions* instead of *2. Priority Water Quality Conditions*

Given the styles and formatting currently used within the Tentative Order, these edits were not made within Attachment B.

FINDINGS

4. Finding 2 (Page 1 of 120) – A Regional Permit Cannot Be Issued to Orange County Because There Is No System-wide, Jurisdiction-wide, Watershed or Other Basis to Do So

The Tentative Order is intended to cover Copermittees in three large metropolitan counties – Orange, Riverside and San Diego. In May 2012, Orange and Riverside Counties ("**Counties**") sent letters to Staff Counsel for the Regional Board requesting the legal authority to issue a regional permit to the three counties.[1] The Counties contended that, in accordance with federal regulations, there was no system-wide, jurisdiction-wide or watershed basis to issue a regional permit. The Counties also asserted that the lack of a Report of Waste Discharge (ROWD) process for either county prior to the initial adoption of the Tentative Order prevented the issuance of a regional permit on the grounds that there was a conflict with both federal and state law. On September 7, 2012, Staff Counsel responded to the Counties stating that there was a jurisdiction-wide and watershed basis to impose a regional permit on the Counties, and cited legal authority and examples in the Bay Area and an Alaskan borough where regional permits had been issued.[2]

For the following reasons, the County continues to believe that the Regional Board lacks authority to issue a regional permit to Orange County:

1. Orange County's MS4 system does not interconnect with Riverside and San Diego Counties,
2. There is no jurisdictional basis to issue a regional permit to Orange County,

[1] Letter from Ryan M. F. Baron, Office of County Counsel, County of Orange, to Catherine Hagan, Office of Chief Counsel, State Water Resources Control Board, San Diego Region (May 10, 2012); Letter from David H. K. Huff, Office of County Counsel, County of Riverside, to Catherine Hagan, Office of Chief Counsel, State Water Resources Control Board, San Diego Region (May 21, 2012).

[2] Letter from Jessica Jahr, California Regional Water Quality Control Board, San Diego Region, to Ryan M. F. Baron, Office of County Counsel, County of Orange, and David H. K. Huff, Office of County Counsel, County of Riverside (Sept. 7, 2012).

3. Orange County's MS4 does not drain into a shared watershed, and
4. Orange County's MS4 is not adjacent to Riverside or San Diego's MS4, and the quantity and nature of pollutants differ between the three counties.

Therefore, the Regional Board cannot under federal and state regulations impose a Regional Permit without the Permittees expressly consenting to the Board's jurisdiction.

A. There Is No System-wide, Jurisdiction-Wide, Watershed or Other Basis by Which to Legally Impose a Regional Permit on Orange County

Finding 2 in the Tentative Order states that the legal and regulatory authority for implementing a regional MS4 permit stems from Section 402(p)(3)(B) and 40 CFR 122.26(a)(1)(v). The Tentative Order also cites EPA's Final Rule regarding stormwater discharge permit application procedures that there is flexibility to establish system-wide or region-wide permits.[3] During Focused Meeting Workshops conducted on June 27, 2012 and July 11, 2012, Regional Board staff stated that the reason for a regional permit was to consolidate all three permits into one to lessen the amount of permit writing time for three separate permits and reduce internal costs for writing and issuing permits. The justification at Finding 2 is largely the same although it adds that the "regional nature of this Order will ensure consistency of regulation within watersheds and is expected to result in overall costs savings for the Copermittees and San Diego Water Board."[4]

First, although Orange County geographical boundaries abut San Diego and Riverside Counties, Orange County's MS4 does not interconnect with the counties regulated under the regional permit (see map in **Appendix A-1**). There is substantial undeveloped area between the developed jurisdictions of Orange County and Riverside Counties. The Santa Ana Mountains and the Cleveland National Forest separate Orange and Riverside Counties encompassing tens of thousands of acres of total land separating the two counties. Camp Pendleton military base separates Orange and San Diego Counties totaling over 122,000 acres with no adjacent cities or interconnected MS4s. Clean Water Act (CWA) regulations expressly state that a permit can be issued on a system-wide basis covering all discharges from MS4s within a large or medium municipal storm sewer system. One of the primary considerations in defining a "large or medium municipal separate storm sewer system" is one that has physical interconnections with other municipal separate storm sewers.[5] In this case, there are no physical interconnections.

Secondly, there is no jurisdiction-wide basis to issue a regional permit. 40 CFR 122.26(a)(3)(ii) states that one system-wide permit can cover all discharges from MS4s within a large or medium municipal storm sewer system located within the same jurisdiction. Orange, Riverside and San Diego Counties are separate counties with distinct political and geographical boundaries that do not drain into a common watershed and do not share physical interconnections. The three counties are not within the same political jurisdiction. While Region 9 can be considered one jurisdiction for Regional Water Board purposes, federal regulations state that there has to be one stormwater management regional authority in which to issue a permit, and the Regional Board is not such an authority.[6] Regardless, such a permit can only be issued to a multi-jurisdictional entity upon a permit application and upon there being an

[3] 55 Fed. Reg. 47990, 48039-48042.
[4] Part I.2.
[5] 40 CFR 122.26(b)(4) (defining large systems); 40 CFR 122.26(b)(7) (defining medium systems)
[6] 40 CFR § 122.26(a)(3)(iii)(C).

interconnected MS4 or adjacent MS4. There is no tri-county stormwater management authority, there is no system-wide interconnection and Orange County is not adjacent to San Diego and Riverside Counties due to the large federal lands that separate the County.

Third, Orange County does not drain into a shared watershed with Riverside and San Diego Counties. The Orange County Copermittees drain into various watersheds that drain into the Pacific Ocean. The Riverside County Copermittees drain into the Santa Margarita watershed. San Diego County drains into various watersheds. Orange County's MS4 does not drain into or share one common watershed with either county, and therefore cannot be regulated on this basis.

There is no other basis by which to regulate Orange County in the same permit with Riverside and San Diego Counties. Although it is true that Orange County political boundaries abut the two counties, there are hundreds of thousands of acres of federal land that separate Orange County, and thus, the County's MS4 does not interconnect with and is not adjacent to its neighbors like Orange County is with Los Angeles County. Based on differing permit requirements for the three counties, such as TMDLs, and data filed in annual reports and past ROWDs, the quantity and nature of pollutants are different between the three counties, and do not serve as a basis or determination by which to lump all three counties into a one-size fits all permit (e.g., hydromodification). In addition, federal regulations look to interconnection and similarities between jurisdictions as the basis by which to issue one permit.[7] Federal regulations do not authorize and the EPA Final Rule does not contemplate regional permit issuance based on overall reduced cost savings, and overall cost savings have not been demonstrated in the Tentative Order.[8] And although it may be convenient to ensure consistency of regulation, EPA Final Rule contemplates such consistency within a watershed and not throughout a geographical area the size of the three counties. In fact, the EPA Final Rule does indeed use the term "regional" throughout its analysis in the Response to Comments. A careful examination of the term "regional," however, shows that EPA was analyzing whether individual permits should be issued to individual cities, a county and its incorporated cities, a set of Copermittees with interconnected sewer systems and other infrastructure, one state entity or a regional stormwater management authority. The largest area by which one permit could be issued under the Final Rule was essentially to a state entity or one county and its incorporated cities. There is no factual or technical basis in the Tentative Order that meets this criteria or establishes other bases to regulate Orange County under one unified permit. There is also no statistical basis by which to issue a regional permit as Orange County is comprised of over three million people and is the sixth largest county by population in the U.S. In fact, the U.S. Bureau of Census designates Orange County in a different Metropolitan Statistical Area than San Diego County, and is designated in a Combined Statistical Area with Los Angeles, Ventura and San Bernardino Counties.

Lastly, the letter from Staff Counsel cites examples in the Bay Area and in Alaska where regional permits have been issued. In the Bay Area, various cities and counties under that permit interconnect in some fashion and drain into the San Francisco Bay. The Bay Area is also represented by a joint powers organization or regional watershed management program comprised of 8 municipal stormwater programs that voluntarily agreed to end their existing permits early and enroll in a regional permit. In the case of the Alaska example, a "regional" permit was issued to the Fairbanks North Star Borough, City of Fairbanks, City of the North

[7] 33 USC 1342(p)(3)(B)(i); 40 CFR 122.26(a)(1)(v).
[8] 55 Fed. Reg. 47990-01.

Pole, the Alaska Department of Transportation and the University of Alaska Fairbanks. Further examination of that permit and the stormwater program maps demonstrate, though, that the region regulated is a borough, the Alaskan equivalent of a county. All of the regulated Copermittees are physically interconnected through its storm drain system and roadways, and most drain into one watershed. In short, neither the Bay Area nor the Fairbanks Borough permits provide sufficient examples of a regional permit comparable to the one being issued to Orange County.

B. There Is No Technical Basis to Regulate Orange County Due to the Lack of a Report of Waste Discharge Application.

The ROWD is a federally required application that is the technical basis to draft a new permit for a permittee. The information contained in the ROWD is used to determine prospective provisions of the new permit, including but not limited to monitoring, program strengths and other tools that are assessed in the new permit. In other words, the ROWD is the technical basis or substantial evidence for determining what will be required in the new permit. In the case of the Tentative Order, permit conditions that will apply to Orange County upon the expiration of its current permit in December 2014 or upon early enrollment are not based on any ROWD filed by the County. Thus, there is no technical basis or substantial evidence to regulate Orange County under a regional permit, and therefore, the regional permit terms and conditions are arbitrary and capricious. The initial draft of the Tentative Order did not contain a ROWD requirement for Orange County. The Order was subsequently revised to include a ROWD requirement to determine whether modification to the Order upon enrollment by Orange County is necessary, but the Tentative Order will still be adopted by the Regional Board with terms and conditions that apply to Orange County that are not based on any federally required application or report. Orange County's current Fourth Term permit has been in existence for only two years with programs that have just started, or like hydromodification, have not yet started or are in interim phases. Therefore, the current programs do not provide any meaningful benchmark by which to draft new regional permit terms that apply to the County. And, in addition, the ROWD requirement that is now in the Tentative Order is essentially an after the fact application.

In short, the Tentative Order is drafted and will be initially adopted by the Regional Board with provisions that will generally regulate Orange County Copermittees, along with specific numeric and other requirements that will only apply to Orange County that are not based on an application process or other documented technical basis. There is no substantial evidence or CWA basis by which to impose certain regulations on the County. Thus, the lack of a ROWD requirement prior to initial adoption of a regional permit is in conflict with the CWA, Porter Cologne and the California Administrative Procedure Act.

The County recommends the following language changes:

I. Findings
2. Legal and Regulatory Authority
This Order is issued pursuant to section 402 of the federal Clean Water Act (CWA) and implementing regulations (Code of Federal Regulations [CFR] Title 40, Part 122 [40 CFR 122]) adopted by the United States Environmental Protection Agency (USEPA), and chapter 5.5, division 7 of the California Water Code (CWC) (commencing with section 13370). This Order serves as an NPDES permit for discharges from MS4s to surface waters. This Order also serves as waste discharge requirements (WDRs) pursuant to article 4, chapter 4, division 7 of the CWC (commencing with section 13260).

~~*The San Diego Water Board has the legal authority to issue a regional MS4 permit pursuant to its authority under CWA section 402(p)(3)(B) and 40 CFR 122.26(a)(1)(v). The USEPA also made it clear that the permitting authority, in this case the San Diego Water Board, has the flexibility to establish system- or region-wide permits (55 Federal Register [FR] 47990, 48039-48042). The regional nature of this Order will ensure consistency of regulation within watersheds and is expected to result in overall cost savings for the Copermittees and San Diego Water Board.*~~

The federal regulations make it clear that the Copermittees need only comply with permit conditions relating to discharges from the MS4s for which they are operators (40 CFR 122.26(a)(3)(vi)). This Order does not require the Copermittees to manage storm water outside of their jurisdictional boundaries, but rather to work collectively to improve storm water management within watersheds.

I. Findings
26. Report of Waste Discharge Process
…..The San Diego Water Board understands that each municipality is unique ~~although the Counties share watersheds and geographical boundaries.~~ The Order will continue to use the Report of Waste Discharge process prior to initially making Orange County or Riverside County Copermittees subject to the requirements of this Order.

5. Finding 8 (Page 3 of 120) – It Should Not Be Presumed That Discharges From MS4s Always Contain Waste or Pollutants

Discharges may contain waste or pollutants, but it should not be presumed that they necessarily always contain waste or pollutants.

Under current law, the State Board's issuance of the Small MS4 Permit is a quasi-judicial decision.[9] As a quasi-judicial decision, the State Board's action must be supported by legally adequate findings, and those findings must be supported by evidence in the record.[10]

Pursuant to the Supreme Court's decision in *Topanga Association for a Scenic Community v. County of Los Angeles* (1974) 11 Cal.3d 506, findings are intended to "facilitate orderly analysis and ***minimize the likelihood that the agency will randomly leap from evidence to conclusions***."[11] Here, there is no cited evidence that stormwater itself is a pollutant or that in every instance it contains pollutants or waste as those terms are defined by the CWA and Porter Cologne respectively. Absent evidence demonstrating that this is the case, in all cases, the Regional Board cannot make this finding.

Moreover, as a matter of law, the Regional Board lacks the authority to regulate pure stormwater as a pollutant. The CWA and its implementing regulations define the term "pollutant" to mean:

> dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials

[9] *City of Rancho Cucamonga v. Regional Water Quality Control Board* (2006) 135 Cal.App.4th 1377, 1385.
[10] T*opanga Association for a Scenic Community v. County of Los Angeles* (1974) 11 Cal.3d 506.
[11] *Id*., at 514 [emphasis added].

> (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.)), heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water[12].

Federal regulations further define the term "stormwater" to mean: "storm water runoff, snow melt runoff, and surface runoff and drainage."[13] Notably, the definition of the term "Pollutant" does not include "Stormwater." Moreover, the text of the CWA requires the discharges of *pollutants* to be reduced to the Maximum Extent Practicable (MEP).[14] There is no prohibition on or comparable authority to regulate the discharge of pure *stormwater.*

This rationale was recently adopted by the Eastern District of Virginia, when it held that the EPA has no authority under the Clean Water Act to regulate non-pollutants.[15] Specifically, the Court stated:

> Pollutant is statutorily defined. (33 U.S.C. § 1362(6).) The Court sees no ambiguity in the wording of this statute. EPA is charged with establishing TMDLs for the appropriate pollutants; that does not give them the authority to regulate nonpollutants. The parties agree that sediment is a pollutant under 33 U.S.C. § 1362(6), and stormwater is not. Then how does EPA claim jurisdiction over setting TMDLs for stormwater.[16]

Likewise, Porter Cologne defines the term "Waste" to mean:

> sewage and any and all other waste substances, liquid, solid, gaseous, or radioactive, associated with human habitation, or of human or animal origin, or from any producing, manufacturing, or processing operation, including waste placed within containers of whatever nature prior to, and for purposes of, disposal.[17]

While the definition is certainly different and potentially broader than the definition of *Pollutant* under the CWA, the definition of waste does not include stormwater or any other discharge that is not created by human activity. As a matter of law, the Regional Board is therefore without authority to regulate all discharges of stormwater as pollutants or waste.

[12] 33 U.S.C. § 1362(6); 40 C.F.R. § 122.2.
[13] 40 C.F.R. § 122.26(b)(13).
[14] 33 U.S.C. § 1342(p).
[15] Virginia Dept. of Transportation v. EPA, No. 1:12-CV-775, slip op. (E.D. Va. Jan. 3, 2013).
[16] Id., at 5.

[17] Cal Water Code § 13050(d).

The County recommends the following language changes:

I. Findings

8. Point Source Discharges of Pollutants
Discharges from the MS4s may contain waste, as defined in the CWC, and pollutants that adversely affect the quality of the waters of the state. A discharge from an MS4 is a "discharge of pollutants from a point source" into waters of the U.S. as defined in the CWA. Storm water and non-storm water discharges from the MS4s may contain pollutants that cause or threaten to cause a violation of surface water quality standards, as outlined in the Basin Plan…..

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16. Best Management Practices. Waste and pollutants which are deposited and accumulate in MS4 drainage structures may ~~will~~ be discharged from these structures to waters of the U.S. unless they are removed…..

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17. BMP Implementation. …..Retrofitting areas of existing development with storm water pollutant control and hydromodification management BMPs ~~is~~ may, in many cases be necessary to address storm water discharges from existing development that may cause or contribute to a condition of pollution or a violation of water quality standards.

6. Finding 11 (Page 4 of 120) – Natural Waters Cannot Legally Be Classified as Part of the MS4, and Cannot Be Classified as Both a MS4 and Receiving Water

The Tentative Order states that development often makes use of natural drainage patterns and features as conveyances for runoff. Finding 11 goes on to state that rivers, streams and creeks in developed areas are part of the Copermittees' MS4 whether the river, stream or creek is natural, anthropogenic or partially modified. It further states that these natural water bodies are both an MS4 and a receiving water.

Finding 11 is expressly contradicted by federal regulations and a recent opinion by the U.S. Supreme Court. Natural creeks cannot legally be classified as part of the MS4, and the MS4 and a water of the U.S. cannot be comingled. The flow of water from an improved portion of a navigable waterway into an unimproved portion of the same waterway does not qualify as a "discharge of a pollutant" under the CWA.[18]

In addition, the definition of a *municipal separate storm sewer* means "a conveyance or system of conveyances including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains:

i. Owned or operated by a state, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to state law) ... including special districts under state law such as a sewer district sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the Clean Water Act that discharges into waters of the United States;

[18] *L.A. County Flood Control District v. NRDC*, slip op. (Jan. 8, 2013); *South. Fla. Water Management Dist. V. Miccosukee Tribe*, 541 U.S. 95, 109-112 (holding that the transfer of a polluted water between two parts of the same waterbody does not cause a discharge of pollutants under the CWA).

ii. Designed or used for collecting or conveying stormwater;

iii. Which is not a combined sewer; and

iv. Which is not part of a publicly owned treatment works (POTW) as defined at 40 CFR 122.2."[19]

This definition only includes man-made channels and systems and does not encompass natural water bodies simply because an outfall discharges to a receiving water. Any water quality improvement to a natural river, stream or creek does not mean it is a MS4, but an improved water of the U.S. Moreover, U.S. EPA itself, in the Preamble to its proposed MS4 regulations[20] expressly determined that “streams, wetlands and other water bodies that are waters of the United States are not storm sewers for the purposes of this rule” and that “stream channelization, and stream bed stabilization, which occur in waters of the United States” were not subject to NPDES permits under Section 402 of the CWA[21].

Lastly, municipalities do not own, control or operate natural rivers, streams and creeks. Such water bodies are often administrated by the State of California in the public trust for the right of the people to use such waters for certain purposes or are privately owned.[22] The Legislature, acting within the confines of the common law public trust doctrine, is the ultimate administrator of the trust and may often be the final arbiter of permissible uses of trust lands. Moreover, a municipality obviously cannot “operate” a natural creek or stream.

The County recommends the following language changes:

I. Findings
11. Runoff Discharges to Receiving Waters
….Historic and current development makes use of natural drainage patterns and features as conveyances for runoff. ~~Rivers, streams and creeks in developed areas used in this manner are part of the Copermittees’ MS4s regardless of whether they are natural, anthropogenic, or partially modified features. In these cases, the rivers, streams and creeks in the developed areas of the Copermittees’ jurisdictions are both an MS4 and receiving water.~~ Numerous receiving water bodies and water body segments have been designated as impaired by the San Diego Water Board pursuant to CWA section 303(d).

7. Finding 12 (Page 4 of 120) – Copermittees Do Not Accept Free and Open Access to MS4s, and Are Not Responsible for All Discharges not Prohibited

The Tentative Order states that MS4s willingly provide free and open access and convey discharges to waters of the U.S., and that MS4 operators then accept all responsibility for such discharges not prohibited or otherwise controlled. This is simply not the case and is legally unsupportable. An MS4 is designed to accept stormwater for flood control purposes and prevent damage to life and property. Although it is true that the Copermittees have an obligation to effectively prohibit non-stormwater discharges, namely illicit connections and unlawful dumping, it is also true that the discharger into the MS4 is ultimately responsible for a condition of pollution or violation of a water quality standard. And, in accordance with California

[19] 40 CFR 122.26(b)(8).
[20] 53 Fed. Reg. 49416 (Dec. 7, 1988)
[21] 53 Fed. Reg. at 49442.
[22] *Marks v. Whitney* (1971) 6 Cal. 3d 251, 259, 260.

state law, MS4s downstream of upstream flows must accept those flows and cannot attempt to block or divert such flows.[23] Finding 12 attempts to shift all legal responsibility to the MS4s, which is unsupported by federal and State law.

The County recommends the following language changes:

I. Findings
12. Pollutants in Runoff
…. As operators of the MS4s, the Copermittees cannot passively receive and discharge pollutants from third parties. ~~By providing free and open access to an MS4 that conveys discharges to waters of the U.S., the operator essentially accepts responsibility for discharges into the MS4 that it does not prohibit or otherwise control.~~ These discharges may cause or contribute to a condition of pollution or a violation of water quality standards.

8. Finding 15 (Page 5 of 120) – The Tentative Order Must Recognize that the Discharge of All Pollutants From the MS4 is Subject to the MEP Standard

Section 402(p)(3)(B)(ii) requires the Copermittees to effectively prohibit non-stormwater discharges into the MS4, namely pollutants generated from illicit connections and unlawful dumping.

The Tentative Order at Finding 15, however, states that non-stormwater discharges are not subject to the MEP standard. This finding is not supported by federal law. While federal law regulates "non-stormwater discharges" into the MS4, Section 402(p)(3)(B)(iii) expressly states that the "discharge of pollutants" shall be reduced to MEP. In drafting this section of the CWA, Congress expressly intended all discharges from MS4s to be subject to MEP as it used the term "pollutant" and did not differentiate between stormwater and nonstormwater, as the Tentative Order attempts to do. Therefore, the duty of the Copermittees to reduce the discharge of pollutants from the MS4 to MEP applies to both stormwater and nonstormwater pollutants.

Furthermore, the focus of the CWA and federal regulations is on a management program that includes a comprehensive planning process to reduce the discharge of pollutants to MEP.[24] One of the elements of the management program is the illicit discharge prevention program.[25] The control and limitation of illicit discharges into the MS4 is intended to achieve the overall MEP standard for discharges from the MS4. This is confirmed by the preamble to EPA regulations that discuss the required elements of the management program. According to EPA:

> [Copermittees are required] to develop management programs for four types of pollutant sources which discharge to large and medium municipal storm sewer systems. Discharges from large and medium municipal storm sewer systems are usually expected to be composed primarily of: (1) Runoff from commercial and residential areas; (2) storm water runoff from industrial areas; (3) runoff from construction sites; and **(4) non-storm water discharges**. Part 2 of the permit application has been designed to allow [Copermittees] the opportunity to propose **MEP control measures for each of these components of the discharge**. 55 Fed Reg at 48052 (emphasis added). *See also* 55 Fed Reg at 48045 (stating "Part 2 of the proposed permit application [which includes the illicit discharge prevention requirement] is designed to . . . provide municipalities with

[23] *Keyes v. Romley* (1966) 64 Cal.2d 396; *Locklin v. City of Lafayette*, (1994) 7 Cal. 4th 327.
[24] 40 CFR 122.26(d)(2)(iv).
[25] 40 CFR 122.26(d)(2)(iv)(B)(1).

> the opportunity of proposing a comprehensive program of structural and non-structural control measures that will **control the discharge of pollutants, to the maximum extent practicable, from municipal storm sewers**.") (Emphasis added).

EPA's position is consistent with existing State Water Resources Control Board policy which states that discharges into the MS4 are to be controlled through an iterative, BMP based approach that is *less* stringent than the MEP standard.[26] The State Board held:

> An NPDES permit is properly issued for "discharge of a pollutant" to waters of the United States. (Clean Water Act § 402(a).) The Clean Water Act defines "discharge of a pollutant" as an "addition" of a pollutant to waters of the United States from a point source. (Clean Water Act section 502(12).) Section 402(p)(3)(B) authorizes the issuance of permits for discharges "from municipal storm sewers."
>
> We find that the permit language is overly broad because it applies the MEP standard not only to discharges "from" MS4s, but also to discharges "into" MS4s. . . [T]he specific language in this prohibition too broadly restricts all discharges "into" an MS4, and does not allow flexibility to use regional solutions, where they could be applied in a manner that fully protects receiving waters. It is important to emphasize that dischargers into MS4s continue to be required to implement a full range of BMPs, including source control. In particular, dischargers subject to industrial and construction permits must comply with all conditions in those permits prior to discharging storm water into MS4s.[27]

The State Board's decision in the Building Industry Association (BIA) matter makes clear that the CWA does not include a blanket prohibition on discharges of non-stormwater into the MS4. To the extent the Tentative Order would hold the dischargers liable in the event that any discharge into the MS4 occurs, the Tentative Order exceeds the requirements of the CWA and violates existing State Board policy.

It is also technically infeasible in some cases to differentiate between non-stormwater or stormwater pollutants discharged from the MS4. Thus, just as the discharge of non-stormwater into the MS4 is subject to the effective prohibition standard, the discharge of pollutants in non-stormwater from the MS4 is subject to the MEP standard. There are several instances where the specific provisions in the Tentative Order need to be modified in order to reflect this approach.

The County recommends the following language changes:

I. Findings
3. CWA NPDES Permit Conditions
….This Order prescribes conditions to assure compliance with the CWA requirements for owners and operators of MS4s to effectively prohibit non-storm water discharges ~~in to~~ into the MS4s, and require controls to reduce the discharge of pollutants in storm water from the MS4s to the MEP.

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[26] Specifically in State Board in Order No. WQ-2001-15, *In the Matter of the Petitions of Building Industry Assoc. of San Diego County and Western States Petroleum Assoc*. (2001).
[27] Id., at 9-10.

I. Findings
15. Non-Storm Water and Storm Water Discharges
The discharge of pollutants from the MS4 is subject to the MEP standard notwithstanding whether the pollutants are transported by stormwater or non-stormwater. ~~Non-storm water discharges from the MS4s are not considered storm water discharges and therefore are not subject to the MEP standard of CWA section 402(p)(3)(B)(iii), which is explicitly for "Municipal … Stormwater Discharges (emphasis added)" from the MS4s.~~ Pursuant to CWA 402(p)(3)(B)(ii), non-storm water discharges into the MS4s,namely identified illicit discharges and pollutants from unlawful dumping, must be effectively prohibited.

II. Provisions
A. Prohibitions and Limitations
The purpose of this provision is to describe the conditions under which storm water from and non-storm water discharges into ~~and from~~ the MS4s are effectively prohibited or limited.

E. Jurisdictional Runoff Management Programs [Intro]
The purpose of this provision is for each Copermittee to implement a program to control non-stormwater ~~the~~ discharges ~~contribution of pollutants~~ into and ~~the~~ stormwater discharges from the MS4 within its jurisdiction and to focus and prioritize those implementation actions based on the highest water quality priorities identified within the associated Water Quality Improvement Plan……

E. Jurisdictional Runoff Management Programs
1. Legal Authority Establishment and Enforcement
a.(1) Effectively prohibit and eliminate all illicit discharges and illicit connections into its MS4;
a.(2) Control the contribution of pollutants in discharges of runoff associated with industrial and construction activity into its MS4 and control the quality of runoff from industrial and construction sites

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E. Jurisdictional Runoff Management Programs
2. Illicit Discharge Detection and Elimination
a. Non-stormwater Discharges
(3) Discharges of non-storm water into the MS4 from the following categories must be controlled by the requirements given below through statute, ordinance, permit, contract, order, or similar means, where there is evidence that those discharges are a source of pollutants to waters of the state. Discharges of non-storm water into the MS4 from the following categories not controlled by the…..

E. Jurisdictional Runoff Management Programs
2. Illicit Discharge Detection and Elimination
b. Prevent and Detect Illicit Discharges and Connections
(3) Each Copermittee must promote, publicize, and facilitate public reporting of the presence of illicit discharges or water quality impacts associated with discharges into or from the MS4, including the following methods for public reporting

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E. Jurisdictional Runoff Management Programs
2. Illicit Discharge Detection and Elimination
e. Investigate and Eliminate Illicit Discharges and Connections
(1) Each Copermittee must prioritize and determine when follow-up investigations will be performed in response to visual observations and/or water quality monitoring data collected during an investigation of a detected non-storm water or illicit discharge <u>in</u>to or from the MS4

E. Jurisdictional Runoff Management Programs
2. Illicit Discharge Detection and Elimination
e. Investigate and Eliminate Illicit Discharges and Connections
(2)(c) Each Copermittee must investigate and seek to identify the source(s) of ~~discharges of non-stormwater where flows are~~ <u>illicit discharges or illicit connections</u> observed into and from the MS4 during the…

E. Jurisdictional Runoff Management Programs
2. Illicit Discharge Detection and Elimination
e. Investigate and Eliminate Illicit Discharges and Connections
(3)(e) If the Copermittee is unable to identify and document the source of a recurring ~~non-stormwater discharge~~ <u>illicit discharges or connections</u> <u>in</u>to or from the MS4, then the….

E. Jurisdictional Runoff Management Programs
5. Existing Development Management
c. Existing Development Inspections
(1)(ii) The frequency of inspections must be appropriate to confirm that BMPs are being implemented to reduce the discharge of pollutants in storm water from the MS4 to the MEP and effectively prohibit non-storm water discharges <u>in</u>to the MS4;

9. Finding 28 (Page 9 of 120) – The Requirements in the Tentative Order Are More Stringent Than Federal Law, Requiring An Economic Analysis. In Addition, the Current Economic Analysis Is Insufficient

Finding 28 states that pollutant restrictions are not more stringent than federal law, yet an economic analysis is still conducted pursuant to CWC 13241. Despite the finding that the Tentative Order does not exceed federal law requirements, there are a number of requirements that are more stringent.

However, when you evaluate the economic analysis presented in the Fact Sheet[1] the Regional Water Board staff did not, in fact, fully consider the 13241 factors when they make the finding that the "requirements in this Order are reasonably necessary to protect beneficial uses." There has not been a full consideration of the section 13241 factors, which would include an analysis of the economic impacts that would result from compliance with the existing stormwater permit compared to the costs of complying with the proposed stormwater permit (thereby the costs of complying with the new requirements). Instead, the Order's analysis begins by stating, and without any quantification, that it would more expensive to not fully implement programs. Section 13241 is not satisfied by this inverse analysis.

Additionally, the Tentative Order states that Copermittees have a significant amount of flexibility to choose how to implement BMPs and that "least expensive measures" can be chosen.[28] This

[28] F-17.

statement, however, conflicts with the Order's definition of MEP at C-6 which expressly acknowledges Chief Counsel's 1993 MEP memo that only the Regional and State Boards determine whether BMPs meet MEP, and that selection of the least expensive BMPs will likely not result in meeting the MEP standard.

The Fact Sheet also fails to cite any recent cost benefit numbers but relies on inapplicable cost data such as a 1999 EPA study on household costs.

The analysis of costs contained in the Fact Sheet is deficient in two additional ways. First, the approach to compliance costs is fundamentally deficient because it tells the public nothing at all about the relationship between the cost of any particular control and the pollution control benefits to be achieved by implementing that control. Under this "generalized" approach, extremely costly requirements that bear little or even no relationship (or even a negative relationship) to the pollution control benefits to be achieved could be "justified" as long as the "overall" program costs are within what the Regional Board deems to be an acceptable range. This is not a proper way to determine whether a control reduces the discharge of pollutants from the MS4 to the MEP. A more individualized assessment of cost is required. Otherwise, dischargers may be required to implement very costly controls that have no relationship to pollution control benefits, a result inconsistent with MEP.

This analytical flaw in the Fact Sheet is compounded by the approach taken to assess the benefits of the Tentative Order. Here again, the assessment approach misses the mark because it tells the public nothing about the pollution control benefits to be achieved by implementation of the controls in the Tentative Order. All the Fact Sheet says, in essence, is that people like clean water and in theory may be willing to pay for it, that urban storm water may contribute to beach closures and that such beach closures have an economic impact. This analysis sheds no light on the relationship between a BMP's costs and the pollution control benefits to be achieved by implementing that BMP.

Second, the Fact Sheet contains faulty assumptions and relies upon outdated or inapplicable data. The California State University, Sacramento (CSUS) Cost Survey assessed program costs for Phase I cities. Nothing in the Fact Sheet links any of the actual conditions of the Phase I permits of the Phase I cities studied by CSUS with any of the requirements of the Tentative Order. Therefore, the study tells the public nothing about the costs to implement the Tentative Order. The data included in the Fact Sheet is also from seven years to more than a decade old. In short, the Fact Sheet uses old data from Phase I programs that have no linkage to any conditions of the Tentative Order. The full costs of implementing the entire program required by the Tentative Order in 2013 dollars must be assessed.

Lastly, stormwater agencies cannot readily establish or raise fees to help pay for the BMPs necessary to comply with either the California Toxics Rule (CTR) criteria or proposed Site Specific Objectives (SSOs) due to the requirements of Proposition 218, Proposition 26 and the Mitigation Fee Act. For instance, Proposition 218 requires that property-related fees be put to a vote, so cities cannot assess fees without the consent of a majority (two-thirds) of the property owners. Therefore, the costs associated with the implementation and maintenance of the BMPs are more likely to be covered through the stormwater agency General Funds.

The County recommends the following language changes:

I. Findings

28. Economic Considerations
As noted in the following finding, the San Diego Water Board finds that the requirements in this permit are ~~not~~ more stringent than the minimum federal requirements. Therefore, a CWC section 13241 analysis is ~~not~~ required for permit requirements that implement the effective prohibition on the discharge of non-storm water into the MS4 or for controls to reduce the discharge of pollutants in storm water to the MEP, or other provisions that the San Diego Water Board has determined appropriate to control such pollutants, as those requirements are mandated by federal law. ~~Not withstanding the above, the San Diego Water Board has developed an economic analysis of the requirements in this Order.~~ The economic analysis is provided in the Fact Sheet.

10. Finding 29 (Page 9 of 120) – The Regional Board has no Legal Ability to Determine Whether a Particular Mandate is Unfunded

The Tentative Order finds that none of the requirements therein constitute an unfunded local mandate. This finding, however, should be stricken as the Regional Board has no legal ability to determine whether a particular mandate is unfunded. The Commission on State Mandates is the only State agency that has the jurisdiction and ability to make that determination.

The Fact Sheet's discussion of unfunded state mandates is not consistent with applicable legal authority or the Tentative Order, as discussed below.

Article XIII B, Section 6(a) of the California Constitution ("Section 6") provides that whenever "any state agency mandates a new program or higher level of service on any local government, the state shall provide a subvention of funds to reimburse that local government for the costs of the program or increased level of service . . . ." Section 6 applies to storm water permits issued by the State Board and the Regional Boards.[29] Thus, Section 6 applies to the Tentative Order.

Section 6 was added to the California Constitution by voter approval in 1979, as part of a larger effort that had as its goal both limiting state and local spending and restricting the ability of local entities to raise revenue. Section 6 must be viewed as a "safety valve" designed to protect local governments from being placed in the untenable position of being required by the state, on the one hand, to implement certain state mandated programs while also, on the other hand, being prohibited from raising the money needed to pay for those state mandated programs.[30] Recognizing that such a situation was neither a fair nor a wise approach to governing, the voters enacted Section 6 to prevent state government from shifting financial responsibility for carrying out governmental functions to local agencies without the state paying for them.

[29] *County of Los Angeles v. Commission on State Mandates* (2007) 150 Cal.App.4th 898, 920.
[30] *Department of Finance v. Commission on State Mandates* (2003) 30 Cal.4th 727, 735; *County of San Diego v. State of California* (1997) 15 Cal.4th 68, 81.

To implement Section 6, the Legislature created the Commission on State Mandates ("Commission"). The Commission has sole and exclusive jurisdiction to determine whether a state law or order of a state agency is an unfunded state mandate.[31] In accordance with Section 6, Government Code section 17500 et seq., and case law, the Commission on State Mandates has determined that an unfunded state mandate exists when: (a) the state imposes a new program or higher level of service that is; (b) mandated by state law, not federal law; and (c) when the local government lacks adequate fee authority to pay for the new program or higher level of service.

Whether and how individual storm water permit conditions constitute unfunded state mandates is currently the subject of pending litigation. In 2009 and 2010, the Commission on State Mandates determined that parts of the Los Angeles Phase I Permit and major components of the San Diego Phase I Permit constituted unfunded state mandates. The State challenged these two decisions in court, and, in the San Diego matter, the court confirmed that only the Commission on State Mandates could make the ultimate determination of whether a permit condition constituted an unfunded state mandate. Specifically, the court in the San Diego case held that the "Commission has exclusive authority to determine whether the Regional Board has imposed a state mandate." The court in the San Diego case further concluded that the Commission on State Mandates should reconsider its decision to assess whether each of the individual permit conditions were required to achieve the MEP standard. Specifically, the court held that "the Commission must determine whether any of the permit conditions exceed the 'maximum extent practicable' standard." (Emphasis added.) Therefore, contrary to the discussion in the Fact Sheet, each permit condition (control) must be assessed to determine whether it is consistent with MEP.

The San Diego Copermittees have appealed the trial court's decision that the Commission on State Mandates revisit its decision. Regardless of the outcome of that appeal, however, the Commission on State Mandates is the entity that must determine whether a condition in the Tentative Order constitutes an unfunded state mandate.

I. Findings
~~29. Unfunded Mandates~~
~~This Order does not constitute an unfunded local government mandate subject to subvention under Article XIIIB, Section (6) of the California Constitution for several reasons, including, but not limited to, the following:~~

a. *~~This Order implements federally mandated requirements under CWA section 402 (33 USC section 1342(p)(3)(B)).~~*

b. *~~The local agency Copermittees' obligations under this Order are similar to, and in many respects less stringent than, the obligations of non-governmental and new dischargers who are issued NPDES permits for storm water and non-storm water discharges.~~*

c. *~~The local agency Copermittees have the authority to levy service charges, fees, or assessments sufficient to pay for compliance with this Order.~~*

d. *~~The Copermittees have requested permit coverage in lieu of compliance with the complete prohibition against the discharge of pollutants contained in CWA section~~*

[31] Government Code §§ 17551 and 17552; *Kinlaw v. State of California* (1991) 54 Cal.3d 326, 331-334.

~~*301(a) (33 USC section 1311(a)) and in lieu of numeric restrictions on their MS4 discharges (i.e. effluent limitations).*~~

e. ~~*The local agencies' responsibility for preventing discharges of waste that can create conditions of pollution or nuisance from conveyances that are within their ownership or control under State law predates the enactment of Article XIIIB, Section (6) of the California Constitution.*~~

f. ~~*The provisions of this Order to implement TMDLs are federal mandates. The CWA requires TMDLs to be developed for water bodies that do not meet federal water quality standards (33 USC section 1313(d)). Once the USEPA or a state develops a TMDL, federal law requires that permits must contain water quality based effluent limitations consistent with the assumptions and requirements of any applicable wasteload allocation (40 CFR 122.44(d)(1)(vii)(B)).*~~

~~*See the Fact Sheet for further discussion of unfunded mandates.*~~

PERMIT PROVISIONS

General

11. The Tentative Order Includes Language That Provides An Overly Broad Interpretation Of The Stormwater Regulations By Requiring MS4s To "Enhance" and/or "Restore" Beneficial Uses Or Habitat

The Tentative Order recognizes that the overarching objective of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters" and that, in order to carry out this objective, the CWA utilizes a number permitting programs and regulatory tools to regulate the discharge of pollutants and other materials to Waters of the United States (Waters of the U.S.).

However, CWA Section 402(p), that section which governs that permitting for municipal and industrial stormwater discharges, is only one regulatory tool within the CWA. Moreover, it requires the MS4s to focus on the quality and impact of their non-stormwater and stormwater discharges, not on the active enhancement and/or restoration of beneficial uses or habitat.

While the Fact Sheet recognizes that the development and implementation of a WQIP will identify the highest priority water quality conditions and that "addressing these threats and/or adverse impacts should restore the physical, chemical, and biological integrity of receiving waters, and result in the restoration and protection of the beneficial uses of the receiving waters in the Watershed Management Area",[32] the Tentative Order should not explicitly require the enhancement or restoration of beneficial uses as the CWA only requires that the Copermittees protect beneficial uses and prevent nuisance.[33]

[32] Fact Sheet, Page F-45
[33] 40 CFR 131.12()(1); CWC 13263(a) and 13050.

This is important from a prioritization and resource allocation perspective because while the Copermittees must control the discharge of pollutants in order to, ultimately, protect the beneficial uses of the receiving waters, they are not required to actively “enhance” or “restore” the beneficial uses and habitat of the receiving waters. It must be recognized that the actions and resources necessary to “protect” the beneficial uses may, in fact, be different than those that would be required to “enhance” or “restore” the beneficial uses of a particular receiving water.

The County recommends the following language changes:

B. Water Quality Improvement Plans
The purpose of this provision is to develop Water Quality Improvement Plans that guide the Copermittees’ jurisdictional runoff management programs towards achieving the outcome of improved water quality in MS4 discharges and receiving waters. The goal of the Water Quality Improvement Plans is to address the impacts of MS4 discharges so that such discharges do not impair ~~protect, preserve, enhance, and restore the~~ water quality and designated beneficial uses of waters of the state…….

B. Water Quality Improvement Plans
2. Priority Water Quality Conditions
e. Numeric Goals and Schedules
(1) Final numeric goals must be based on measureable criteria or indicators, to be achieved in the receiving waters and/or MS4 discharges for the highest priority water quality conditions which will be capable of demonstrating the ~~achievement of the restoration and/or~~ protection of water quality standards in receiving waters;

B. Water Quality Improvement Plans
3. Water Quality Improvement Strategies and Schedules
The Copermittees must develop specific water quality improvement strategies to address the highest priority water quality conditions identified within a Watershed Management Area. The water quality improvement strategies must address the highest priority water quality conditions by preventing or eliminating non-storm water discharges to and from the MS4, reducing pollutants in storm water discharges from the MS4 to the MEP, and ~~restoring and/or~~ protecting the water quality standards of receiving waters.

D. Monitoring and Assessment Program Requirements
4. Assessment Requirements
a. Receiving Waters Assessment
(2)(b) Identify the most critical beneficial uses that must be protected ~~or restored~~ to ensure overall health of the receiving water;
(2)(c) Determine whether or not those critical beneficial uses are being protected ~~and where those beneficial used must be restored~~;

D. Monitoring and Assessment Program Requirements
4. Assessment Requirements
d. Integrated Assessment of Water Quality Improvement Plan
(1)(d) Identify beneficial uses of the receiving waters that are protected ~~or must be restored~~ in accordance with Provision D.4.a;

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(1)(e) Evaluate the progress toward achieving the interim and final numeric goals for ~~restoring impacted~~ protecting beneficial uses in the receiving waters.
(2)(b) Identify the non-storm water and storm water pollutant load reductions, or other improvements to receiving water or water quality conditions, that are necessary to attain the interim and final numeric goals for ~~restoring impacted~~ protecting beneficial uses in the receiving waters;
(2)(d) Evaluate the progress of the water quality improvement strategies toward achieving the interim and final numeric goals for ~~restoring impacted~~ protecting beneficial uses in the receiving waters.

E. Jurisdictional Runoff Management Program
5. Existing Development Management
e. Strategies to Address the Highest Priority Water Quality Conditions
(3)(b) Candidates for stream, channel, and/or habitat rehabilitation projects may be utilized to address storm water runoff flows and durations from areas of existing development that cause or contribute to hydromodification in receiving waters, rehabilitate channelized or hydromodified streams, restore wetland and riparian habitat, restore watershed functions, and/or ~~restore~~ protect beneficial uses of receiving waters;

E. Jurisdictional Runoff Management Program
7. Public Education and Participation
b. Public Participation
(3) Opportunities for members of the public to participate in programs and/or activities that can result in the prevention or elimination of non-storm water discharges to the MS4, reduction of pollutants in storm water discharges from the MS4, and/or ~~restoration and~~ protection of the quality of receiving waters.

F. Reporting
3. Progress Reporting
c. Regional Monitoring and Assessment Report
(1)(a) The beneficial uses of the receiving waters within the San Diego Region that are protected ~~or must be restored~~;
(1)(b) The progress toward protecting the ~~restoring~~ impacted beneficial uses in the receiving waters within the San Diego Region; and

12. The Tentative Order Includes Language That Provides An Overly Broad Use Of The Term “Prohibit”

Although some changes were made in the Tentative Order language, the Tentative Order should be reviewed for the correct use of the terminology “effectively prohibit” since it appears that there are a couple of cases where this language was not modified.

The term “prohibit” is broader than the CWA requirements, and should be changed to “effectively prohibit.” CWA section 402(p) (3) (B) (ii) reads as follows:

> (B) Municipal Discharge – Permits for discharges from municipal storm sewers –
> (ii) shall include a requirement to effectively prohibit non-stormwater discharges into the storm sewer; (Emphasis added)

The Tentative Order shall "effectively prohibit non-stormwater discharges" but may exempt certain discharges that are not significant sources of pollutants from the prohibition. The section does not require a full prohibition but rather an effective prohibition. The operative word is "effective", which recognizes the constraints of owning and operating a stormwater drainage system, which includes hundreds of miles of open channel. The finding/provision should note that non-stormwater discharges are effectively prohibited.[34]

In addition, discharges that are not significant sources of pollutants are exempted from the prohibition. In a practical sense, the use of word "effective" also provides flexibility to assess the impacts of relatively benign discharges such as air condition condensate, individual car washing, and non-emergency fire-fighting flows or non-anthropogenic sources before instituting a prohibition.

The County recommends the following language changes:

Finding 12. Pollutants in Runoff
....By providing free and open access to an MS4 that conveys discharges to waters of the U.S., the operator essentially accepts responsibility for discharges into the MS4 that it does not effectively prohibit or otherwise control…..

A. Prohibitions and Limitations
The purpose of this provision is to describe the conditions under which storm water from and non-storm water discharges into ~~and from~~ the MS4s are effectively prohibited or limited. The goal of the prohibitions and limitations……

D. Monitoring and Assessment Program Requirements
4. Assessment Requirements
b. MS4 Outfall Discharges Assessments
(1)(a) Each Copermittee must assess and report the progress of its illicit discharge detection and elimination program, required to be implemented pursuant to Provision E.2, toward ~~reducing and~~ effectively prohibiting non-storm water and illicit discharges into the MS4 within its jurisdiction as follows:

E. Jurisdictional Runoff Management Programs
1. Legal authority Establishment and Enforcement
(1) Effectively ~~P~~prohibit and eliminate all illicit discharges and illicit connections into its MS4

COVER PAGE – PERMIT ENROLLMENT

13. Cover Page (Page 1 of 120) – The Tentative Order Should Recognize That The Enrollment Of The Orange County and/or Riverside County Copermittees Must Necessitate Changes To The Order Based On The Report Of Waste Discharge Submittals

The Tentative Order does not account for Orange County's current Fourth Term permit as there is no process for a ROWD prior to initial adoption of the permit by the Regional Board, and thus

[34] Per 402(p)(3)(B)(ii)

there is no technical basis by which to adopt many of the permit terms that apply to Orange County. Instead, the Tentative Order states that the Orange County Copermittees will submit a ROWD and will become subject to the waste discharge requirements set forth within the Tentative Order:

1) After the expiration of their current Permits (Order No. R9-2009-0002 and Order No. R9-2010-0016, respectively); or
2) At a date earlier than the expiration of their current Permits subject to the conditions described in Provision F.6 of the Tentative Order.

Although the cover page of the Tentative Order states "After the San Diego Water Board receives and considers the Orange County Copermittees' Report of Waste Discharge and makes any necessary changes to the Order….", Provision F.6 and Provision H, do not similarly recognize that changes to the Order must be made prior to the enrollment of the Orange County and/or Riverside County Copermittees.

In addition, the Findings and Fact Sheet would need to consider the thorough program analysis that the Copermittees conduct as a part of their preparation of the ROWD and the deficiencies and program modifications that Copermittees themselves identify as necessary for the program.

The County recommends the following language changes:

F. Reporting
6. Application for Early Coverage
a. The Orange County Copermittees, collectively, or Riverside County Copermittees, collectively, may apply for early coverage under this Order by submitting a Report of Waste Discharge Form 200, with a written request for early coverage under this Order <u>and identification of the necessary changes to this Order, if any, that the Copermittees are recommending based on the ROWD submittal</u>.

b. The San Diego Water Board will review the application for early coverage <u>and will make any necessary changes to this Order</u>. A notification of coverage under this Order will be issued to the Copermittees in the respective county by the San Diego Water Board upon completion of the early coverage application requirements <u>and consideration of any necessary changes to this Order</u>. The effective coverage…..

<u>c. The timelines specified within this Order will be initiated based on the effective coverage date (as specified within the notification of coverage)</u>.

H. Modification of Programs
<u>5. The San Diego Water Board will review any applications received for early coverage under this Order (Provision F.6) as well as any general applications received for coverage under this Order and will consider any necessary changes to this Order based on the newly-obtained information and/or reports received as a part of the application process. Within the applications for coverage under this Order, the Copermittees shall identify the changes that are proposed to this Order.</u>

PROVISION A – PROHIBITIONS AND LIMITATIONS

14. Provision A (Entire Provision; Begins Page 13 of 120) – A Clear Linkage Between The Compliance Provisions And Prohibitions, Receiving Water Limitations, And Effluent Limitations Must Be Established

The proposed Prohibitions and Limitations provisions may be construed as standalone provisions that could expose the Copermittees to state and federal enforcement actions, as well as to third party actions under the federal Clean Water Act's citizen suit provisions. Consistent with the recent 9th Circuit Court of Appeal decision, each provision of the permit could be read separately, so if Provision A.2.a states that "the MS4 must not cause or contribute to the violation of a water quality standard" then that is the stand-alone provision, and the accompanying language found in A.4 (Compliance with Discharge Prohibitions) regarding compliance may be considered irrelevant. As such, a clear linkage between the compliance provisions and the prohibitions, receiving water limitations, and effluent limitations must be established. This was the subject of a State Water Resources Control Board workshop on November 20, 2012; however the State Board did not make any determinations or provide further direction after a day of testimony.

In addition, compliance with Provisions A.1, A.2 and A.3 should be linked to Provision A.4, Provision B, and Attachment E so that it is clear that the compliance mechanism for A.4 is the WQIP (Provision B) and/or the TMDL (Attachment E), as applicable.

The County recommends the following language changes:

A. Prohibitions and Limitations (Introduction)
[at the end of the introductory paragraph insert this sentence]
<u>The process for determining compliance with the Discharge Prohibitions (A.1), Receiving Water Limitations (A.2), and Effluent Limitations (A.3, including effluent limitations derived from the TMDL requirements – Attachment E) is defined in Provision A.4.</u>

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1. Discharge Prohibitions
a. <u>Except as provided for in Provisions A.1.e or A.4,</u> ~~D~~<u>d</u>ischarges from MS4s in a manner causing, or threatening to cause, a condition of pollution, contamination, or nuisance in receiving waters of the state are prohibited.

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2. Receiving Water Limitations
a. Discharges from MS4s must not cause or contribute to the violation of water quality standards in any receiving waters, including but not limited to all applicable provisions contained in <u>the list below to the extent that they remain in effect and are operative, unless such discharges are being addressed by the Copermittee(s) through the processes set forth in this Order (Provision A.4 and Attachment E). Where a TMDL has been developed and its terms have been incorporated into this Order (in a manner that is consistent with the waste load allocations set forth in the TMDL), a Permittee shall also be considered in compliance with such TMDL-related requirements provided in this Order, if it is timely and in good faith implementing the MEP-compliant control measures otherwise established by this Order.</u>

15. Provision A (Entire Provision; Begins Page 13 of 120) – The Discharge Prohibitions Must Establish A Linkage With The Approved Compliance Schedules For TMDLs That Have Been Incorporated Into The Basin Plan

The Discharge Prohibitions do not establish a sufficient linkage with approved compliance schedules for TMDLs that have been incorporated into the Basin Plan. TMDLs adopted within the region include a schedule to provide MS4 Copermittees the time necessary to develop and implement a plan to achieve water quality standards in impaired waters. The compliance schedules for adopted TMDLs have been incorporated into Attachment E and language is recommended in the Receiving Water Limitations provisions (A.2.c.) and the Effluent Limitations provisions (A.3.b.) pointing to the TMDL compliance schedules.

The Receiving Water Limitations language in the Tentative Order conflicts with TMDL compliance schedules. Language should be included to clarify that in instances where a TMDL is in effect, the Copermittees shall achieve compliance with these provisions as outlined in Attachment E (Specific provisions for TMDLs). Without this change, the Receiving Water Limitations language puts Copermittees in immediate and ongoing non-compliance with the permit, as opposed to incorporating TMDL implementation schedules.

In addition, the footnote to A.2.a.(4)(b) requires Copermittees to not cause or contribute to the more stringent of a water quality objective or a CTR criterion. Instances may exist where it has been determined that one or the other is more appropriate given site specific conditions or analysis (i.e., a TMDL has been established).

The County recommends the following language changes:

1. Discharge Prohibitions
e. For discharges associated with water body pollutant combinations addressed in a TMDL in Attachment E of this Order, the affected Copermittees shall achieve compliance as outlined in Attachment E.

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2. Receiving Water Limitations
a. Discharges from MS4s must not cause or contribute to the violation of water quality standards in any receiving waters, including but not limited to all applicable provisions contained in the list below to the extent that they remain in effect and are operative, unless such discharges are being addressed by the Copermittee(s) through the processes set forth in this Order (Provision A.4 and Attachment E). Where a TMDL has been developed and its terms have been incorporated into this Order (in a manner that is consistent with the waste load allocations set forth in the TMDL), a Permittee shall also be considered in compliance with such TMDL-related requirements provided in this Order, if it is timely and in good faith implementing the MEP-compliant control measures otherwise established by this Order.

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2. Receiving Water Limitations
c. For receiving water limitations associated with water body pollutant combination addressed in a TMDL in Attachment E of this Order, the affected Copermittees shall achieve compliance as outlined in Attachment E.

Footnote #4 to Provision A.2.a.(4)(b)

[1] *If a water quality objective and a CTR criterion are in effect for the same priority pollutant, the more stringent of the two applies, unless a previous regulatory action (i.e., TMDL) has specified otherwise.*

16. Provision A (Entire Provision; Begins Page 13 of 120) – The Receiving Water Limitations Language Is Discretionary And Should Be Revised To Provide A Clear Compliance Mechanism

The Copermittees envision WQIPs as the foundation for a BMP-based compliance approach for the Discharge Prohibitions and Receiving Water Limitations language. However, the language in the Provision A.4 describes the WQIPs as a document trail rather than a compliance mechanism. In essence, the language suggests that Copermittees shall expend significant resources to develop and implement WQIPs, but taking the actions in the WQIPs has no effect on the Regional Board's compliance determination.

The Receiving Water Limitations language should be revised to expressly state that if exceedances of a water quality objective, water quality standard or any effluent limitation persist, or a discharge prohibition stated as an effluent limitation is not complied with, notwithstanding implementation of control measures, BMPs or compliance with the other water quality control program requirements of the Order, the Copermittee shall take actions to further reduce its discharges of such pollutants over time by complying with the iterative process, and that diligent implementation of the iterative process (i.e., WQIP) constitutes compliance to MEP.

The iterative process is a fundamental aspect of MS4 programs, as envisioned by State Water Board Order 99-05 and later reconfirmed in Order WQ 2001-15 (BIA Order), and is the mechanism by which MS4 Copermittees should demonstrate compliance. The WQIPs now provide a mechanism to provide the detail and quantitative analyses used to identify pollutant sources and implement BMPs to address those sources.

Language in Provision A.4 should be consistent with the California Stormwater Quality Association (CASQA) proposed receiving water limitation language (see **Attachment B**).

(See the recommended language changes in Provision A.4 of the Attachment B, Tentative Order redline)

PROVISION B – WATER QUALITY IMPROVEMENT PLANS

17. Provision B (Entire Provision; Begins Page 17 of 120) – The Water Quality Improvement Plans Should Be The Foundation For A BMP-Based Compliance Approach [35]

The County strongly supports the Watershed approach as described in the Tentative Order and Fact Sheet, with modifications as discussed below and in Provision E. A watershed-based approach is ideal for the implementation of stormwater programs in the San Diego Region as it allows for the integration of all program elements, focuses efforts on the highest priorities for each watershed through the customization of actions and strategies, and allows for streamlined reporting. This approach also supports the implementation of TMDLs, which are developed and implemented at the watershed scale.

Although the language for the WQIP recognizes the need for the consideration of provisions A.1, A.2, and A.3 as a part of the assessments and identification of water quality priorities, consistent with the intent described in the Fact Sheet, the language within the Tentative Order should explicitly identify that compliance with those provisions is achieved through the development and implementation of the WQIPs and or TMDLs (Attachment E).

In particular, the Fact Sheet states[36]:

> **Provision B includes requirements for the Copermittees to develop and implement Water Quality Improvement Plans to ultimately comply with the prohibitions and limitations under Provision A**. The Water Quality Improvement Plans will provide the Copermittees a comprehensive program that can achieve the requirements of the CWA.

[35] Orange County notes that in the recently adopted LA MS4 permit a Reasonable Assurance Analysis (RAA) is required in order for a Copermittee to receive approval of a Watershed Management Program (essentially the same concept as the WQIP) and then utilize the Watershed Management Program as a method of compliance with Receiving Water Limitation provision requirements. Orange County believes that the WQIP process described in the Tentative Order, subject to the County's comments herein, is robust and does not necessitate the addition of a RAA. The WQIPs will provide enforceable, objective, and measurable requirements for the Copermittees, without having to implement an RAA.

To the extent that future proceedings on the Tentative Order contemplate a RAA requirement, Orange County strongly disagrees with such an approach. RAA would impose unnecessary and costly modeling requirements on the Copermittees. Orange County is not covered by TMDLs to the extent that Los Angeles and other counties are, where such models have already been developed and where such modeling efforts have previously been conducted for many pollutant-waterbody combinations. RAA is essentially a "TMDL-lite" process that would shift regulatory obligations from the Regional Board to the Copermittees. Although the Copermittees may choose to work with the Regional Board, as deemed appropriate and necessary in the future, to develop TMDLs collaboratively, the Copermittees object to the obligation to fully assume the Regional Board's regulatory responsibilities. Federal law is clear as to how a TMDL should be established, and RAA would "backdoor" the TMDL process into the WQIP approach without the Regional Board going through the necessary steps to formulate a TMDL. This would be a violation of federal law. There is also no federal or state authority by which a RAA could be required by the Regional Board. Even assuming such authority, a RAA is unnecessary and goes beyond MEP.

[36] Fact Sheet, Page F-42

> Implementation of the Water Quality Improvement Plans will also improve the quality of the receiving waters in the San Diego Region…..
>
> The Water Quality Improvement Plan also incorporates a program to monitor and assess the progress of the Copermittees' jurisdictional runoff management programs toward improving the quality of discharges from the MS4s, as well as tracking improvements to the quality of receiving waters. **A process to adapt and improve the effectiveness of the Water Quality Improvement Plans has also been incorporated into the requirements of Provision B to be consistent with the "iterative approach" required to achieve compliance with discharge prohibitions of Provisions A.1.a and A.1.c and receiving water limitations of Provision A.2.a, pursuant to the requirements of Provision A.4.**
>
> [Emphasis added]

In other words, the Water Quality Improvement Plan framework, as outlined within the Tentative Order, is established as the compliance mechanism for Provision A.4. In fact, this would complement the existing language in Provision A.4, which states (as modified below):

> Each Copermittee must achieve compliance with Provisions A.1, A.2, and A.3 of this Order through timely implementation of control measures and other actions as specified in Provisions B and E of this Order, including any modifications. The Water Quality Improvement Plans required under Provision B must be designed and adapted to ultimately achieve compliance with Provisions A.1, A2, and A.3.

In addition, the WQIP should identify the high priority water quality issues and conditions and provide direction for the development and implementation of the JRMPs. The goals for the WQIPs should be clearly identified and directly linked to the JURMPs (and the corresponding flexibility provided within the development of the JURMPs) (See also Provision E).

Lastly, although Regional Water Board staff have indicated that the WQIPs, once developed and approved, will functionally replace the CLRPs and BLRPs, the Tentative Order does not formally recognize this. The County recommends that a footnote be added to clarify that this is the case.

The County recommends the following language changes:

B. Water Quality Improvement Plans[1]
The purpose of this provision is to develop Water Quality Improvement Plans that guide the Copermittees' jurisdictional runoff management programs towards achieving the outcome of improved water quality in MS4 discharges and receiving waters. The goal of the Water Quality Improvement Plans is to address the impacts of MS4 discharges so that such discharges do not impair ~~protect, preserve, enhance, and restore~~ the water quality and designated beneficial uses of waters of the state. Therefore, implementation of the WQIPs also provides the basis for complying with Provisions II.A.1, II.A.2, and II.A.3, as described in Provision II.A.4. This goal will be accomplished through an adaptive planning and management process that identifies the highest priority water quality conditions within a watershed and implements strategies through the jurisdictional runoff management programs to achieve improvements in the quality of discharges from the MS4s and receiving waters. As such, the requirements outlined in Provision

<u>E may be modified for consistency with the WQIP priorities for the applicable Watershed Management Area, if appropriate justification is provided</u>.

<u>[1] – Once developed and approved, the Water Quality Improvement Plan and corresponding Jurisdictional Runoff Management Plan will functionally replace the Load Reduction Plans.</u>

18. Provision B (Entire Provision; Begins Page 17 of 120) – The WQIP Numeric Goals Are Used To Support The WQIP Implementation And Measure Progress, They Are Not Enforceable Compliance Standards

Similar to the footnotes in Provisions C.1.a and C.2.a, Provision B.2.e should explicitly state that the action levels, interim goals and final goals are not enforceable limitations.

The County recommends the following language changes:

B. Water Quality Improvement Plans
2. Priority Water Quality Conditions
e. Numeric Goals
The Copermittees must develop and incorporate <u>action levels,</u> interim and final numeric goals and schedules into the Water Quality Improvement Plan. Numeric goals must be used to support Water Quality Improvement Plan implementation and measure progress towards addressing the highest priority water quality conditions identified under B.2.c. <u>Actions levels and numeric goals, themselves, are not enforceable compliance standards, effluent limitations, or receiving water limitations</u>. When establishing numeric goals…..

19. Provision B.2 (Page 19 of 120) – The Schedule For The Achievement Of The Final WQIP Numeric Goals Should Be Based On The Results Of The Assessment Conducted As A Part Of The Development Of The WQIP Priority Water Quality Conditions

Provision B.2.e.(3)(e) states that the "final dates for achieving the final numeric goals must not initially extend more than 10 years beyond the effective date of this Order, unless a longer period of time is authorized by the San Diego Water Board Executive Officer or the schedule includes an applicable TMDL…."

In addition, the Fact Sheet notes that this provision is consistent with 40 CFR 122.47(a)(1), which states:

> (1) Time for compliance. Any schedules of compliance under this section shall require compliance as soon as possible, but not later than the applicable statutory deadline under the CWA.

The Fact Sheet provision citing 122.47 is inapplicable, however, and this provision should be deleted, as there are no federal or state statutory deadlines for achieving WQIP final numeric goals. Provision B.2.e(3)(e) expressly states that the Copermittees must develop and incorporate schedules for numeric goals into the WQIP, and compliance schedules for such goals are determined by the Copermittees with certain approvals by the Regional Board or the Executive Officer.

Furthermore, the requirement that the final dates for achieving the final numeric targets must not extend more than 10 years unless authorized by the Executive Officer is one of the most disconcerting requirements in the Tentative Order for several reasons:

- There is no factual or technical basis or other evidence for why a 10 year time period is the timeframe for all of the listed numeric goal, and therefore 10 year is arbitrary;
- Although the assessments that will be conducted pursuant to Provision E.2 will be thorough, they will not take the place of the type(s) of assessments that should be conducted when developing a TMDL and establishing waste load allocations and the timeframes necessary for achieving the allocations;
- Many TMDLs that are developed have longer timeframes than 10 years. There are many implementation schedules that extend out 15 or 20 years depending upon the constituent, sources, and potential compliance options available to the responsible parties.

Instead of a 'one size fits all' timeline of 10 years, the final date for achieving the final goals should be determined by the Copermittees during the development of the WQIP, which undergoes a thorough public review process. It should also be recognized that this date may need to be modified based on additional data and information that is received during the implementation of the WQIP.

Based on conversations with Regional Board staff, it is understood that goals can take a number of forms and the "10 year" requirement is not intended as a requirement to attain all Basin Plan water quality standards within 10 years. However, to ensure this requirement does not cause confusion and is not mis-interpreted by third parties, language should be added to clarify this.

The County recommends the following language changes:

B. Water Quality Improvement Plans
2. Priority Water Quality Conditions
e. Numeric Goals
~~(3)(e) Final dates for achieving the final numeric goals must not initially extend more than 10 years beyond the effective date of this Order, unless a longer period of time is authorized by the San Diego Water Board Executive Officer or the schedule includes an applicable TMDL in Attachment E to this Order.~~

(4) The schedules for achieving the interim and final goals will be evaluated with each annual report [F.3.b.(1)(d)] and/or as a part of the ROWD development [B.5.a] to determine if they should be modified.

PROVISION C – ACTION LEVELS

20. Provision C (Entire Provision; Begins Page 28 of 120) – The Tentative Order Should Clarify The Use Of The Action Levels Within The WQIP And IDDE Program and the Copermittees Should Develop The NALs/SALs Based On The Priorities Of The WQIP and/or the IDDE Program

Although the modifications in this provision have improved from the Administrative Draft, there are a number of outstanding issues related to the proposed language that need to be addressed in order for the Action Levels to be effective and assist with the overall management and assessment of the Stormwater Program. These issues include:

- The differentiation for the Non-stormwater Action Levels (NALs) between the WQIP and Illicit Discharge Detection and Elimination (IDDE) program element; and
- The Copermittees should be allowed to develop or use previously established NALs/Stormwater Action Levels (SALs) instead of the values identified within this provision.

These outstanding issues are discussed in additional detail below.

<u>A. The Tentative Order Needs to Differentiate and Provide a Clear Linkage Between Provisions B and C and Provisions E.2 and C.</u>

Provision C.1 indicates that the NALs will be incorporated into the WQIPs and used to:

a) Support the development and prioritization of water quality improvement strategies for addressing non-stormwater discharges to and from the MS4s;

b) Assess the effectiveness of the water quality improvement strategies toward addressing MS4 non-storm water discharges; and

c) Support the detection and elimination of non-stormwater and illicit discharges to and from the MS4.

Similarly, Provision C.2 indicates that the SALs will be incorporated into the WQIPs and used to:

a) Support the development and prioritization of water quality improvement strategies for reducing pollutants in stormwater discharges from the MS4s;

b) Assess the effectiveness of the water quality improvement strategies toward reducing pollutants in stormwater discharges….

Although the NALs and SALs have these stated objectives, the Tentative Order must provide a clearer linkage and differentiate between

- Provision B (WQIPs) and Provision C (Action Levels) and
- Provision E.2 (Illicit Discharge Detection and Elimination Program [IDDE]) and Provision C.

Examples of what clarification is necessary include the following:

- Provision B does not include any mention of the NALs or SALs even though they are supposed to be incorporated into the WQIPs.
- It should be recognized that the WQIP should guide the customization of the NALs/SALs to meet the highest water quality priorities in a given watershed and that NALs/SALs will be used to assist Copermittees in reaching the goals specified in the WQIP.
- The NALs and SALs developed and incorporated into the WQIP should address the high priority water quality conditions identified. (see comment below)

<u>B. The Copermittees Need to Have the Flexibility to Develop or Use Previously Established Action Levels</u>

Although the Tentative Order states that the Copermittees are to <u>develop and incorporate</u> numeric non-stormwater and numeric stormwater action levels into the Water Quality Improvement Plans (C.1 and C.2, respectively), the Tentative Order then contradicts this approach and mandates that the Copermittees include all of the numeric actions levels as identified in tables C-1, C-2, C-3, C-4 and C-5.

The mandated action levels are problematic for the following reasons:

1) The NALs for the WQIPs will likely include different constituents and/or values than those values that would be used for the IDDE program.
2) The NALs and SALs will likely include different constituents and/or values between WQIPs depending upon the identified high priority water quality conditions.
3) The NALs set for the IDDE program should not be based on water quality objectives at the 'end of pipe'. Instead, these values should be based on upset values.
4) In Provision B.2.d the Copermittees are required to develop and use interim and final numeric targets/goals to measure progress towards the protection/enhancement of the receiving waters and beneficial uses. The choice of the target/goals of the watershed may be biological, chemical, or physical based and may include multiple criteria and/or indicators. If the mandated values have to be used as action levels within the WQIP, they may not correspond to the highest priority water quality conditions or the metrics that are being used to measure progress. Thus, the chemically based NALs/SALs may direct resources away from the watershed priorities.

As a part of the IDDE program, the County had developed and implemented an innovative Dry Weather Reconnaissance Program, based upon statistically derived benchmarks to identify illegal discharges and illicit connections during the typically dry summer months of May through September using a suite of water quality analyses conducted in the field at designated random and targeted drains. The 2010-11 reporting period marked the ninth season of dry weather monitoring in the San Diego Region. Monitoring in the San Diego Region under the Dry Weather Reconnaissance Program was replaced in August 2011 with the NALs Monitoring Program (pursuant to Order No. R9-2009-0002).

After the implementation of the NAL-based program for a year, some clear differences between the previously established Dry Weather Reconnaissance Program and the NAL-based program have been evident (see the table below).

- Of the 236 site visits conducted in the Dry Weather Reconnaissance Program, there were 77 exceedances that required follow up actions;
- For the Dry Weather Reconnaissance Program, this represented 32% of the discharges samples being prioritized for follow up actions and/or investigations;
- Of the 68 site visits conducted in the NAL program, there were 167 exceedances that required follow up actions (almost 2 x the number of site visits); and
- For the NAL program, there was limited ability to prioritize discharges for follow up since some of the constituents exceeded the NALs 33-91% of the time.

Comparison of NAL Program and Previous Dry Weather Reconnaissance Program

	NAL Exceedances 2011 - 12		DW Reconn Pgm Action Level* Exceedances May-Sep 2010	
Constituent	**Number**	**%**	**Number**	**%**
pH	1	1.5	12	5.1
MBAS	1	1.5	2	0.8
Turbidity	5	11	3	1.3
Dissolved Oxygen	1	1.5	2	0.8
Fecal Coliform	19	42	0	0
Enterococcus	41	91	1	0.4
Total P / Ortho PO4	37	82	6	2.5
Total N / Nitrate	41	91	22	9.3
Nickel	6	13	18	7.6
Cadmium	15	33	11	4.7
Total # of Site Visits	**68**		**236**	

The conclusions from the implementation of the Orange County NAL-based program to date are:

- The NAL program replaced an previously existing and effective program;
- The NAL program has required increased resources and has resulted in everything being a priority;
- There have been many exceedances that have been due to non-IDDE factors such as local geology (especially for nickel and cadmium);
- It has been very difficult to determine the endpoints, the sources, of the various non-stormwater discharges since the discharges are so co-mingled; and
- There is a strong need for a regionally-based prioritization so that there is not a mis-direction of limited resources

The Regional Water Board would be well served to review the results of the Orange County NAL-based program to date and consider the revisions as proposed in order to assist with the prioritization of resources and water quality issues. The Tentative Order should establish the purpose(s) of the action levels and then allow the Copermittees to develop the numeric action levels. The mandated NALs and SALs should only be considered “default” values if the Copermittees do not develop their own NALs/SALs or use previously established values. Previously developed action levels should serve as interim action levels until the WQIPs are completed.

The County recommends the following language changes:

B. Water Quality Improvement Plans
2. Priority Water Quality Conditions
e. Numeric Goals and Schedules
The Copermittees must develop and incorporate action levels, interim and final numeric goals[37] and schedules into the Water Quality Improvement Plan. Numeric goals must be used to support Water Quality Improvement Plan implementation and measure progress towards addressing the highest priority water quality conditions identified under Provision B.2.c. Action levels and numeric goals, themselves, are not enforceable compliance standards, effluent limitations, or receiving water limitations. When establishing numeric goals and corresponding schedules, the Copermittees must consider the following:

C. Action Levels
The purpose of this provision is for the Copermittees to incorporate numeric non-stormwater action levels (NALs) and stormwater action levels (SALs) in the Water Quality Improvement Plans (WQIP) and numeric non-stormwater action levels (NALs) in the Illicit Discharge Detection and Elimination (IDDE) Program.

- *For the purposes of the WQIPs, ~~Water Quality Improvement Plan~~ the goal of the action levels is to guide the implementation efforts and measure progress towards the protection of the high priority water quality conditions and designated beneficial uses of waters of the state from adverse impacts caused or contributed to by MS4 discharges. This goal will be accomplished through monitoring and assessing the quality of the MS4 discharges during the implementation of the Water Quality Improvement Plans.*

- *For the purposes of the IDDE program, the goal of the action levels is to assist in the effective prohibition of non-stormwater discharges into the MS4.*

Action levels will be developed and incorporated into the WQIP (Provision B) and the IDDE Program (Provision E). Depending upon the goals/objectives for the use of the action levels and the priority receiving water conditions, the constituents and values at which they are set may differ between watersheds. Copermittees may develop Watershed Management Area specific numeric action levels for non-stormwater and stormwater MS4 discharges using an approach approved by the Regional Board or use the default non-stormwater and stormwater action levels prescribed in C.1 and C.2 below.

The Copermittees will submit the action levels as a part of the WQIP and JURMP submittals. The action levels currently established will serve as the interim action levels until revised action levels are completed and approved. Exceedances of the action levels are not subject to enforcement or non-compliance actions under this Order.

[37] Interim and final numeric goals may take a variety of forms such as TMDL established WQBELs, action levels, pollutant concentration, load reductions, number of impaired water bodies delisted from the List of Water Quality Impaired Segments, Index of Biotic Integrity (IBI) scores, or other appropriate metrics. Interim and final numeric goals are not necessarily limited to one criterion or indicator, but may include multiple criteria and/or indicators. Except for TMDL established WQBELs, interim and final numeric goals and corresponding schedules may be revised through the adaptive management process under Provision B.5.

1. *Default Non-Storm Water Action Levels*[38]

~~*The Copermittees must develop and incorporate numeric non-storm water action levels (NALs) into the Water Quality Improvement Plan to: 1) support the development and prioritization of water quality improvement strategies for addressing non-storm water discharges to and from the MS4s, 2) assess the effectiveness of the water quality improvement strategies toward addressing MS4 non-storm water discharges, required pursuant to Provision D.4.b.(1), and 3) support the detection and elimination of non-storm water and illicit discharges to and from the MS4, required pursuant to Provision E.2.*~~[39] *The following non-stormwater action levels (NALs) must be incorporated in the WQIPs and IDDE program if the Copermittees have not developed their own NALs for the identified high priority constituents using an approach approved by the Regional Board EO.*

~~C.1.c For the NALs incorporated into the Water Quality Improvement Plan, the Copermittees may develop and incorporate secondary NALs specific to the Watershed Management Area at levels greater than the NALs required by Provisions C.1.a and C.1.b which can be utilized to further refine the prioritization and assessment of water quality improvement strategies for addressing non-storm water discharges to and from the MS4s, as well as the detection and elimination of non-storm water and illicit discharges to and from the MS4. The secondary NALs may be developed using an approach acceptable to the San Diego Water Board.~~

2. Default Storm Water Action Levels[40]

The Copermittees must develop and incorporate numeric storm water action levels (SALs) in the Water Quality Improvement Plans to: 1) support the development and prioritization of water quality improvement strategies for reducing pollutants in storm water discharges from the MS4s, and 2) assess the effectiveness of the water quality improvement strategies toward reducing pollutants in storm water discharges, required pursuant to Provision D.4.b.(2)[41].

The following stormwater action levels (SALs) must be incorporated in the WQIPs if the Copermittees have not developed their own SALs for the identified high priority constituents using an approach approved by the Regional Board EO.

~~*C.2.c For the SALs incorporated into the Water Quality Improvement Plan, the Copermittees may develop and incorporate secondary SALs specific to the Watershed Management Area at levels greater than the SALs required by Provisions C.2.a and C.2.b which can be utilized to further refine the prioritization and assessment of water quality improvement strategies for reducing pollutants in storm water discharges from the MS4s. The secondary SALs may be developed based on the approaches recommended by the State Water Board's Storm Water Panel*[42] *or using an approach acceptable to the San Diego Water Board.*~~

[38] NALs are not considered by the San Diego Water Board to be enforceable limitations.

[40] SALs are not considered by the Regional Water Board to be enforceable limitations.
[41] The Copermittees may utilize SALs or other benchmarks currently established by the Copermittees as interim SALs until the WQIPs are accepted by the San Diego Water Board Executive Officer.

PROVISION D – MONITORING AND ASSESSMENT PROGRAM REQUIREMENTS

21. Provision D (Entire Provision; Begins Page 33 of 120) – The Prescribed Receiving Water Program Does Not Incorporate A Question Driven Approach Nor Does The Tentative Order Recognize That The Phase I Municipal NPDES Copermittees Are Not The Sole Dischargers To Receiving Water

Provision D.1.f provides for alternative watershed monitoring requirements that may be fulfilled in addition to or in lieu of the receiving water monitoring program detailed in Provision D.1.b to D.1.d

The Tentative Order contains a modified approach to receiving waters monitoring that has not been implemented in previous Tentative Orders. While this approach provides a welcomed opportunity for the Copermittees to shift their resources towards assessing MS4 contributions, the conceptual basis of the receiving waters programs needs additional consideration. The prescribed receiving water program does not appear to be a question driven approach nor does the Tentative Order recognize that the Phase I municipal NPDES Copermittees are not the sole dischargers to receiving waters and that the contributions from many other regulated and unregulated entities contribute to the overall receiving water conditions.

The Tentative Order should establish an integrated and collaborative receiving water program that is consistent with watershed management area priorities in lieu of individual and uncoordinated efforts. The Regional Board should:

1. Establish a water-body oriented monitoring and assessment workgroup for each Watershed Management Area as outlined in the staff report titled “A Framework for Monitoring and Assessment in the San Diego Region” that establishes a question-driven monitoring program;
2. Establish language that provides an opportunity for all regulated discharges to create pooled resources so that monitoring efforts are singularly focused on receiving waters during both dry and wet weather conditions; and
3. Establish language that provides for an alternate compliance option for the Monitoring and Reporting program in lieu of the prescribed receiving waters monitoring program as previously adopted in R9-2009-0002 that lead to the development of the Orange County Regional Shoreline Monitoring Program.

The County recommends the following changes

D. Monitoring and Assessment Program Requirements
1. Receiving Water Monitoring Requirements
f. Alternate Watershed Monitoring Requirements

The San Diego Water Board may direct the Copermittees to participate in an effort to develop alternative watershed monitoring with other regulated entities, other interested parties, and the San Diego Water Board to refine, coordinate, and implement regional monitoring and assessment programs to determine the status and trends of water quality conditions in 1) coastal waters, 2) enclosed bays, harbors, estuaries, and lagoons, and 3) streams.

In lieu of the Receiving Water Monitoring Program requirements specified in 1.a to 1.d, the Copermittees may participate in the development and implementation of monitoring for the _*collaborative receiving waters monitoring program. It is expected that a regional monitoring will allow for a more effective and efficient receiving waters monitoring program. The regional monitoring plan must be submitted to the Executive Officer for review and approval. Documentation of participation and monitoring shall be included in the annual report.*_

22. Provision D (Entire Provision; Begins Page 33 of 120) – The Prescribed MS4 Outfall Discharge Monitoring Needs Additional Refinement In Order To Support The Development Of Effective Water Quality Improvement Plans

A. Transitional Wet Weather MS4 Outfall Discharge Monitoring Program

In order to fulfill the jurisdictional and land use requirements for the monitoring and assessment provisions of the Tentative Order, the coordination of the wet weather MS4 program should be scheduled to start at a later date. The rescheduling of the commencement of wet weather MS4 monitoring will provide adequate time to complete the required geo-location and land use analysis of the major MS4 drainage areas.

The County recommends the following changes

2. MS4 Outfall Discharge Monitoring
a. Transitional MS4 Outfall Discharge Monitoring
(3) Transitional Wet Weather MS4 Outfall Discharge Monitoring
(b) Transitional Wet Weather MS4 Outfall Discharge Monitoring Frequency

Each wet weather MS4 outfall discharge monitoring station selected pursuant to Provision D.2.a.(3)(a) must be monitored twice during the wet season (October 1 – April 30). One wet weather monitoring event must be conducted during the first wet weather event of the wet season, and one wet weather monitoring event at least a month after the first wet weather event of the wet season.

*Transitional wet weather MS4 outfall discharge monitoring may begin in year 2 of the transitional period once the MS4 outfall discharge monitoring stations have been inventoried and evaluated pursuant to Provision D.2.a.(1)*

B. Transitional MS4 Outfall Discharge Analytical Monitoring

The Copermittees need the flexibility to retain consistent monitoring methods between permit cycles in order to maintain the long term trend baselines.

The County recommends the following changes

2. MS4 Outfall Discharge Monitoring
a. Transitional MS4 Outfall Discharge Monitoring
(3) Transitional Wet Weather MS4 Outfall Discharge Monitoring
(e) Transitional Wet Weather MS4 Outfall Discharge Analytical Monitoring

(iv) For all other constituents, composite samples must be collected for a duration adequate to be representative of changes in pollutant concentrations and runoff flows using one of the following techniques:

[a] Time-weighted composites collected over the length of the storm event or the first 24 hour period, whichever is shorter, composed of ~~24~~ discrete ~~hourly~~ samples, which may be collected through the use of automated equipment, or

[b] Flow-weighted composites collected over the length of the storm event or a typical 24 hour period, whichever is shorter, which may be collected through the use of automated equipment, or

[c] If automated compositing is not feasible, a composite sample may be collected using a minimum of 4 grab samples, collected during the first 24 hours of the storm water discharge, or for the entire storm water discharge if the storm event is less than 24 hours;

Additionally in Provision D:

2. MS4 Outfall Discharge Monitoring
c. Wet Weather MS4 Outfall Discharge Monitoring
(5) Wet Weather MS4 Outfall Discharge Analytical Monitoring
(d) composite sample requirements

(i) *Time-weighted composites collected over the length of the storm event or the first 24 hour period, whichever is shorter, composed of discrete samples, which may be collected through the use of automated equipment ~~Time weighted composites composed of 24 discrete hourly samples, which may be collected through the use of automated equipment~~, or,*

(ii) Flow-weighted composites collected over the length of the storm event or a typical 24 hour period, whichever is shorter, which may be collected through the use of automated equipment, or

(iii) If automated compositing is not feasible, a composite sample may be collected using a minimum of 4 grab samples, collected during the first 24 hours of the storm water discharge, or for the entire storm water discharge if the storm event is less than 24 hours.

***23.* Provision D (Entire Provision; Begins Page 33 of 120) – The Copermittees Need To Have The Flexibility To Develop Or Use Analytical Monitoring Requirements In The Water Quality Improvement Plans Based On Assessments Of Current Sources That May Contribute To The Section 303(d) Water Body Impairments**

The Regional Board should recognize the inherent difficulties associated with monitoring 303(d) constituents such as the legacy pesticides or the monitoring of aquatic toxicity. Many existing developments were never subjected to the application of legacy pesticides such as DDT and, as such, these constituents are highly unlikely to be found in modern communities. The Regional Board should also recognize that laboratory toxicity tests provide a cumulative perspective of pollutant effects that may or may not be sampled as part of a monitoring program.

The Copermittees should be relieved of analytical monitoring requirements if supporting information can be provided to document the current pollutant concentrations or may provide historic information to support the absence of usage of these constituents in the MS4 drainage area. Additionally, the Copermittees should be allowed to develop an alternate approach for monitoring that allows the Copermittees to evaluate and identify the cause of toxicity currently affecting receiving waters and to iteratively adapt the monitoring program to address these chemical stressors in their MS4 outfall discharges through the WQIPs.

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Supporting Document No. 5

The County recommends the following changes

2. MS4 Outfall Discharge Monitoring
a. Transitional MS4 Outfall Discharge Monitoring
(3) Transitional Wet Weather MS4 Outfall Discharge Monitoring
(e) Transitional Wet Weather MS4 Outfall Discharge Analytical Monitoring
(iv) *The samples must be analyzed for the following constituents:*

- *[a] Constituents listed as a cause for impairment of receiving waters in the Watershed Management Area listed on the CWA section 303(d) List with the exception of toxicity[1]*
- *[b] Constituents for implementation plans or load reduction plans (e.g. Bacteria Load Reduction Plans, Comprehensive Load Reduction Plans) developed for watersheds where the Copermittees are listed responsible parties under the TMDLs in Attachment E to this Order, and*
- *[c] Constituents listed in in Table D-7.*
- *[e] The Copermittee may be relieved of analytical monitoring requirements [a] to [c] if supporting information can be provided or has historical data that can demonstrate or provide justification that the analysis of the constituent is not necessary.*

Footnote to [a]
[1]Copermittees may provide an alternate approach to evaluate and identify the cause of toxicity currently affecting receiving waters and to iteratively adapt the monitoring program to address these chemical stressors in their MS4 outfall discharges in the monitoring plan which is subject to Regional Board approval.

Additionally in Provision D

2. MS4 Outfall Discharge Monitoring
b. Dry Weather MS4 Outfall Discharge Monitoring
(2) Non-Storm Water Persistent Flow MS4 Outfall Discharge Monitoring
(e) Non-Storm Water Persistent Flow MS4 Outfall Discharge Analytical Monitoring
(iii) Collect grab or composite samples to be analyzed for the following constituents:

- *[a] Constituents contributing to the highest priority water quality conditions identified in the Water Quality Improvement Plan,*
- *[b] Constituents listed as a cause for impairment of receiving waters in the Watershed Management Area listed on the CWA section 303(d) List with the exception of toxicity[1],*
- *[c] Constituents for implementation plans or load reduction plans (e.g. Bacteria Load Reduction Plans, Comprehensive Load Reduction Plans) developed for watersheds where the Copermittees are listed responsible parties under the TMDLs in Attachment E to this Order,*
- *[d] Applicable NAL constituents, and*
- *[e] Constituents listed in Table D-8, unless the Copermittee has historical data that can demonstrate or provide justification that the analysis of the constituent is not necessary.*
- *[f] The Copermittee may be relieved of analytical monitoring requirements if supporting information can be provided or has historical data that can demonstrate or provide justification that the analysis of the constituent is not necessary.*

Footnote to [b]

[1]<u>*Copermittees may provide an alternate approach to evaluate and identify the cause of toxicity currently affecting receiving waters and to iteratively adapt the monitoring program to address these chemical stressors in their MS4 outfall discharges in the monitoring plan which is subject to Regional Board approval.*</u>
Additionally in Provision D

2. MS4 Outfall Discharge Monitoring
c. Wet Weather MS4 Outfall Discharge Monitoring
(5) Wet Weather MS4 Outfall Discharge Analytical Monitoring
(f) *Analysis for the following constituents is required:*

(i) *Constituents contributing to the highest priority water quality conditions identified in the Water Quality Improvement Plan,*

(ii) *Constituents listed as a cause for impairment of receiving waters in the Watershed Management Area listed on the CWA section 303(d) List,* <u>*with the exception of toxicity*</u>[1]*,*

(iii) *Constituents for implementation plans or load reduction plans (e.g. Bacteria Load Reduction Plans, Comprehensive Load Reduction Plans) developed for watersheds where the Copermittees are listed responsible parties under the TMDLs in* <u>*Attachment E*</u> *to this Order, and*

(iv) *Applicable SAL constituents.*

(v) <u>*The Copermittee may be relieved of analytical monitoring requirements if supporting information can be provided or has historical data that can demonstrate or provide justification that the analysis of the constituent is not necessary.*</u>

Footnote to [ii]
[1]<u>*Copermittees may provide an alternate approach to evaluate and identify the cause of toxicity currently affecting receiving waters and to iteratively adapt the monitoring program to address these chemical stressors in their MS4 outfall discharges in the monitoring plan which is subject to Regional Board approval*</u>

Additionally in Provision D

Footnotes Table D-3.
1. Nitrite and nitrate may be combined and reported as nitrite+nitrate.
2. E. Coli may be substituted for <u>*Total*</u> ~~*Fecal*~~ *Coliform* <u>*at inland receiving water monitoring stations*</u>*.*

Footnotes Table D-7.
1. Nitrite and nitrate may be combined and reported as nitrite+nitrate.
2. E. Coli may be substituted for <u>*Total*</u> ~~*Fecal*~~ *Coliform* <u>*for discharges to inland surface waters*</u>*.*

Footnotes Table D-8.
1. Nitrite and nitrate may be combined and reported as nitrite+nitrate.
2. E. Coli may be substituted for <u>*Total*</u> ~~*Fecal*~~ *Coliform* <u>*for discharges to inland surface waters*</u>

PROVISION E – JURISDICTIONAL RUNOFF MANAGEMENT PROGRAMS

24. Provision E (Entire Provision; Begins Page 64 of 120) – The JRMP Provisions Must Be Modified So As Not To Negate The Very Intent And Purpose Of The Watershed Approach And The Focus On The Highest Priorities Within Each Watershed Management Area

The Tentative Order states that the purpose of the WQIPs is to guide the Copermittees' jurisdictional runoff management programs towards achieving improved water quality by identifying the highest priority water quality conditions within a watershed and implementing strategies through the jurisdictional runoff management programs (Provision B).

Provision E goes on to state that the jurisdictional runoff management programs will be implemented in accordance with the strategies identified in the WQIPs. In addition, the Fact Sheet states:

> "Where the Water Quality Improvement Plan is the '*comprehensive planning process'* on a Watershed Management Area scale, requiring '*intergovernmental coordination'*, the jurisdictional runoff management program document is the '*comprehensive planning process'* on a jurisdictional scale that should be coordinated with the other Copermittees in the Watershed Management Area to achieve the goals of the Water Quality Improvement Plan."[43]

The Fact Sheet also supports this when it states:

> "Based on the economic considerations below, the San Diego Water Board has provided the Copermittees a significant amount of flexibility to choose how to implement the requirements of the Order. This Order also allows the Copermittees to customize their plans, programs, and monitoring requirements. In the end, it is up to the Copermittees to determine the effective BMPs and measures necessary to comply with this Order. The Copermittees can choose to implement the least expensive measures that are effective in meeting the requirements of this Order."[44]

Although the Fact Sheet states that "Implementation of the components of each Copermittee's jurisdictional runoff management program must be consistent with the water quality improvement strategies identified within the Water Quality Improvement Plan,"[45] the Tentative Order then requires the Copermittees to incorporate <u>all</u> of the requirements identified within Provision E regardless of the high priority water quality conditions that have been identified within the WQIP. If the Copermittees are required to implement <u>all</u> of the requirements in Provision E instead of prioritizing and implementing those requirements that directly address the highest priority water quality conditions and support the watershed strategies, then the program becomes additive instead of prioritized and focused. The net result is that the approach in Provision E negates the prioritized and strategic approach outlined in Provision B.

The Tentative Order should provide a clear linkage between Provision B and Provision E and state that the WQIP should guide the customization of the JRMP to meet the highest water quality priorities and strategies in a given watershed.

[43] Fact Sheet, Page F-71
[44] Fact Sheet, Page F-17
[45] Fact Sheet, Page F-71

(See also the corresponding comments under Provision E.2, E.3. E.4, E.5, and E.7)
The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs [Intro]
The purpose of this provision is for each Copermittee to implement a program to control non-stormwater ~~the~~ discharges ~~contribution of pollutants~~ into and ~~the~~ stormwater discharges from the MS4 within its jurisdiction and to focus and prioritize those implementation actions based on the highest water quality priorities identified within the associated Water Quality Improvement Plan. The goal of the jurisdictional runoff management programs is to implement strategies and actions that effectively prohibit non-storm water discharges into the MS4 and reduce the discharge of pollutants in storm water to the MEP. This goal will be accomplished through implementing the jurisdictional runoff management programs in accordance with the water quality priorities and strategies identified in the Water Quality Improvement Plans.

Each Copermittee must update its jurisdictional runoff management program document, in accordance with Provision F.2.a, to incorporate ~~all~~ the requirements of Provision E consistent with the highest water quality priorities as identified in the corresponding Water Quality Improvement Plan. Until the Copermittee has updated its jurisdictional runoff management program document with the requirements of Provision E, the Copermittee must continue implementing its current jurisdictional runoff management program.

Similarly, the County recommends the following language changes be incorporated into each of the program elements within Provision E as identified below:
The requirements of the jurisdictional runoff management programs as outlined below may be modified and prioritized as appropriate for consistency with the highest water quality priorities as identified in the corresponding Water Quality improvement Plan.

LEGAL AUTHORITY

25. Provision E.1 (Page 64 of 120) – The Copermittees Are Only Responsible For Administering and Enforcing the Codes and Ordinances Applicable To Their Jurisdictions

Provision E.1.a(2) requires the Copermittees to establish the legal authority to control the contribution of pollutants in discharges of runoff associated with industrial and construction activity within their jurisdictions. Since the Copermittees can only administer and enforce their local codes and ordinances, it is unnecessary and confusing to include the language regarding the Statewide Industrial and Construction General Permits. The sites subject to the Statewide Permits (which are administered and enforced by the State and Regional Boards) are already inspected by state staff and are included within the Copermittee inventories, inspection, and enforcement programs.

In addition, language that acknowledges that the local codes and ordinances will include the legal authorities identified within the Tentative Order to the extent permitted by the Constitution should be included.

The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
1. Legal Authority Establishment and Enforcement

a.(2) – Control the contribution of pollutants in discharges of runoff associated with industrial and construction activity <u>in</u>to its MS4 and control the quality of runoff from industrial and construction sites[1] ~~including industrial and construction sites which have coverage under the statewide General Permit for Discharges of Storm Water Associated with Industrial Activities (Industrial General Permit) or General Permit for Discharges of Storm Water Associated with Construction Activities (Construction General Permit), as well as to those sites which do not~~

<u>[1] - The Copermittees will only be responsible for administering and enforcing the codes and ordinances applicable to their jurisdictions (i.e.; a municipality is not responsible for administering and/or enforcing a permit issued by the State of California).</u>

E. Jurisdictional Runoff Management Programs
1. Legal Authority Establishment and Enforcement
a.(10) Carry out all inspections, surveillance, and monitoring procedures necessary to determine compliance and noncompliance with its statutes, ordinances, permits, contracts, orders, or similar means and with the requirements of this Order, including the <u>effective</u> prohibition of illicit discharges and connections to its MS4. <u>The Copermittee's ordinance must include adequate legal authority, to the extent permitted by California and Federal Law and subject to the limitations on municipal action under the constitutions of California and the United States.</u> The Copermittee must also have authority to enter, monitor, inspect, take measurements, review and copy records, and require regular reports from industrial facilities, including construction sites, discharging into its MS4.

26. Provision E (Entire Provision; Begins Page 64 of 120) – The Requirement For Third Party BMP Effectiveness Documentation Is Duplicative

The Tentative Order includes a provision that requires the Copermittees to demonstrate that they have the legal authority to require documentation on the effectiveness of BMPs. The County has concerns about this provision for the following reasons:

As it is currently written, this provision broadly applies to any aspect of the stormwater program where BMPs have been implemented – the result is that this provision sets up a process for the establishment of multiple third party monitoring programs and expenditure of a significant amount of funds to monitor the effectiveness of BMPs. If the desire is to document the effectiveness of certain types of BMPs, it would be much more effective and scientifically sound to establish special studies by entities qualified to conduct such sampling instead of requiring potentially hundreds of third parties to conduct a monitoring program for every BMP that is implemented.

This provision is redundant with other requirements in the Tentative Order in that it ignores the fact that the New Development/Significant Redevelopment section of the Drainage Area Management Plan (DAMP) (Section 7.0) establishes a process for the selection, design, and long-term maintenance of permanent BMPs for new development and significant redevelopment projects and requires developers to select BMPs that have been demonstrated as effective for their project category. By going through a thorough process, the Copermittees have determined what BMPs would be effective for a particular project – thus eliminating the need to establish a monitoring program for every BMP implemented.

This provision ignores the fact that the Copermittees have already established legal authority for their development standards so that project proponents have to incorporate and implement the required BMPs.

The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
1. Legal Authority Establishment and Enforcement
~~a.(8) Require documentation on the effectiveness of BMPs implemented to prevent or reduce the discharge of pollutants in storm water from its MS4 to the MEP;~~

ILLICIT DISCHARGE DETECTION AND ELIMINATION

27. Provision E.2 (Page 65 of 120) – The Illicit Discharge Detection And Elimination Program Provisions Must Be Modified So As Not To Negate The Very Intent And Purpose Of The Watershed Approach And The Focus On The Highest Priorities Within Each Watershed Management Area

(See the corresponding comments under Provision E – Jurisdictional Runoff Management Programs)

The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
2. Illicit Discharge Detection and Elimination [Intro]
….The illicit discharge detection and elimination program must be implemented in accordance with the strategies identified in the Water Quality Improvement Plan ~~and include, at a minimum, the following requirements.~~ The requirements of the jurisdictional runoff management programs as outlined below may be modified and prioritized as appropriate for consistency with the highest water quality priorities and strategies as identified in the corresponding Water Quality improvement Plan(s).

Move Provision 2e, "Strategies to Address the Highest Priority Water Quality Conditions" to just after the Introduction to the section. This should become the new Provision 2.a.

E. Jurisdictional Runoff Management Programs
2. Illicit Discharge Detection and Elimination
a. Each Copermittee must describe in its jurisdictional runoff management program document the strategies and/or activities that will be implemented as part of the illicit discharge detection and elimination program to address ~~non-stormwater and~~ illicit discharges and connections that the Copermittee has identified as potential sources of pollutants and/or stressors that contribute to the highest priority water quality conditions in the Watershed Management Area as follows:

(1) *Provide specific details about how the strategies and/or activities will be implemented (e.g. designate ~~additional~~ BMPs, focus education, and/or increase/decrease frequency of inspections in specific areas); and*

(2) *The strategies and/or activities must be consistent with the requirements of Provisions E.2.a-d and the strategies identified in the Water Quality Improvement Plan.*

28. Provision E.2 (Page 65 of 120) – The Copermittees Should Be Allowed The Flexibility To Prioritize Their IDDE Program To Focus On Those Non-Stormwater Discharges That Are Likely To Be A Source Of Pollutants

Provision E.2.a identifies several categories of discharges that are to be considered "non-stormwater discharges." The categories that are considered to be non-stormwater discharges (do not need to be addressed as an illicit discharge) generally include the following:

- E.2.a.(1) - Those discharges which have coverage under a separate NPDES Permit;
- E.2.a.(2) - Those discharges which have coverage under a separate NPDES Permit
- E.2.a.(3) - Those discharges which are recognized within the federal regulations as acceptable unless they are identified as a source of pollutants to the receiving waters;
- E.2.a.(4) - Those discharges that are addressed by a set of requirements/BMPs; and
- E.2.a.(5) - Firefighting related discharges that are addressed by a set of requirements/BMPs.

In comparison, the Code of Federal Regulations [40CFR122.26(d)(2)(iv)(B)(1)] states that, as a part of an illicit discharge program, that the Copermittees shall incorporate a series of items including the following:

> A description of a program, including inspections, to implement and enforce an ordinance, orders or similar means to prevent illicit discharges to the municipal separate storm sewer system; this program description shall address all types of illicit discharges, <u>however the following category of non-storm water discharges or flows shall be addressed where such discharges are identified by the municipality as sources of pollutants to waters of the United States</u>: [Emphasis added and items re-ordered based on Tentative Order (TO) structure]
>
> - landscape irrigation, [not included in TO]
> - irrigation water, [not included in TO]
> - lawn watering, [not included in TO]
> - street wash water [not included in TO]
> - *uncontaminated pumped ground water, [E.2.a.(1)]*
> - *foundation drains, [E.2.a.(3)]; [E.2.a.(1)]*
> - *water from crawl space pumps, [E.2.a.(1)]*
> - *footing drains, [E.2.a.(3)]; [E.2.a.(1)]*
> - water line flushing, [E.2.a.(2)]
> - diverted stream flows, [E.2.a.(3)]
> - rising ground waters, [E.2.a.(3)]
> - springs, [E.2.a.(3)]
> - uncontaminated ground water infiltration (as defined at 40 CFR 35.2005(20)) to separate storm sewers, [E.2.a.(3)]
> - flows from riparian habitats and wetlands, [E.2.a.(3)]
> - discharges from potable water sources, [E.2.a.(3)]
> - air conditioning condensation, [E.2.a.(4)]
> - individual residential car washing, [E.2.a.(4)]
> - dechlorinated swimming pool discharges, and [E.2.a.(4)]
>
> (program descriptions shall address discharges or flows from fire fighting [E.2.a.(5)] only where such discharges or flows are identified as significant sources of pollutants to waters of the United States);

Although the discharges listed within the Federal Regulations are generally considered to be "conditionally exempt" from the illicit discharge program (unless they are found to be sources of pollutants), the Regional Water Board has determined that the following categories of non-stormwater discharges

- uncontaminated pumped ground water, [E.2.a.(1)]
- foundation drains, [E.2.a.(3)]; [E.2.a.(1)]
- water from crawl space pumps, [E.2.a.(1)]
- footing drains, [E.2.a.(3)]; [E.2.a.(1)]

will be considered to be illicit discharges unless the discharge has coverage under the following two NPDES Permits:

1) NPDES Permit No. CAG919001 (Order No. R9-2007-0034)
General Waste Discharge Requirements for Discharges from Temporary Groundwater Extraction and Similar Waste Discharges to San Diego Bay, Tributaries Thereto Under Tidal Influence, and Storm Drains or Other Conveyance Systems and Tributary Thereto

- Groundwater Extraction defined as (I.A): Existing and proposed discharges of groundwater extraction waste to San Diego Bay from construction groundwater extraction, foundation groundwater extraction, and groundwater extraction related to groundwater remediation cleanup projects (collectively groundwater extraction):

  1. Result from similar operations (all involve extraction and discharge of groundwater);

  2. Are the same type of wastes (<u>all are groundwater containing or potentially containing petroleum hydrocarbons, solvents, or other pollutants</u>);

  3. Require similar effluent limitations for the protection of the beneficial uses of San Diego Bay;

  4. Require similar monitoring; <u>and</u>

  5. Are more appropriately regulated under a WDR rather than individual permits.

- Eligibility Criteria (I.C): This WDR is intended to cover <u>temporary discharges</u> of groundwater extraction wastes to San Diego Bay, and its tributaries under tidal influence, from groundwater extraction <u>due to construction and other groundwater extraction activities</u>.

2) NPDES Permit No. CAG919002 (Order No. R9-2008-002)
General Waste Discharge Requirements for Discharges from Groundwater Extraction and Similar Discharges to Surface Waters Within the San Diego Region Except for San Diego Bay

- Groundwater Extraction defined as (I.A): Existing and proposed discharges of groundwater extraction waste to surface waters within the San Diego Region from construction groundwater extraction, foundation groundwater extraction, and groundwater extraction related to groundwater remediation cleanup projects (collectively groundwater extraction):

  1. Result from similar operations (all involve extraction and discharge of groundwater);

  2. Are the same type of wastes (<u>all are groundwater containing or potentially containing petroleum hydrocarbons, solvents, or other pollutants</u>);

3. Require similar effluent limitations for the protection of the beneficial uses of San Diego Bay;

4. Require similar monitoring; and

5. Are more appropriately regulated under a general permit rather than individual permits.

- Eligibility Criteria (I.C): This WDR is intended to cover all discharges of groundwater extraction wastes to surface waters within the San Diego Region Except San Diego Bay from groundwater extraction due to construction and other groundwater extraction activities, regardless of volume.

However, the County would submit that it is unnecessary to move these discharges (uncontaminated pumped groundwater, foundation drains, water from crawl space pumps, and footing drains) from the E.2.a.(3) category to the E.2.a.(1) category and require them to obtain coverage under one of these two permits for the following reasons:

- There is no technical basis or demonstrated water quality concern that justifies the need for these discharges to obtain coverage under these permits;
- The two permits are clearly defined for groundwater extraction activities where there is groundwater containing or potentially containing petroleum hydrocarbons, solvents, or other pollutants (in fact, one of the categories of discharges required to obtain coverage is 'uncontaminated pumped groundwater');
- One of the permits is clearly defined for temporary discharges, not permanent discharges; and
- The categories of discharges are non-stormwater discharges that are generally not expected to be a source of pollutants to receiving waters.

The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
2. Illicit Discharge Detection and Elimination
a. Each Copermittee must address ~~all~~ non-storm water discharges as illicit discharges, where the likelihood exists that they are a source of pollutants to the waters of the state, unless the ~~a non-storm water~~ discharge is either identified as a discharge authorized by a separate NPDES permit, or identified as a category of non-storm water discharges or flows that must be addressed pursuant to the following requirements:

Delete Provision 2.a.(1)

Add the following categories from Provision 2.a.(1) to the list of allowable non-stormwater discharges listed in Provision 2.a.(3):

- *Uncontaminated pumped ground water*
- *Discharges from foundation drains*
- *Water from crawl space pumps*
- *Water from footing drains*

E. Jurisdictional Runoff Management Programs
2. Illicit Discharge Detection and Elimination
a.(4) Discharges of non-storm water <u>in</u>to the MS4 from the following categories must be controlled by the requirements given below through statute, ordinance, permit, contract, order, or similar means<u>, where there is evidence that those discharges are a source of pollutants to waters of the state</u>. Discharges of non-storm water <u>in</u>to the MS4 from the following categories not controlled by the requirements given below through statute, ordinance, permit, contract, order, or similar means must be addressed by the Copermittee as illicit discharges.

29. Provision E.2.a (Page 65 of 120) – The Fire Fighting BMP Provisions Should Reflect The Language Included In The Current Orange County Permit

Provision E.2.a includes a requirement for the Copermittees to establish BMPs for both emergency and non-emergency firefighting activities. While the Copermittees already have established guidelines for non-emergency firefighting activities, it is unclear why the approach and language in the Tentative Order regarding the emergency firefighting activities has been modified from Order R9-2009-0002. In fact, the language in the Tentative Order is actually inconsistent with the Phase I Final Rule (55 FR 48037), which stated

"In the case of fire fighting <u>it is not the intention of these rules to prohibit in any circumstances</u> the protection of life and public and private property through the use of water or other fire retardants that flow into separate storm sewers." [Emphasis added]

Thus, as stated above, there should <u>not</u> be a circumstance in which the Copermittees or San Diego Water Board would identify emergency firefighting discharges as illicit discharges or a significant source of pollutants to receiving waters. The language previously adopted by the San Diego Regional Board in Order R9-2009-0002 regarding emergency firefighting discharges is recommended.

The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
2. Illicit Discharge Detection and Elimination
a. Non-Storm Water Discharges
(5) Firefighting discharges to the MS4 must <u>continue to</u> be addressed by the Copermittee<u>s</u> ~~as illicit discharges only if the Copermittee or the San Diego Water Board identifies the discharge as a significant source of pollutants to receiving waters. Firefighting discharges to the MS4 not identified as a significant source of pollutants to receiving waters, must be addressed, at a minimum,~~ as follows:

(a) Non-emergency firefighting discharges

(i) *Building fire suppression system maintenance discharges (e.g. sprinkler line flushing) to the MS4 must be addressed as illicit discharges.*

(ii) *Non-emergency firefighting discharges (i.e., discharges from controlled or practice blazes, firefighting training, and maintenance activities not associated with building fire suppression systems) must be addressed by a program, to be developed and implemented by the Copermittee, <u>in conjunction with the local Fire Authority/District,</u> to reduce or eliminate pollutants in such discharges from entering the MS4.*

(b) *Emergency firefighting discharges* *(i.e., flows necessary for the protection of life or property) do not require BMPs and need not be prohibited.*

~~*Each Copermittee should develop and encourage implementation of BMPs to reduce or eliminate pollutants in emergency firefighting discharges to the MS4s and receiving waters within its jurisdiction. During emergency situations, priority of efforts should be directed toward life, property, and the environment (in descending order). BMPs should not interfere with immediate emergency response operations or impact public health and safety.*~~

30. Provision E (Entire Provision; Begins Page 64 of 120) – The Tentative Order Should Not Require the Reduction Or Elimination Of All Non-Stormwater Discharges As A Part Of The IDDE Program

Provision E.2.a and E.2.a.(7) require the Copermittees to, as a part of their IDDE program, to address all non-stormwater discharges as illicit discharges, and thus Copermittees must "reduce or eliminate non-stormwater discharges" whether or not the discharges have been identified as illicit discharges.

The rationale within the Fact Sheet states that "Provision E.2.a.(7) is consistent with the requirements of the CWA section 402(p)(3)(B)(ii) and 40CFR 122.26(d)(1)(v)(B)." That, in fact, is not the case. Clean Water Act Section 402(p)(3)(B)(ii) states that the MS4 stormwater permits "shall include a requirement to effectively prohibit non-stormwater discharges into the storm sewers" (emphasis added). Federal regulations include two provisions designed to begin implementation of the "effective prohibition."[46] The first provision requires Copermittees to perform a screening analysis, intended to provide sufficient information to develop priorities for a program to detect and remove illicit discharges[47]. The second provision requires Copermittees to develop a recommended site-specific management plan to detect and remove illicit discharges (or ensure they are covered by an NPDES permit) and to control improper disposal to MS4s.[48] Therefore, Provision E.2.a and E.2.a(7) misapply federal regulations in that Copermittees are required to identify the non-stormwater discharge as an illicit discharge prior to having an obligation to effectively prohibit it. There is not a presumption to reduce or eliminate it otherwise.

> The Code of Federal Regulations 122.26(d)(1)(v)(B) states "A description of the existing program to identify illicit connections to the municipal storm sewer system. The description should include inspection procedures and methods for detecting and preventing illicit discharges, and describe areas where this program has been implemented."

The provision and rationale within the Fact Sheet blur the lines between the need of the Copermittees to "effectively" prohibit non-stormwater discharges and detect and eliminate illicit discharges.

- The requirement is "effectively prohibit" non-stormwater discharges, not "reduce or eliminate" non-stormwater discharges (this is already addressed in Provision A).
- Although the Copermittees are required to have a program to prevent illicit discharges to the MS4, non-stormwater discharges should only be addressed as illicit discharges

[46] 55 Fed. Reg. 47989, 48037 (Nov. 16, 1990).
[47] 40 CFR 122.26(d)(1)(iv)(D).
[48] 40 CFR 122.26(d)(1)(iv)(D) and 122.26(d)(2)(B).

where such discharges are identified as sources of pollutants that may cause or contribute to an exceedance of a water quality objective.

- The IDDE program is established to detect and eliminate "illicit discharges", not non-stormwater discharges in general.

In order to clarify the requirements the following modifications to Provision E.2, which expressly address the Illicit Discharge Detection and Elimination Program are requested.

The County recommends the following language changes:

A. Prohibitions and Limitations
1. Discharge Prohibitions
b. Non-storm water discharges into MS4s are to be effectively prohibited, unless such discharges are either authorized by a separate NPDES permit, or the discharge is a category of non-storm water discharges ~~or flows~~ that must be addressed pursuant to Provisions E.2.a.(1)-(5) of this Order.

E. Jurisdictional Runoff Management Programs
2. Illicit Discharge Detection and Elimination
b. Non-Stormwater Discharges
Each Copermittee must address ~~all~~ non-storm water discharges as illicit discharges, where the likelihood exists that they are a source of pollutants to the waters of the state, unless the ~~a non-stormwater~~ discharge is either identified as a discharge authorized by a separate NPDES permit, or identified as a category of non-storm water discharges ~~or flows~~ that must be addressed pursuant to the following requirements:

E. Jurisdictional Runoff Management Programs
2. Illicit Discharge Detection and Elimination
a. Non-Storm Water Discharges
~~(7) Each Copermittee must, where feasible, reduce or eliminate non-storm water discharges listed under Provisions E.2.a.(1)-(4) into its MS4 whether or not the non-storm water discharge has been identified as an illicit discharge, unless a non-storm water discharge is identified as a discharge authorized by a separate NPDES permit.~~

E. Jurisdictional Runoff Management Programs
2. Illicit Discharge Detection and Elimination
c. Field Screening
Each Copermittee must conduct field screening (i.e. visual observations, field testing, and/or analytical testing) of MS4 outfalls and other portions of its MS4 within its jurisdiction to detect ~~non-stormwater and~~ illicit discharges and connections to the MS4 in accordance with the dry weather MS4 outfall discharge monitoring requirements in Provisions D.2.a.(2) and D.2.b.(1).

E. Jurisdictional Runoff Management Programs
2. Illicit Discharge Detection and Elimination
d. Investigate and Eliminate Illicit Discharges and Connections
[Various – see the suggested changes in the redline of the Tentative Order]

DEVELOPMENT PLANNING

The Tentative Order's land development requirements are some of the most onerous requirements in the Tentative Order, and in many cases lack the necessary technical and legal foundation for adoption. Many of the land development requirements, particularly hydromodification controls, pose federal constitutional issues as well as conflict with the CWA, the State Administrative Procedure Act, California Environmental Quality Act (CEQA), the Mitigation Fee Act and federal court decisions such as the recent U.S. District Court case, *Virginia Dept. of Transportation v. EPA*[49] (holding that EPA has no authority to regulate non-pollutants).

The following discussion examines the overarching legal concerns with the land development requirements, and is followed by specific technical analyses for individual requirements.

A. Land Development Requirements Expose the Copermittees to Significant Litigation Risk And Will Be Largely Unenforceable

Many of the land development requirements, such as hydromodification, pose constitutional issues either exposing municipalities to litigation and/or will result in municipalities being unable and unwilling to implement such requirements. Specifically, but not limited to, Orange County is most concerned with the provisions: 1) requiring Copermittees to compel development projects that have no impact on hydromodification to implement on-site or alternative compliance hydromodification mitigation measures, 2) using pre-development (naturally occurring) runoff reference condition as applied to sites that are, in fact, developed, and 3) stream, channel, and habitat restoration.

Orange County is concerned that implementing these types of requirements would subject the Copermittees to liability under the takings clauses of the U.S. and California Constitutions and the Mitigation Fee Act because of the questionable nexus between a project's impacts on hydromodification and the hydromodification management measures in the Tentative Order. When imposing a condition on a development permit, a local government is required under federal and state constitutions to establish that the condition bears a reasonable relationship to the impacts of the project. This rule applies evenly to legislatively enacted requirements and impact fees or exactions.[50] Moreover, fees imposed on a discretionary ad-hoc basis are subject to heightened scrutiny under a two-part test. First, local governments must show that there is a substantial relationship between the burden created by the impact of development and any fee or exaction[51]. Second, a project's impacts must bear a rough proportionality to any development fee or exaction.[52] Under California law, the *Nollan/Dolan* heightened scrutiny test also applies to in-lieu fees.[53]

The Legislature has memorialized these requirements in the Mitigation Fee Act, which establishes procedures that local governments must follow to impose impact fees.[54] Irrespective of whether the hydromodification management requirements are implemented by

[49] Virginia Dept. of Transportation v. EPA, No. 1:12-CV-775, slip op. (E.D. Va. Jan. 3, 2013).
[50] *Building Ass'n Industry v. City of Patterson*, 171 Cal. App. 4th 886, 898 (2009).
[51] *Nollan v. Calif. Coastal Comm'n*, 483 U.S. 825, 837 (1987).
[52] *Dolan v. City of Tigard*, 512 U.S. 374, 391 (1994).
[53] *Ehrlich v. City of Culver City*, 12 Cal. 4th 854, 876 (1996).
[54] Gov't Code secs. 66000-66025.

legislative act or on an ad-hoc basis, the Copermittees attempt to enforce them as proposed in the Tentative Order will likely result in claims alleging unconstitutional takings of private property and violations of the Mitigation Fee Act. This is because a developer could argue that limiting hydromodification impacts of already developed property to its naturally occurring state, or requiring hydromodification mitigation measures for impacts not imposed by the project, would not have a legally sufficient nexus to the impact of the development project.

Additionally, CEQA does not allow a local government discretionary approval to require over-mitigation of a project. The CEQA Guidelines provide that "a lead agency for a project has the authority to require feasible changes in any or all activities involved in the project in order to substantially lessen or avoid significant effects on the environment, consistent with applicable constitutional requirements such as the 'nexus' and 'rough proportionality' standards established by case law."[55] Thus, Copermittees would most assuredly be exposed to CEQA challenges, which are the most prevalent lawsuits against projects.

In all likelihood, municipalities will not risk constitutional challenges and the high litigation costs of such challenges, but will instead exempt projects from certain requirements or limit their applicability based on documented technical and legal reasons. Such actions then would only be addressed through a Regional Board audit years after a project has been approved and developed. Therefore, predevelopment runoff reference conditions and stream, channel and habitat restoration requirements should be eliminated in their entirety.

B. Stream, Channel and Habitat Restoration Cannot Be Required Due to Conflicts with Federal and State Laws

The Tentative Order requires stream, channel and habitat restoration and/or retrofitting depending on certain land development projects. The prior analysis above discussed the litigation risk to which municipalities will be exposed. The following discussion focuses on the direct conflicts with federal and state laws that also prohibit such requirements.

The objective of the CWA is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters.[56] In carrying out this objective, Section 402(p) requires municipalities to reduce the discharge of pollutants from the MS4 to the MEP standard. The Tentative Order, however, goes well beyond the Congressional intent of the CWA to only address pollutants by requiring both Copermittees and the property owners to restore and/or retrofit streams, channels and habitat, with no technical evidence as to how this will reduce the discharge of pollutants to MEP or under what legal authority these requirements can be imposed.

Not only do such requirements go beyond MEP, but go beyond the scope of the CWA's focus on pollutant reduction. First, there is no evidence in the Order for how restoration requirements reduce pollutants from leaving the MS4. Second, in a recent decision in the Eastern District of Virginia, a federal court has held that the EPA has no authority under the Clean Water Act to regulate non-pollutants.[57] Restoration as described in the Tentative Order does not regulate pollutants directly, but requires costly over-mitigation by project proponents to do more than address pollutants by restoring streams, channels and habitat to a subjective, predevelopment

[55] Cal. Code Regs. Tit. 14, sec. 15041 (citing *Nollan/Dolan*).
[56] CWA 101(a).
[57] *Virginia Dept. of Transportation v. EPA*, No. 1:12-CV-775, slip op. (E.D. Va. Jan. 3, 2013).

standard. Essentially, the Tentative Order uses restoration as a surrogate for pollutants, and tries to unlawfully regulate the flow of water and not pollutants themselves.

Under state law, the Orange County Flood Control District has been delegated authority by the Legislature to construct lengthy networks of channels and infrastructure for flood control purposes. Under this authority, the Flood Control District has exclusive authority to control the flow of water in these channels. Although the State and Regional Boards may have some ability to impose conditions that impact volumetric flows (which is now called into question by the 4th District court case), this authority does not extend to NPDES permits.[58] Returning channels to natural conditions impinges on municipal flood control authority as removing concrete and performing other restoration efforts would alter the flow of water in those channels.

Engineered channels serve the public health and safety through flood control protection. A significant portion of Orange County lies in a flood plain whereby property owners are required to carry flood insurance. Concrete channels are used to better control the flow of water and minimize flooding and reduce insurance premiums. State courts have long recognized that residents living near flood control improvements have a right to rely on the current standards of a particular channel to protect against flooding.[59] Restoring a stream or channel to a natural state would not ensure against flooding as engineering is used to ensure that stormwater is controlled to certain patterns. Many developments are built up to flood control channels, and thus, restoration would expose residents to threats of flood, potential property damage and loss of life and expose municipalities to claims of inverse condemnation and other torts based on relied upon flood control protections by the public. Restoration in some cases would also require use of eminent domain authority, which the State cannot require municipalities to exercise.

31. Provision E.3 (Page 73 of 120) – The Development Planning Provisions Must Be Modified So As Not To Negate The Very Intent And Purpose Of The Watershed Approach And The Focus On The Highest Priorities Within Each Watershed Management Area

(See the corresponding comments under Provision E – Jurisdictional Runoff Management Programs)

The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
3. Development Planning [Intro]
Each Copermittee must use their land use and planning authorities to implement a development planning program in accordance with the strategies identified in the Water Quality Improvement Plan ~~and include, at a minimum, the following requirements.~~ <u>The requirements of the jurisdictional runoff management programs as outlined below may be modified and prioritized as appropriate for consistency with the highest water quality priorities and strategies as identified in the corresponding Water Quality improvement Plan(s).</u>

[58] *S.D. Warren Co. v. Me. Bd. of Envtl. Prot.*, 547 U.S. 370 (2006); *PUD No.1 v. Washington Dep't of Ecology*, 511 U.S. 700 (1994).
[59] *Arreola v. County of Monterey*, 99 Cal.App.4th 722 (2002).

Move Provision 3g, "Strategies to Address the Highest Priority Water Quality Conditions" to just after the Introduction to the section and before Provision 3.a.

(1) *Provide specific details about how the strategies and/or activities will be implemented (e.g. designate ~~additional~~ BMPs, focus education, increase frequency of verifications and/or inspections, alternative compliance options);*

32. Provision E.3 (Page 73 of 120) – Clarifying Language For Applying The PDP Requirements For A New Development Project Feature Is Confusing And Should Be Removed

In E.3.b.(1)(a) the Regional Board staff attempts to provide clarifying language which we believe actually makes for more confusion. The purpose of this provision is to state that Priority Development Projects are defined in E.3.b(2). In E.3.b(2) further clarification is provided regarding what is parts of a project are subject to the new development standards. The language provided in E.3.b(1)(a) starting with "where a new …. Requirement" does not add clarification and instead may be construed to be in conflict with E.3.b(2).

The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
3. Development Planning
b. Priority Development Projects
(1) Definition of Priority Development Project
(a) All new development projects that fall under the Priority Development Project categories listed under Provision E.3.b.(2)~~. Where a new development project feature, such as a parking lot, falls into a Priority Development Project category, the entire project footprint is subject to Priority Development Project requirements~~; and

33. Provision E.3 (Page 73 of 120) – Portions Of Redevelopment Projects That Already Have Water Quality Treatment BMPs Should Not Be Subject To The New PDP Requirements

Some redevelopment projects already have portions of the project that were subject to previous permit PDP requirements. These portions of redevelopment that were subject to prior PDP requirements should not be subject to the new PDP requirements as these projects already have water quality treatment. Such an approach is consistent with the Los Angeles and Ventura MS4 permits.

The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
3. Development Planning
b. Priority Development Projects
(1) Definition of Priority Development Project
(b) Those redevelopment projects that create, add, or replace at least 5,000 square feet of impervious surfaces on an already developed site, or the redevelopment project is a Priority Development Project category listed under Provision E.3.b.(2). Where redevelopment results in an increase of less than fifty percent of the impervious surfaces of a previously existing development, and the existing development was not subject to Priority Development Project

requirements, the performance requirements of Provisions E.3.c.(1) and E.3.c.(2) apply only to the addition or replacement, and not to the entire development.
Where redevelopment results in an increase of more than fifty percent of the impervious surfaces of a previously existing development, <u>and was not subject to previous Priority Project Development requirements</u>, the performance requirements of Provisions E.3.c.(1) and E.3.c.(2) apply to the entire development.

34. Provision E.3.b.2 (Page 76 of 120) – Residential Driveways Should Not Be Subject To The PDP Requirements

Section E.3.b.2.g triggers PDP requirements for development and redevelopment of streets, roads, highways, freeways, and residential driveways over 5,000 square feet. This requirement was present in the prior permit; however, the residential driveways requirement was added under the Tentative Order and will require additional Copermittee effort for treatment control and structural Low Impact Development (LID) BMP inventory, inspections, and maintenance verification and may have potential enforcement issues. The Regional Board has not provided sound technical basis for this provision as there is no evidence provided in the fact sheet that the cumulative impact of residential driveways would be significant and that residential driveways are a significant source of pollutants. Additionally vehicles should be defined as internal combustion vehicles since internal combustion vehicles are the source of pollutants this section is developed for.

The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
3. Development Planning
b. Priority Development Projects
(2) Priority Development Project Categories
(g) Streets, roads, highways, <u>and</u> freeways~~, and residential driveways~~. This category is defined as any paved impervious surface that is 5,000 square feet or more used for the transportation of automobiles, trucks, motorcycles, and other <u>internal combustion</u> vehicles.

35. Provision E.3 (Page 73 of 120) – All Municipal Roadway Projects Should Only Be Subject To The USEPA Guidance Regarding Managing Wet Weather With Green Infrastructure: Green Streets

The Ventura County NPDES MS4 Permit, the Santa Ana Region permits for Orange County, San Bernardino County, and Riverside County, and the Greater Los Angeles MS4 Permit provide that streets, roads, and highways follow US EPA guidance regarding *Managing Wet Weather with Green Infrastructure: Green Streets to the maximum extent practicable*. This document is recognized nationwide as the standard for incorporation of LID techniques into roadway projects, which is why it was it is specified in the permits identified above. In April of 2007 the US EPA, National Association of Clean Water Agencies; Natural Resources Defense Council; the Low Impact Development Center; and the Association of State and Interstate Water Pollution Control Administrators signed the Green Infrastructure Statement of Intent. This statement of intent recognized the benefits of green infrastructure and laid the ground work for the development of the USEPA Green Infrastructure Action Strategy. One of the areas of study was the municipal roadways and the result of the study is the US EPA Green Streets Municipal Handbook. The Handbook provides guidance on green street design, different types of LID BMPs that are appropriate for municipal roadways, and implementation hurdles. The Handbook

was specifically developed for incorporating LID techniques into roadway projects as roadways are very different from traditional land development projects.
Roadways are different than other development projects as there are significant constraints to implementation of BMPs that need to be considered such as limited right-of-way, utilities, geotechnical and structural concerns, street trees, parking, and fire truck access among others. The US EPA guidance considers these constraints where the PDP requirements do not. Even in new roadways implementing hydromodification requirements can disturb a significant area of land which has its own environmental impacts including changing the natural hydrology which is antithetical to the LID approach.

In addition, retrofitting of existing alleys is infeasible. In accordance with the Streets & Highways Code, State Controller Gas Tax Expenditure Guidelines and several California Attorney General opinions, alleys are not considered "city streets" or "county highways," and are not certified to the State Controller for gas tax purposes as they do not serve as thoroughfares for the general public. Therefore, section 2150 of the Streets & Highways Code and other State laws prohibit municipalities from expending Road Funds on alleyway rehabilitation, and retrofitting of an alleyway would be an unlawful expenditure. In the case of private development where there is a clear nexus to alleyway improvement, a landowner adjacent to an alley could only be conditioned to retrofit that portion of alleyway in front of the property and could not be conditioned to retrofit an entire alleyway.

The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
3. Development Planning
b. Priority Development Projects
(3) Priority Development Project Exemptions
(b) Any impervious surface that is 5,000 square feet or more used for the transportation of automobiles, trucks, motorcycles, and other vehicles that follows the USEPA guidance regarding Managing Wet Weather with Green Infrastructure: Green Streets[1] to the MEP.

[1]:http://water.epa.gov/infrastructure/greeninfrastructure/index.cfm

~~Retrofitting of existing paved alleys, streets or roads that meet the following criteria:~~
~~(i) Must be two lanes or less; AND~~
~~(ii) Must be a retrofitting project implemented as part of an alternative compliance project option under Provision E.3.c.(3)(b)(v) to achieve the performance requirements of Provisions E.3.c.(1) and/or E.3.c.(2) for a Priority Development Project; AND~~
~~(iii) Designed and constructed in accordance with the USEPA Green Streets guidance.23~~

36. Provision E.3 (Page 73 of 120) – Exemptions From The Development Planning Requirements Should Be Provided For Certain Types Of Projects

An exemption for PDPs should be provided for driveways and parking lots constructed with permeable surfaces. This exemption is provided to sidewalks, bicycle lanes and trails and should also be provided to driveways and parking lots. The fact sheet identifies that "The exemptions have been provided as an incentive for the Copermittees to encourage and promote the implementation of LID design concepts and green infrastructure and building principles." Permeable surfaces qualify as an LID design concept, which should be recognized in the Tentative Order provisions for driveways and parking lots. The use of permeable surfaces

should be encouraged, which will be accomplished by providing an exemption for driveways and parking lots constructed with permeable surfaces.
The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
3. Development Planning
b. Priority Development Projects
(3) Priority Development Project Exemptions
(a) ~~New paved~~ Sidewalks, bicycle lanes, driveways, parking lots, or trails that meet the following criteria:
(i) Designed and constructed to direct storm water runoff to adjacent vegetated areas, or other non-erodible permeable areas; OR
(ii) Designed and constructed to be hydraulically disconnected from paved streets or roads; OR
(iii) Designed and constructed with permeable pavements or surfaces in accordance with USEPA Green Streets guidance.22

An exemption should also be provided to single family residential projects as single family residential projects should not be subject to PDP requirements as the PDP requirements would put an undue burden on single family residences where it has not been shown that they are significant source of pollutants. There is no technical justification or proof that single family residences are a significant source of pollutants identified in the fact sheet and thus should be provided an exemption. Furthermore the inclusion of the U.S. Green Building Council (USGCB) Leadership in Energy and Environmental Design (LEED) for Homes green building certification program in the Tentative Order is not appropriate as this program encompasses other environmental considerations besides surface water management which are outside the scope of a stormwater permit and outside the authority of the Regional Board. Since the Regional Board has not met the burden of proof that single family residential projects are a significant source of pollutants the exemption should be provided to all single family residential projects and not just in meeting the LEED certification which is inappropriate for the Regional Board to specify.

The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
3. Development Planning
b. Priority Development Projects
(3) Priority Development Project Exemptions
(c) Single-family residential projects that are not part of a larger development or proposed subdivision.

~~New single family residences that meet the following criteria:~~
~~(i) Must not be constructed as part of a larger development or proposed subdivision; AND~~
~~(ii) Designed and constructed to be certified under the U.S. Green Building Council (USGCB) Leadership in Energy and Environmental Design (LEED) for Homes green building certification program, receiving at least four (4) Surface Water Management credits under the Sustainable Sites category;24 OR~~
~~(iii) Designed and constructed with structural BMPs that will achieve the performance requirements of Provisions E.3.c.(1) and E.3.c.(2) onsite.~~
~~(d) Redevelopment of existing single family residences that meet the following criteria:~~

~~*(i) Designed and constructed to be certified under the USGCB LEED for Homes green building certification program, receiving at least four (4) Surface Water Management credits under the Sustainable Sites category; 25 OR*~~
~~*(ii) Designed and constructed with structural BMPs that will achieve the performance requirements of Provisions E.3.c.(1) and E.3.c.(2) onsite.*~~

An exemption should be added for the protection of persons and property, particularly as it applies to BMPs not being implemented in waters of the U.S. or state. This language is consistent with Cal. Water Code §13269(c)(1-2). Flood control projects are intended for the protection of public safety and property and are mandated by the Orange County Flood Control Act of 1927. Requiring flood control projects to implement BMPs which are intended for traditional types of development projects is inappropriate and in most cases infeasible. Furthermore requiring flood control projects to implement BMPs may cause flood control projects to be infeasible which in many cases will increase the risk of flooding. If flooding does occur in these areas it would increase the risk of pollutants discharging into receiving waters from the flooded areas. Stream restoration projects are also projects that should not be subject to the PDP requirements as they are projects intended to restore beneficial uses of receiving waters.

The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
3. Development Planning
b. Priority Development Projects
(3) Priority Development Project Exemptions
<u>(d)Flood control and stream restoration projects.</u>

An exemption for emergency public safety projects where a delay due to a Standard Stormwater Mitigation Plan (SSMP) would compromise public safety, public health and/or the environment is needed in the permit. Copermittees need an exemption where if public health or safety or environmental protection is threatened the project can proceed without a SSMP. Emergency projects are provided exempt status in many other MS4 permits including the recently adopted LA MS4 permit.

The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
3. Development Planning
b. Priority Development Projects
(3) Priority Development Project Exemptions
<u>(e) *Emergency public safety projects in any of the Priority Development Categories may be excluded if the delay caused due to the requirement for a SSMP compromises public safety, public health and/or environmental protection*</u>

37. Provision E.3.c (Page 78 of 120) – Flexibility Should Be Provided To The Structural BMP Performance Standards If Watershed-Specific Performance Standards Are Developed In The Water Quality Improvement Plans

Based on the watershed approach it is conceivable that the Water Quality Improvement Plans may identify that an alternate performance standard than the provisions in E.3.c. may be appropriate for certain watersheds. To fully realize the watershed approach the Copermittees should be given the opportunity to develop alternative BMP performance standards consistent with the goals and objectives developed in the Water Quality Improvement Plans.

The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
3. Development Planning
c. Priority Development Project Structural BMP Performance Requirements

In addition to the BMP requirements listed for all development projects under Provision E.3.a, Priority Development Projects must also implement structural BMPs that conform to performance requirements below. <u>If watershed-specific performance requirements are developed as part of a Water Quality Improvement Plan; these requirements would take precedence over the general performance requirements below. The watershed-specific requirement must provide at least equal protection as the general performance requirements below.</u>

38. Provision E.3 (Page 73 of 120) – Terminology Is Inconsistent Especially With The Use Of Low Impact Development BMPs And Should Be Modified

In Provision E.3.c. the Tentative Order specifies the requirements for structural BMPs. Furthermore in Provision E.3.c.(1) the concepts of onsite structural BMPs and LID BMPs are introduced. The County recommends that the Tentative Order be modified to provide more consistency in terminology. The County views LID as a strategy of BMPs that is used to mimic predevelopment water balance. (see Provision E.3.a(3)). Furthermore there is no single definition for LID BMPs that has gained widespread recognition. Although Attachment C includes a definition for LID BMPs, this definition is not widely accepted. LID is rather a concept (the attachment C definition does adequately capture this concept) made up of various non-structural and structural BMPs. While the onsite BMP requirements should be defined (e.g. retention of the 85% storm) the Tentative Order could be greatly simplified by avoiding multiple terms and uses. The County has provided suggested edits throughout the Development Planning provision to provide better consistency.

39. Provision E.3.c (Page 78 of 120) – The Retention Performance Standard Needs Clarification

Clarification is needed regarding both Section E.3.c.(1)(a)(i) and (ii). In Section E.3.c.(1)(a)(i) the section states “The volume of storm water produced…” where it should state “The volume of storm water <u>runoff</u> produced”. The Fact Sheet identifies that this design standard is consistent with the Fourth Term Permits for Orange County and Riverside County however in both of these permits the standard is identified “the volume of runoff produced from a from a 24-hour 85th percentile storm event”. The word “runoff” needs to be added to the Tentative Order. In Section E.3.c.(1)(a)(ii) the newly added language that provides an alternative method for calculating the design capture volume does not specify a storm threshold or range of storms for the alternative method for calculating the design capture volume. Clarification is needed to identify the threshold to be used and the County believes that the average annual volume of stormwater runoff is appropriate. Additionally flexibility should be provided as far as the technique to calculate this volume so that other methods besides continuous simulation should be accepted.

The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
3. Development Planning
c. Priority Development Project Structural BMP Performance Requirements
(1) Storm Water Pollutant Control BMP Requirements
(a) Each Priority Development Project must be required to implement LID BMPs that are designed to retain (i.e. intercept, store, infiltrate, evaporate, and evapotranspire) onsite the pollutants contained in the design capture volume. The design capture volume is equivalent to:
(i) The volume of storm water runoff produced from a 24-hour 85th percentile storm event; OR
(ii) The average annual volume of storm water runoff that would be retained onsite if the site was fully undeveloped and naturally vegetated, as determined using continuous simulation modeling or other techniques based on site-specific soil conditions and typical native vegetative cover.

40. Provision E.3.c (Page 78 of 120) – If Projects Use Alternative Compliance Conventional BMPs Should Not Be Also Required Onsite

Section E.3.c.(1)(c) requires that if projects use alternative compliance that conventional BMPs must also be implemented onsite. Although the Fact Sheet identifies that the intent of this provision is to reduce the pollutants onsite to the MEP there is not adequate technical justification for effectively requiring additional mitigation. This provision requires additional mitigation for projects and in effect requires double mitigation which goes well beyond the MEP standard that is referenced in the Fact Sheet. Providing mitigation offsite for the PDP requirements offsite in itself is adequate to meet the MEP standard.

The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
3. Development Planning
c. Priority Development Project Structural BMP Performance Requirements
(1) On-site Storm Water Pollutant Control Structural BMP Requirements
(c) If a Priority Development project is allowed to utilize alternative compliance pursuant to Provisions E.3.c.(1)(b), ~~flow-thru conventional treatment control BMPs must be implemented to treat the portion of the design capture volume that is not retained onsite. Additionally,~~ project applicants must mitigate for the portion of the pollutant load in the design capture volume that is not retained onsite through one or more alternative compliance options under Provision E.3.c.(3). If alternative compliance involves the use of ~~C~~conventional treatment control BMPs, those BMPs must be sized and designed to:

41. Provision E (Entire Provision; Begins Page 64 of 120) – The Hydromodification Management Requirements Should Be Based On A Watershed Management Approach, Be Consistent With The WQIPs, And Consider The Current Copermittee HMPs

Hydromodification management should be based on the conditions of receiving waters and on the impacts and potential impacts from development projects. The basis to make hydromodification management decisions needs to be an understanding of the watershed and receiving waters within a watershed. This understanding of a watershed is achieved through watershed analysis and analysis of the susceptibility of the receiving waters to hydromodification impacts. This approach of watershed analysis is identified in the Southern California Coastal Water Research Project (SCCWRP) Technical Report 667 – Hydromodification Assessment and Management in California **(Appendix A-2).** The SCCWRP report identifies that watershed analysis is the first step and most critical step in the development of watershed hydromodification management. The SCCWRP report, the authors of the SCCWRP report at the Hydromodification Management Meeting in August of 2012, and even State Water Resource Control Board (SWRCB) staff at the recent California Stormwater Quality Association (CASQA) General Meeting in San Francisco on January 10, 2012 identified that hydromodification management is not a one size fits all approach and needs to consider watershed analysis. The Tentative Order hydromodification requirements are however a one size fits all approach as the requirements do not allow consideration of watershed analysis or receiving water information.

The County believes the best way to implement the vision of the SCCWRP Report for development of effective hydromodification management is to develop clear hydromodification management objectives that are watershed specific and developed through a stakeholder process, which is consistent with the approach in the SCCWRP report. The intent of the WQIPs is to improve water quality in the WMAs based on the highest priorities for water quality in the watershed, however unless more is known about the watersheds and their receiving waters including their susceptibility to hydromodification then the appropriate standards and performance criteria cannot be identified to reach the goal of improving water quality. The WQIPs can build on the current Hydromodification Management Plans (HMPs) that have been developed and can use additional watershed and receiving water information to develop appropriate watershed specific hydromodification standards and where they should apply in a specific watershed. Instead of hydromodification requirements that do not consider specific watershed analysis and conditions of receiving waters and that were developed unilaterally by Regional Board staff the County suggests that watershed specific requirements be developed as part of the WQIPs as part of a watershed stakeholder process.

Matching pre-development (naturally occurring) flow rates and duration is identified as the performance standard for hydromodification management. Although it is not stated anywhere in the Tentative Order, it is assumed that the purpose of such a standard is to address the overall objective of the CWA (§101) - to restore the chemical, physical, and biological integrity of the Nation's waters in the Tentative Order's jurisdiction. However, the CWA does not imply or state that its objective is to restore waters to pre-Columbian (pre-development) conditions. Rather the objective must be taken in context of § 402(p) and reflect the stormwater compliance standard to reduce pollutants to the maximum extent practicable. When read in total the hydromodification standard should reflect the developed urban environment. To do otherwise would negate the engineering efforts done to date to protect life and property from floods and create an impractical solution for municipalities. Furthermore the current hydromodification standard as provided for in numerous municipal permits in California is to match post development with "pre-project" conditions. It is unclear to us how the San Diego Regional Board staff has redefined the MEP standard for hydromodification.

Hydromodification effects may also be caused from other sources that are not in the Copermittees' jurisdiction. Initial implementation of the pre-development (naturally occurring) hydromodification performance standard has identified that BMPs to comply with the standard are of significant size even for smaller projects. Implementing the hydromodification requirements can disturb a significant area of land which has its own environmental impacts including changing the natural hydrology which is antithetical to the LID concept. This can also cause a decrease in open space which may be of issue with the Orange County General Plan which requires certain thresholds of open space for developments. For the smaller redevelopment projects and infill projects it may just not be feasible, either physically or due to cost, to build these projects which will represent a lost opportunity to improve water quality through the implementation of the LID requirements.

Furthermore identifying "naturally occurring" conditions for redevelopment sites is difficult and entirely subjective, as in most cases there are no historical records of the natural condition of the site, and begs a technical question as to how far back does one go historically in determining the proper predevelopment timeframe. In cases where natural conditions of a site are not known the best approach is to use an undeveloped natural site in proximity to the re-development site as a reference site. The vegetative cover, soil type, and slope will most affect the hydrology of a site and so approximating these conditions for a re-development site using a natural reference site where these parameters can be measured is a way to approximate the natural conditions of a redevelopment site, however, locating a natural reference site in proximity to a redevelopment site is difficult, as the entire sub-watershed or watershed may be developed. Additionally the conditions of the natural reference site maybe totally different than the "naturally occurring" conditions of the re-development site as vegetative cover, soil type, and slope may have been very different and without historical records there is no way of knowing the actual ""naturally occurring" conditions of a re-development site. The subjectivity of the pre-development approach not only puts municipalities in a position to violate the U.S. and California Constitutions on unlawful takings, but it also conflicts with the Mitigation Fee Act, CEQA and the State Administrative Procedure Act in that the Tentative Order does not contain an adequate record justifying the reasonableness of this standard.

The County is therefore suggesting an approach to hydromodification management that is not a one size fits all approach, is consistent with the watershed approach and the intent of the WQIPs, considers the current Copermittee HMPs, and provides an opportunity to develop watershed specific requirements as part of a watershed stakeholder process that have the best chance of improving water quality.

The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
3. Development Planning
c. Priority Development Project Structural BMP Performance Requirements

(2) <u>On-site</u> Hydromodification Management <u>Structural</u> BMP Requirements

Each Copermittee must require each Priority Development Project to implement onsite structural BMPs to manage hydromodification <u>to ensure</u> that ~~may be caused~~ ~~by~~ storm water runoff discharged from a project <u>does not cause adverse hydromodification impacts in the downstream receiving waters.</u> ~~as follows:~~

The Copermittees in each Watershed Management Area may establish, as part of the WQIP, watershed specific requirements that will apply to priority development projects based on the susceptibility of the receiving waters to hydromodification impacts and historic receiving water changes from development. If watershed specific requirements are developed they will supersede requirements in the HMP. The watershed specific requirements must include the following:

(a) Post-project runoff flow rates and durations must not exceed ~~pre-development (naturally occurring)~~ the performance standard for runoff flow rates and durations to be determined as part of the development of the WQIPs for each Watershed Management Area by more than 10 percent (for the range of flows that result in increased potential for erosion, or degraded instream habitat conditions downstream of Priority Development Projects).

(i) In evaluating the range of flows that results in increased potential for erosion of natural (non-hardened) channels, the lower boundary must correspond with the critical channel flow that produces the critical shear stress that initiates channel bed movement or that erodes the toe of channel banks.

~~(ii) For artificially hardened channels, analysis to identify the lower boundary must use characteristics of a natural stream segment similar to that found in the watershed. The lower boundary must correspond with the critical channel flow that produces the critical shear stress that initiates channel bed movement or erodes the toe of the channel banks.~~

~~(iii)~~(ii) The Copermittees may use monitoring results collected pursuant to Provision D.1.a.(2) to re-define the range of flows resulting in increased potential for erosion, or degraded instream habitat conditions, as warranted by the data.

(b) Post-project runoff flow rates and durations must compensate for the loss of sediment supply due to the development project, should loss of sediment supply occur as a result of the development project.

(c) A Priority Development Project may be allowed to utilize alternative compliance under Provision E.3.c.(3) to comply with the performance requirements of Provisions E.3.c.(2)(a)-(b).

(d) Exemptions

Each Copermittee has the discretion to exempt a Priority Development Project from the hydromodification management BMP performance requirements of Provisions E.3.c.(2)(a)-(b) where the project:

(i) Discharges storm water runoff into existing underground storm drains discharging directly to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean;

(ii) Discharges storm water runoff into conveyance channels that are engineered for the capacity to convey the 10-year ultimate build out condition flow and are regularly maintained to ensure flow capacity all the way from the point of discharge to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.

(iii) Discharges to large rivers where large rivers are defined as reaches for which the contributing drainage area exceeds 100 square miles and with a 100-year design flow in excess of 20,000 cfs.

(iv) Discharges from infill redevelopment projects that meet criteria to be established in updates to the Copermittees' HMPs.

(v) Flood control and stream restoration projects.

~~(ii)~~(vi) Is a redevelopment Priority Development Project that meets the alternative compliance requirements of Provision E.3.c.(3)(b)(ii); or

~~(iii)~~(vii) Discharges storm water runoff into other areas identified by the San Diego Water Board as exempt from the requirements of Provisions E.3.c.(2)(a)-(b).

If the Copermittees in a Watershed Management Area select not to develop watershed specific requirements, development projects will be subject to the current Copermittee HMPs inclusive of the exemptions identified in Section E.3.c.(d)(2) that will integrated into updated Copermittee HMPs.

42. Provision E.3.c (Page 78 of 120) – Exemptions For Hydromodification Management Should Include Discharges To Certain Types Of Receiving Waters And Certain Types Of Projects

PDPs that discharge to conveyance channels that are engineered for the capacity to convey the 10-year ultimate build out condition flow and are regularly maintained to ensure flow capacity should be exempt from the hydromodification management requirements. This exemption is similar to the hardened conveyance system exemption, provided in the San Diego HMP and identified in Section D.1.g.(3) of the current San Diego MS4 Permit. Hydromodification requirements are not appropriate for discharges to channels that are designed to accept increased flows from upstream development, as the potential for erosion is non-existent. Studies[60] have shown that hydromodification is caused by the smaller storms up to the 10 year event. Based on these studies those engineered channels designed to convey the 10-year ultimate build out condition will therefore not experience hydromodification impacts. These channels were installed for the purpose of flood control and protection of public safety and property as historically flooding occurred where there is now development. The Permittees in Orange, Riverside and San Diego Counties hosted a workshop on hydromodification management on August 30, 2012. A panel of experts was convened to answer key questions regarding hydromodification to provide the Regional Board Permit team, Copermittee storm water program managers, non-governmental environmental organizations, and the development/business community with a greater understanding of the practice of hydromodification management in the urban watershed. One of the panel expert,s Chris Bowles, PhD, PE, whose qualifications include:

> Chris Bowles, PhD, PE is a registered civil engineer (CA P.E. C76898) specializing in hydraulics, hydrology, geomorphology, water resources, water quality and environmental

[60] *See* Leopold, L.B., M.G. Wolman, J.P. Miller. 1964. Fluvial Processes in Geomorphology. San Francisco, W.H. Freeman and Company. 522 pp. *and* MacRae, C.R. 1993. An Alternate Design Approach for the Control of Instream Erosion Potential in Urbanizing Watersheds. Sixth International Conference on Urban Storm Drainage, Niagara Falls, Ontario.

> restoration. He has over seventeen years of project management experience on a wide variety of large multi-disciplinary, multi-stakeholder projects such as floodplain restoration, sediment studies, watershed hydrology, water quality, river and wetland restoration in California, Nevada, Washington, Oregon, and Florida, and oversees, including projects in the UK and Central America. Thirteen of these years have been spent in practice in the US. His technical expertise spans the range of hydraulic and hydrologic modeling (HEC software and a wide variety of 1D, 2D and 3D hydraulic models), geomorphology, GIS and field data collection (topographic and bathymetric surveying, water quality monitoring, flow gauging and sediment transport measurements). Prior to specializing in environmental hydrology, Dr. Bowles worked initially as a land surveyor and latterly as a site construction supervisor. Dr. Bowles has a doctorate in computational fluid dynamics in the application of fluvial hydraulics and has constructed numerous 1-, 2-, and 3-dimensional hydrodynamic models over his 17 years of experience in environmental engineering.

stated that having to build a storage facility on site to retain stormwater when the site drains into a resilient channel is a "huge waste of money." Dr. Bowles stated that different approaches are needed for different situations (a copy of the video is available at the following link and is incorporated by reference: http://granicus.sandiego.gov/MediaPlayer.php?publish_id=1427 Dr. Bowles statement is at 4:06:24).[61]

Flood control channels cannot be removed as they serve the important and mandated service of flood control. It is also cost prohibitive to think that development can be removed from the floodplain so that these flood control channels could be removed and returned to a natural state. Since removal of these channels is infeasible restoration of these channels to a natural state is also infeasible. In many cases the historic path of the channel went right through where existing development is now and therefore there is no hope of restoration of the channel to its natural state. Since there is no potential for restoration to a natural state and because these channels are designed to be flood control channels they should be allowed to convey the storm events they are designed for. Since there is no potential for removal of these channels there is no environmental benefit to requiring onsite mitigation of hydromodification when these channels are designed and engineered to accept these flows. Although this comment here applies to the hydromodification requirement the County would like to point out that LID concepts will be implemented consistent with the Tentative Order requirements and will have a mitigating effect on hydromodification impacts. Thus between the fact that implementing hydromodification controls on discharges to engineered channel will have no effect on the channel and that LID concepts will be implemented to address the smaller storms there is justification for creating an exemption for discharges to engineered channels.

The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
3. Development Planning
c. Priority Development Project Structural BMP Performance Requirements
(2) Hydromodification Management BMP Requirements
(d) Exemptions

[61] Video Presentation of August 30, 2012 Hydromodification Management Workshop: http://granicus.sandiego.gov/MediaPlayer.php?publish_id=1427

(ii) *Discharges storm water runoff into conveyance channels that are engineered for the capacity to convey the 10-year ultimate build out condition flow and are regularly maintained to ensure flow capacity all the way from the point of discharge to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean;"*

Based on this proposed exemption the County recommends deleting section E.3.c.(2)(a)(ii):

E. Jurisdictional Runoff Management Programs
3. Development Planning
c. Priority Development Project Structural BMP Performance Requirements
(2) Hydromodification Management BMP Requirements
(a)
~~*(ii) For artificially hardened channels, analysis to identify the lower boundary must use characteristics of a natural stream segment similar to that found in the watershed. The lower boundary must correspond with the critical channel flow that produces the critical shear stress that initiates channel bed movement or erodes the toe of the channel banks.*~~

The San Diego and South Orange County HMPs identified that cumulative watershed impacts are minimal in stream reaches of large depositional rivers. Analysis in the San Diego HMP demonstrated that the effects of cumulative watershed impacts are minimal in those reaches which the drainage area exceeds 100 square miles and with a 100-year design flow in excess of 20,000 cubic feet per second (cfs). An exemption for those reaches that meet these criteria should be included in the exemption provisions of the Tentative Order.

The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
3. Development Planning
c. Priority Development Project Structural BMP Performance Requirements
(2) Hydromodification Management BMP Requirements
(d) Exemptions
(iii) *Discharges to large rivers where large rivers are defined as reaches for which the contributing drainage area exceeds 100 square miles and with a 100-year design flow in excess of 20,000 cfs.*

Infill redevelopment projects offer an opportunity for improvement in water quality. Due to the usual tight constraints and limited footprint of infill development projects implementing onsite hydromodification controls is often infeasible. In many cases projects will not be able to meet the hydromodification criteria and so will choose "greenfield" developments where meeting hydromodification criteria are more feasible. To encourage infill development over "urban sprawl" and "greenfield" development, a hydromodification exemption should be provided for infill development projects. This will also provide the benefit of improving water quality as the water quality/LID requirements will still be required to be met. Over time, infill redevelopment projects will address the significant issue of improving water quality from existing development. Without this exemption redevelopment for infill projects will likely not occur as implementing onsite hydromodification will just be too expensive for these types of projects and so the benefits meeting the water quality/LID requirements will not be realized at these sites. Criteria for what projects qualify for the infill development exemption shall be developed by each of the Copermittees as part of updates to their HMPs.

An exemption for infill redevelopment projects comports with a current EPA study that demonstrates the significant environmental benefits that can be attained from infill. *Residential Construction Trends in America's Metropolitan Regions: 2012 Edition*.[62] The lack of an exemption and rigid infill requirements would then be contrary to EPA's support for such projects.

Additionally, the lack of an infill exemption conflicts with State housing element law,[63] guidelines set forth by the California Department of Housing and Community Development and achievement with Regional Housing Needs Assessment (RHNA) numbers issued by the Southern California Area of Governments (SCAG), which require municipalities to quantify and meet their low income housing needs. Infill development is the only means by which affordable housing projects are built. Affordable units cannot be offered at market rates and are heavily subsidized. The lack of an exemption will make it increasingly difficult to construct affordable units due to increased costs, and will likely inhibit municipalities from meeting their RHNA obligations for low income housing. This will have the further effect of making local zoning actions inconsistent with municipal general plans, which may subject municipalities to lawsuits preventing the issuance of building permits.[64]

The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
3. Development Planning
c. Priority Development Project Structural BMP Performance Requirements
(2) Hydromodification Management BMP Requirements
(d) Exemptions
<u>(iv) *Discharges from infill redevelopment projects that meet criteria to be established in updates to the Copermittees' HMPs.*</u>

Flood control projects are intended for the protection of public safety and property and are mandated by the Orange County Flood Control Act of 1927. Requiring flood control projects to implement hydromodification controls intended for traditional types of development projects is inappropriate and in most cases infeasible. Furthermore requiring flood control projects to implement hydromodification controls may cause flood control projects to be infeasible which may increase the risk of flooding. If flooding does occur in these areas it would increase the risk of hydromodification impacts to receiving waters from the flooded areas. In-stream restoration projects are designed to restore beneficial use of streams and channels. These projects also serve as a potential option for restoring impacts from hydromodification. It is counterproductive to require mitigation of a stream restoration project.

The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
3. Development Planning
c. Priority Development Project Structural BMP Performance Requirements

[62] EPA Study Available at: http://www.epa.gov/smartgrowth/construction_trends.htm
[63] Gov't Code §§ 65580 et seq.
[64] *Urban Habitat Program v. City of Pleasonton*, No. RG06—293831, Alameda Sup. Ct. (March 12, 2010) (unpublished trial court decision ordering city to cease issuing building permits due to non-compliance with housing element law); *see generally Garat v. City of Riverside*, 2 Cal. App. 4th 259, 286 (1991); *Citizens of Goleta Valley v Board of Supervisors*, 52 Cal. 3d 553, 570 (1990).

(2) Hydromodification Management BMP Requirements
(d) Exemptions
(v) Flood control and stream restoration projects.

43. Provision E.3.c (Page 78 of 120) – Biofiltration BMPs Should Be Sized For The Design Capture Volume And If Used For Alternative Compliance Conventional BMPs Should Not Also Be Required

Section E.3.c.(3)(b)(i)[c] requires that if biofiltration is used as an alternative compliance method the biofiltration BMP is required to be sized to 1.5 times the design capture volume, which is an increase from the existing Orange County permit. The Fact Sheet provides no technical justification for the 1.5 factor.

Studies based on work conducted within Orange County by Geosyntec Consultants provide contrary information to the unsupported subjective inclusion of a 1.5 factor. The following documents are submitted for the record [**Appendix A-3 & Appendix A-4**].

Storage and Reuse Systems for Stormwater Management – Preliminary Cost and Performance Estimates for Residential Use in Irvine, CA, Eric Strecker (2009 presentation to Santa Ana Regional Board). Assessed the costs and modeled the performance of harvest and use retention BMPs and compared average annual total suspended solids (TSS) load removed and annual TSS concentrations with BMPs. In both scenarios presented, biofiltration provided superior TSS results to harvest and use.

The Water Report Issue #65: Stormwater Retention on Site, An Analysis of Feasibility and Desirability,[65] The paper identified significant limitations with all retention BMPs and states that "There needs to be a more technical vetting of "retain on site" and stormwater harvest and use before these approaches are made mandatory." The authors also caution that a "one size fits all" approach requiring retention may not be desirable and "in many cases would lead to undesirable results."

Based on the above information, the requirement to oversize biofiltration BMPs should be deleted from the Tentative Order. Biofiltration should be considered equivalent to other retention BMPs and should remain a full part of the LID toolbox without penalization.

Section E.3.c.(3)(b)(i)[d] requires that PDPs that use biofiltration as an alternative compliance option must also implement conventional BMPs. This provision requires additional mitigation for projects and in effect requires double mitigation when it is not needed. Biofiltration BMPs are more effective than conventional BMPs and requiring both does not make any technical sense and this goes well beyond the MEP standard. Furthermore the Fact Sheet provides no technical justification for requiring conventional treatment in addition to biofiltration and this is not the standard in the current Orange County and Riverside permits nor any other permits in California.

The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
3. Development Planning

[65] Strecker and Poresky (2009) (reproduced with permission of The Water Report).

c. Priority Development Project Structural BMP Performance Requirements
(3) Alternative Compliance to Onsite Structural BMP Performance Requirements
(b) Alternative Compliance Project Options
(i) Onsite LID Biofiltration Treatment Control BMPs
~~[c] Biofilter at least 1.5 times the design capture volume that is not reliably retained onsite; OR~~
[~~d~~c]Biofilter up to the design capture volume that is not reliably retained onsite, ~~AND 1) treat the remaining portion of the design capture volume not retained onsite with conventional treatment control BMPs in accordance with Provision E.3.c.(1)(c),~~ and ~~2)~~ if necessary, mitigate for the portion of the pollutant load in the design capture volume not retained onsite through one or more alternative compliance project, in-lieu fee and/or water quality credit system options below.

44. Provision E.3.c (Page 78 of 120) – USGBC LEED Certification Is Not An Appropriate Standard In A Stormwater Permit

Provision E.3.c.(3)(b)(ii) allows redevelopment projects to comply with the hydromodification management requirements by achieving LEED Certification. As previously noted inclusion of the USGCB LEED for Homes green building certification program in the Tentative Order is not appropriate as this program encompasses other environmental considerations besides surface water management which are outside the scope of a stormwater permit and outside the authority of the Regional Board.

The County recommends that provision E.3.c.(3)(B)(ii) be deleted from the Tentative Order.

E. Jurisdictional Runoff Management Programs
3. Development Planning
c. Priority Development Project Structural BMP Performance Requirements
(3) Alternative Compliance to Onsite Structural BMP Performance Requirements
(b) Alternative Compliance Project Options
~~(ii) LEED Certified Redevelopment Projects~~
~~The Copermittee may allow redevelopment Priority Development Projects to comply with the hydromodification management BMP performance requirements of Provision E.3.c.(2) where the project is designed and constructed to be certified under the USGCB LEED for New Construction and Major Renovations green building certification program. The Priority Development Project must receive at least one (1) Site Design credit and two (2) Stormwater Design credits under the Sustainable Sites category. In addition, the existing and future configuration of the receiving water must not be unnaturally altered or adversely impacted by storm water flow rates and durations discharged from the site.~~

45. Provision E.3.c (Page 78 of 120) – Offsite Regional BMPs Should Be Sized For The Design Capture Volume

Provision E.3.c.(3)(b)(iv)[a] requires that if an offsite regional BMP is used as an alternative compliance method the offsite regional BMP is required to be sized to 1.1 times the design capture volume, which is an increase from the existing Orange County permit. The Fact Sheet provides no technical justification for the 1.1 factor and so the 1.1 factor should be removed and offsite regional BMPs should only be sized for the design capture volume.

The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
3. Development Planning
c. Priority Development Project Structural BMP Performance Requirements
(3) Alternative Compliance to Onsite Structural BMP Performance Requirements
(b) Alternative Compliance Project Options
(iv)Offsite Regional BMPs
[a] The Copermittee may allow Priority Development Projects to utilize offsite regional BMPs to comply with the storm water pollutant control BMP performance requirements of Provision E.3.c.(1) if the offsite regional BMPs have the capacity to receive and retain ~~at least 1.1 times~~ the design capture volume that is not reliably retained onsite.

46. Provision E.3.c (Page 78 of 120) – Alternative Compliance In-Lieu Fee Option Is Inconsistent With State Law

Provision E.3.c.(3)(c)(i) requires the in-lieu fee to be transferred to the Copermittee or an escrow account prior to PDP construction. Development fees however, are collected at the time of building permit issuance, and permits can be issued throughout phases of the development whereby the entire in-lieu fee is not necessarily collected upfront when construction first begins. Furthermore, for large master planned developments, fees are negotiated through a development agreement to be collected based on certain development milestones. Therefore collecting and holding fees prior to construction is not common development practice and there should be flexibility in collecting fees given the timing and phasing of development and the market.

The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
3. Development Planning
c. Priority Development Project Structural BMP Performance Requirements
(3) Alternative Compliance to Onsite Structural BMP Performance Requirements
(c) Alternative Compliance In-Lieu Fee Option
(i) The in-lieu fee <u>should</u> ~~must~~ be <u>collected and held in accordance with the Mitigation Fee Act and all other applicable development fee laws</u>. ~~transferred to the Copermittee (for public projects) or an escrow account (for private projects) prior to the date construction of the Priority Development Project is initiated.~~

Provision E.3.c.(3)(c)(ii)[d] requires the in-lieu fee to include the cost to operate and maintain the alternative compliance projects. Development fees however are generally limited to capital costs (design and construction) that go to the useful life of the project of 5 years or more. There are sometimes limitations in State Law on the use of development fees for operations and maintenance. Operations and maintenance can probably be negotiated with a developer, but a requirement to include operations and maintenance as part of the fee has potential legal issues. *The County recommends the following language be deleted:*

E. Jurisdictional Runoff Management Programs
3. Development Planning
c. Priority Development Project Structural BMP Performance Requirements
(3) Alternative Compliance to Onsite Structural BMP Performance Requirements
(c) Alternative Compliance In-Lieu Fee Option
~~(ii)[d] The in-lieu fee must also include the cost to operate and maintain the offsite alternative compliance projects.~~

47. Provision E.3.c (Page 78 of 120) – The Copermittees Should be Allowed the Flexibility Provided Under EPA Policy to Develop a Trading and Water Quality Credit System

The Copermittees appreciate the flexibility of the Tentative Order to implement a water quality credit system as an alternative compliance schedule. Trading systems create cost-effective, market-based mechanisms for pollutant reduction, and have been successful in other water quality and air quality contexts. The Copermittees do note that any water quality trading system should be implemented in accordance with EPA's 2003 Final Water Quality Trading Policy, which allows for flexibility in generating and trading credits and offsets. The Tentative Order appears to limit a trading system to no net impacts caused by projects meeting the onsite structural BMP performance requirements of Provisions E.3.c(1) and E.3.c(2).

The Copermittees request that this language be stricken and that Copermittees be allowed the flexibility provided under the EPA 2003 Policy. Trading systems differ from program to program and are highly robust and complex credit mechanisms. Therefore, no net impact limitations should be addressed on a case-by-case basis subject to Executive Office approval, and should not immediately be limited by permit language, as certain projects may offer other significant environmental benefits.

The County recommends the following language be deleted:

E. Jurisdictional Runoff Management Programs
3. Development Planning
c. Priority Development Project Structural BMP Performance Requirements
(3) Alternative Compliance to Onsite Structural BMP Performance Requirements
(d) Alternative Compliance Water Quality Credit System Option
The Copermittee may develop and implement an alternative compliance water quality credit system option, individually or with other Copermittees and/or entities. ~~provided that such a credit system clearly exhibits that it will not allow discharges from Priority Development Projects to cause or contribute to a net impact over and above the impact caused by projects meeting the onsite structural BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2).~~ Any credit system that a Copermittee chooses to implement must be submitted to the San Diego Water Board Executive Officer for review and acceptance as part of the Water Quality Improvement Plan.

CONSTRUCTION MANAGEMENT

48. Provision E.4 (Page 90 of 120) – The Construction Management Program Provisions Must Be Modified So As Not To Negate The Very Intent And Purpose Of The Watershed Approach And The Focus On The Highest Priorities Within Each Watershed Management Area

(See the corresponding comments under Provision E – Jurisdictional Runoff Management Programs)

The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
4. Construction Management [Intro]
Each Copermittee must implement a construction management program in accordance with the strategies identified in the Water Quality Improvement Plan ~~and include, at a minimum, the following requirements.~~ The requirements of the jurisdictional runoff management programs as outlined below may be modified and prioritized as appropriate for consistency with the highest water quality priorities and strategies as identified in the corresponding Water Quality improvement Plan(s).
Move Provision 4f, "Strategies to Address the Highest Priority Water Quality Conditions" to just after the Introduction to the section and before Provision 4.a.

E. Jurisdictional Runoff Management Programs
4. Construction Management

(1) *Provide specific details about how the strategies and/or activities will be implemented (e.g. designate ~~additional~~ BMPs, focus education, and/or increase/decrease frequency of inspections for specific types of sites and/or activities); and*

49. Provision E.4 (Page 90 of 120) – Verification Of Permit Coverage By The Copermittees Should Be For The CGP Only

Per Section 4.a.(4) Copermittees are required to verify that the project applicant has obtained coverage under applicable permits. The fact sheet identifies that "The requirements under Provision E.4. are consistent with the 4th Term Permits for San Diego, Orange, and Riverside Counties", however the requirement of the current Orange County permit is to verify coverage under the Construction General Permit only and so there is not consistency with the 4th Term permits. It is only appropriate to require the Copermittees to verify coverage under the CGP as tracking down the other applicable permits does not assist in ensuring construction management is being implemented correctly. Furthermore, the USACE requires all other permits to be in place prior to issuing the 404 permit. It is not possible to have the 404 permit prior to issuing a grading or building permit.

The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
4. Construction Management
a. Project Approval Process

(4) *"Verify that the project applicant has obtained coverage under ~~applicable permits, including, but not limited to~~ the Construction General Permit.~~, Clean Water Act Section 401 Water Qaulity Certification and Section 404 Permit, and California Department of Fish and Game Streambed Alteration Agreement.~~*

50. Provision E.4 (Page 90 of 120) – Maintaining An Inventory Of Construction Sites Should Be Done On A Quarterly Basis

The current language requires monthly update of construction sites. Quarterly update of the inventory is more appropriate to track construction sites as this is a significant burden on the Copermittees. Some information for the construction site inventory will be based on inspections and as inspections for some sites will not be completed monthly it is more appropriate to maintain the inventory on a quarterly basis. These sites are tracked through SMARTS already and, therefore, more frequent tracking is not necessary.

The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
4. Construction Management
b. Construction Site Inventory and Tracking
(1) Each Copermittee must maintain and update at least quarterly ~~monthly~~, a watershed-based inventory of all construction projects issued a local permit that allows ground disturbance or soil disturbing activities that can potentially generate pollutants in storm water runoff. The use of an automated database system, such as GIS, is highly recommended. The inventory must include:

51. Provision E.4 (Page 90 of 120) – Identifying The Weather Conditions During An Inspection Is More Appropriate Than Quantifying The Amount Of Rainfall Since The Last Inspection

The current language requires the inspector to quantify the approximate amount of rainfall since the previous inspection. Quantifying the amount of rainfall since the last inspection provides no benefit in the documentation of an inspection. Documentation of the weather conditions at the time of the inspection however does provide some context as to the state of BMPs during the inspections.

The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
4. Construction Management
e. Construction Site Inspections
(c) ~~Approximate amount of rainfall since last~~ Weather condition during inspection;

EXISTING DEVELOPMENT

52. Provision E.5 (Page 95 of 120) –The Existing Development Program Provisions Must Be Modified So As Not To Negate The Very Intent And Purpose Of The Watershed Approach And The Focus On The Highest Priorities Within Each Watershed Management Area

(See the corresponding comments under Provision E – Jurisdictional Runoff Management Programs)

The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
5. Existing Development Management [Intro]
Each Copermittee must implement an existing development management program in accordance with the strategies identified in the Water Quality Improvement Plan ~~and include, at a minimum, the following requirements.~~ The requirements of the jurisdictional runoff management programs as outlined below may be modified and prioritized as appropriate for consistency with the highest water quality priorities and strategies as identified in the corresponding Water Quality improvement Plan(s).

Move Provision 5e, "Strategies to Address the Highest Priority Water Quality Conditions" to just after the Introduction to the section and before Provision 5.a.

(a) Provide specific details about how the strategies and/or activities will be implemented (e.g. designate ~~additional~~ BMPs, focus education, and/or increase/decrease frequency of inspections for specific types of facilities, areas and/or activities);

E. Jurisdictional Runoff Management Programs
5. Existing Development Management
a. Existing Development Inventory and Tracking
Each Copermittee must maintain, and update at least annually, a watershed-based inventory of the existing development within its jurisdiction that may discharge a high priority pollutant load to and from the MS4……….The inventory must, at a minimum, evaluate and include the following if identified as a source of a high priority pollutant ~~include~~:

(1)(c)(vi) Flood management projects and flood control devices and structures;
(1)(c)(xii) Other municipal facilities that the Copermittee determines may contribute a significant high priority pollutant load to the MS4; and
(2)(g) Identification of the high priority pollutants ~~generated and~~ potentially generated by the facility or area;
~~(2)(j) Whether the facility or area contributes or potentially contributes to the highest priority water quality conditions identified in the Water Quality Improvement Plan.~~

E. Jurisdictional Runoff Management Programs
5. Existing Development Management
b. Existing Development BMP Implementation and Maintenance
Each Copermittee must designate a ~~minimum~~ set of BMPs required for all inventoried existing development, including special event venues. The designated ~~minimum~~ BMPs must be specific

to <u>the identified high priority</u> facility or area types and <u>high priority</u> pollutant generating activities, as appropriate.

53. Provision E.5 (Page 95 of 120) – The Tentative Order Should Recognize That Some Channel Rehabilitation Projects May Occur Downstream Of A Copermittee's Jurisdiction

Some minor changes to the Tentative Order language are needed to recognize that channel rehabilitation projects for a Copermittee may occur just downstream of the Copermittee's jurisdiction.

The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
5. Existing Development Management
e. Strategies to Address the Highest Priority Water Quality Conditions
(3) Stream, Channel and/or Habitat Rehabilitation in Areas of Existing Development
Each Copermittee must describe in its jurisdictional runoff management program document, a program to rehabilitate streams, channels, and/or habitats in areas of existing development within its jurisdiction <u>or just downstream of its jurisdiction</u> to address the highest priority water quality conditions in the Watershed Management Area. The program must be implemented as follows:

54. Provision E.5 (Page 95 of 120) – Remove The Requirement To Evaluate Retrofit Of Stream Channels From The Tentative Order

Requiring Municipalities to take full responsibility for evaluation of stream channels for restoration goes beyond the intent and scope of Section 402 (p) of the Clean Water Act. The fact sheet identifies that "areas of existing development are responsible for poor water quality, degraded habitats, and hydromodified channels", however existing development may not be the only cause and it is not the responsibility of the Copermittees to restore receiving waters but rather reduce the discharge of pollutants in stormwater and non-stormwater to the Maximum Extent Practicable. Restoration and rehabilitation of stream channels is not the responsibility of the Copermittees. Additionally in many instances the channels are flood control facilities which are designed to protect public safety and developments from flooding. In many instances stream restoration or rehabilitation may not be feasible.

The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
5. Existing Development Management
e. Strategies to Address the Highest Priority Water Quality Conditions
(3) Stream, Channel and/or Habitat Rehabilitation in Areas of Existing Development
~~(a) Each Copermittee must identify streams, channels, and/or habitats in areas of existing development as candidates for rehabilitation, focusing on areas where stream, channel, and/or habitat rehabilitation projects will address the highest priority water quality conditions identified in the Water Quality Improvement Plan;~~

ENFORCEMENT RESPONSE PLANS

55. Provision E.6 (Page 104 of 120) – The Copermittees Should Be Allowed To Utilize Existing Guidelines And Procedures For Enforcement

Provision E.6 requires each Copermittee to develop and implement an Enforcement Response Plan as a part of its jurisdictional runoff management plan. The Fact Sheet notes that the Enforcement Response Plans will serve as a reference to determine if consistent enforcement actions are being implemented in order to achieve timely and effective compliance. Although the County understands the need for this document, the Tentative Order should be modified to allow the Copermittees to continue to utilize and implement established, equivalent guidelines and procedures for enforcement.

As a part of the development and implementation of a robust Illegal Discharge/Illicit Connection (ID/IC) Program, the Orange County Copermittees have developed an *Investigative Guidance Document* and *Enforcement Consistency Guide*. The response procedures generally include record keeping, notifications and response requests, response activities, investigations, clean-up activities, reporting, education, and enforcement/progressive enforcement. As provided for in the *Enforcement Consistency Guide*, when selecting enforcement options, the County's Authorized Inspectors ensure that violations of a similar nature receive a consistent enforcement remedy. More severe enforcement options may be utilized depending on variables such as history of non-compliance or failure to take good faith actions to eliminate continuing violations or to meet a previously imposed compliance schedule.

The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
6. Enforcement Response Plans [Intro]
Each Copermittee must develop and implement an Enforcement Response Plan as part of its jurisdictional runoff management program document. The Enforcement Response Plan must describe the applicable approaches and options to enforce its legal authority established pursuant to Provision E.1, as necessary, to achieve compliance with the requirements of this Order. <u>Copermittees may continue to utilize and implement established, equivalent guidelines and procedures for enforcement.</u> The Enforcement Response Plan must include the following:

56. Provision E.6 (Page 104 of 120) – The Term And Definition For "Escalated Enforcement" Should Be Redefined

Although Provision E.6.d requires each Copermittee to include "Escalated Enforcement" in the required Enforcement Response Plan, the definition of what is intended by "Escalated Enforcement" is different within the Tentative Order than the Fact Sheet and may not be enforceable.

The Tentative Order defines "Escalated Enforcement" as "any enforcement scenario where a violation or other non-compliance is determined to cause or contribute to the highest water quality conditions identified in the Water Quality Improvement Plan". This definition seems to indicate that a Copermittee may enforce differently in a particular situation if it involves a high priority pollutant of concern. Not only does the County take exception to the notion that they would enforce differently solely based on the constituent involved, the legality of such an enforcement action is questionable. In fact, when selecting enforcement options, the Co-

Copermittees must ensure that violations of a similar nature are subjected to similar-types of enforcement remedies in order to avoid any claim of selective enforcement of the Ordinance.

However, the Fact Sheet seems to indicate that "Escalated Enforcement" would instead require the Copermittees to "take progressively stricter response to enforce its legal authority and achieve compliance….". The County supports this approach, especially since this is consistent with other ID/IC programs in California and the established guidance that has been developed and implemented by the Copermittees. In fact, the established guidance recognizes that a more severe enforcement option may be selected when a violator has either a history of noncompliance or has failed to take good faith actions to eliminate continuing violations or to meet a previously imposed compliance schedule.

The Tentative Order should be modified as indicated below so that it reflects a standard progressive response approach.

The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
6. Enforcement Response Plans
d. ~~Escalated~~ Progressive Enforcement
(1)The Enforcement Response Plan must include a definition of "~~escalated~~ progressive enforcement". ~~Escalated~~ Progressive enforcement must include a series of enforcement actions that match the severity of the violations and include distinct, progressive steps. ~~any enforcement scenario where a violation or other non-compliance is determined to cause or contribute to the highest priority water quality conditions identified in the Water Quality Improvement Plan~~. ~~Escalated~~ Progressive enforcement may be defined differently for development planning, construction sites, commercial facilities or areas, industrial facilities, municipal facilities, and/or residential areas.
(2)Where the Copermittee determines progressive ~~escalated~~ enforcement is not required, a rationale must be recorded in the applicable electronic database or tabular system used to track violations.
(3)Progressive ~~Escalated~~ enforcement actions must continue to increase in severity, as necessary, to compel compliance as soon as possible.

Add a definition for "Progressive Enforcement" in Attachment C

PUBLIC EDUCATION

57. Provision E.7 (Page 106 of 120) – The Public Education Program Provisions Must Be Modified So As Not To Negate The Very Intent And Purpose Of The Watershed Approach And The Focus On The Highest Priorities Within Each Watershed Management Area

(See the corresponding comments under Provision E – Jurisdictional Runoff Management Programs)

The County recommends the following language changes:

E. Jurisdictional Runoff Management Programs
7. Public Education and Participation [Intro]

Each Copermittee must implement, individually or with other Copermittees, a public education and participation program in accordance with the strategies identified in the Water Quality Improvement Plan to promote and encourage the development…. ~~and include, at a minimum, the following requirements.~~ <u>The requirements of the jurisdictional runoff management programs as outlined below may be modified and prioritized as appropriate for consistency with the highest water quality priorities and strategies as identified in the corresponding Water Quality improvement Plan(s).</u>

Move Provision 7c, "Strategies to Address the Highest Priority Water Quality Conditions" to just after the Introduction to the section and before Provision 7.a.

B. Public Education
The public education program component implemented within the Copermittee's jurisdiction ~~must~~ <u>may</u> include~~, at a minimum,~~ the following:
(1) Educational activities, public information activities, and other appropriate outreach activities intended to reduce pollutants associated with the ~~application of pesticides, herbicides and fertilizer and other pollutants of concern in storm water discharges to and from its MS4 to the MEP, as determined and prioritized by the Copermittee(s) by jurisdiction and/or watershed to address the~~ highest priority water quality conditions identified in the Water Quality Improvement Plan;

PROVISION F – REPORTING

58. Provision F (Entire Provision; Begins Page 109 of 120) – The Process For The Development And Updates Of The Various Plans Needs To Be Aligned And Allow For The Time Necessary To Complete The Work

Provision F includes the requirements for the documents and reports that the Copermittees must prepare and provide to the Regional Water Board. This provision incorporates significantly expanded requirements for public participation and involvement in the development and implementation of the WQIPs and JRMPs.

However, the timeframe outlined in this section links each step of the development of the WQIP and JRMP to the commencement of coverage under the Order instead of to the development step that precedes it. The three steps outlined for the development of the WQIP need to be sequential so that the Copermittees have adequate time to complete each step and build the program based on previous comments received. In addition, the timeframe needs to explicitly incorporate adequate time for the Copermittees to review and respond to the comments received on the current action before moving on to the next step of development. For example, it is unclear how the Copermittees would establish their water quality improvement strategies (step 2 of development) at the same time as the establishment of the priority water quality conditions and numeric goals (step 1 of development), however the timelines are concurrent in the Tentative Order.

It should also be noted that this approach appears to establish a heavy workload for the public, Copermittees, and Regional Board. We would submit that a more streamlined approach for the development of the WQIPs should be considered which would provide the Copermittees with the necessary time to develop the final WQIP without extending the overall timeframe. For example, instead of requiring a formal public notice and solicitation of comments by the Regional Board for all three (3) steps of each WQIP, perhaps the Copermittees can work with the local stakeholders to solicit comments for the first two steps of the development of the WQIP and only require formal public noticing for the final approval of the WQIP. Although this is one approach to streamline the development of the WQIP and recommended by the County, an alternative approach would be to modify the timelines as indicated below.

In addition, it should be noted that the preparation of a regional WQIP may trigger local requirements under CEQA. This should be recognized in setting the timeline as noted within the table below.

A comparison of the current and recommended approach is provided in the table below.

Steps and Timelines	Existing Approach in Tentative Order	Total Time from Effective Date of Order	Recommended Approach (w/ edits provided in Tentative Order)	Total Time from Effective Date of Order
Establish Priority Water Quality Conditions and Numeric Goals	Within 6 months of commencement of coverage	6 months	Within 6 months of commencement of coverage	6 months
Request Public Comments	60 days from posting	8 months	30 days from posting	7 months
Revise Priority Water Quality Conditions and Numeric Goals	Not specified	? months	30 days from receiving comments	8 months
Establish Water Quality Improvement Strategies and Schedules	Within 9 months of commencement of coverage	9 months	Within 3 months of finalizing Priority Water Quality Conditions and Numeric Goals	11 months
Request Public Comments	60 days from posting	11 months	30 days with stakeholders	12 months
Revise Water Quality Improvement Strategies and Schedules	Not specified	? months	30 days from receiving comments	13 months
Develop WQIP	Within 18 months of commencement of coverage	18 months	Within 18 months of commencement of coverage	**18 months (this allows 5 months for the development of the document)**
Request Public Comments	30 days from posting	19 months	30 days from posting	19 months

If no hearing, Regional Board notify Copermittees that the WQIP is accepted	Within 6 months of the public request for comments	25 months	Within 6 months of the public request for comments	25 months
Finalize WQIP	Not specified	? months	60 days from receiving comments (this assumes that it is concurrent with the Regional Board notification above)	? months
Review for CEQA Requirements	*It should be noted that the preparation of a regional WQIP may trigger local requirements under CEQA. This should be recognized in setting the timeline. This would likely take 30-60 days.*			
Posting on Regional Clearinghouse	Within 30 days of acceptance by Regional Board	26 months	Within 30 days of acceptance by Regional Board	26 months

The County recommends the following language changes

F. Reporting
1. Water Quality Improvement Plans
a. Water Quality Improvement Plan Development
(1)(c) Within 6 months after the commencement of coverage under this Order, the Copermittees must develop and submit the Water Quality Improvement Plan requirements of Provision B.2 to the San Diego Water Board. The San Diego Water Board will issue a public notice and solicit public comments on the Water Quality Improvement Plan for a minimum of ~~6~~30 days.
(1)(d) Within 30 days of receiving the public comments, the Copermittees must revise the priority water quality conditions and numeric goals based on comments received and/or recommendations or direction from the San Diego Water Board Executive Officer.

F. Reporting
1. Water Quality Improvement Plans
a. Water Quality Improvement Plan Development
(2)(b) Within 3 months after the development of the priority water quality conditions and numeric goals, ~~9 months after the commencement of coverage under this Order,~~ the Copermittees must develop and submit the Water Quality Improvement Plan requirements of Provision B.3 to the San Diego Water Board. The San Diego Water Board will issue a public notice and solicit public comments on the Water Quality Improvement Plan for a minimum of ~~6~~30 days.
(2)(c) Within 30 days of receiving the public comments, the Copermittees must revise the water quality improvement strategies and schedules based on comments received and/or recommendations or direction from the San Diego Water Board Executive Officer.

F. Reporting
1. Water Quality Improvement Plans
b. Water Quality Improvement Plan Submittal

(2) Based on the comments received, the San Diego Water Board will determine whether to hold a public hearing or to limit public input to submittal of written comments. If no hearing is held the San Diego Water Board will notify the Copermittees within 6 months that the Water Quality Improvement Plan has been accepted as complete following its review and determination that the Water Quality Improvement Plan meets the requirements of this Order.
(3) Within 60 days of receiving comments, the Copermittees must revise the Water Quality Improvement Plan based on comments received and/or recommendations or direction from the San Diego Water Board Executive Officer.

(4)The Water Quality Improvement Plan must be made available on the Regional Clearinghouse required pursuant to Provision F.4 within 30 days of the finalization of the Water Quality Improvement Plan and acceptance by the San Diego Water Board.

F. Reporting
2. Updates
a. Jurisdictional Runoff Management Program Document Updates
(2)Each Copermittee must update its jurisdictional runoff management program document to incorporate the requirements of Provision E no later than 6 ~~18~~ months after the completion of the corresponding Water Quality Improvement Plan and acceptance of the Water Quality Improvement Plan by the San Diego Water Board ~~commencement of coverage under this Order~~.
(3) Each Copermittee must submit updates to its jurisdictional runoff management program, with a rationale for the modifications, either in the Annual Report required pursuant to Provision F.3.b, and/or as part of the Report of Waste Discharge required pursuant to Provision F.5.b. The requested updates are considered accepted by the San Diego Water Board if no response is provided to the Copermittee after 3 months of submitting the request.
(5) Updated jurisdictional runoff management program documents must be made available on the Regional Clearinghouse required pursuant to Provision F.4 within 30 days of ~~submitting the annual report~~ completing the updates.

F. Reporting
2. Updates
d. BMP Design Manual Updates
(2)Subsequent updates must be consistent with the requirements of Provisions E.3.a-d and must be submitted as part of the Annual Reports required pursuant to Provision F.3.b, and/or as part of the Report of Waste Discharge required pursuant to Provision F.5.b. The requested updates are considered accepted by the San Diego Water Board if no response is provided to the Copermittee after 3 months of submitting the request.

59. Provision F.3 (Page 112 of 120) – The JRMP Annual Report Form Is Not Linked To The Watershed Priorities And Does Not Result In Meaningful Reporting

The Tentative Order states that the purpose of the reporting is to determine and document compliance with the Order and to communicate the implementation status of each jurisdictional runoff management program. This goal is met, in part, through the submittal of the Annual Reports (F.3.b), which includes a requirement for each Copermittee to submit a Jurisdictional Runoff Management Program (JRMP) Annual Report Form (Attachment D). The requirement for the Copermittees to submit Attachment D is problematic for the following reasons:

1. The Form is a significant departure from the current jurisdictional reporting and effectiveness assessment required pursuant to Order R9-2009-002 and will only focus on the *implementation* of the permit provisions instead of the *impact, effectiveness* and potential *modifications* necessary for the program.

2. The jurisdictional reporting should complement the WQIP reporting and be focused on the implementation, impact, and effectiveness assessment of the jurisdictional actions and activities that are being implemented to support the goals, objectives, and high priority water quality issues of the WQIP.

3. The ability of the Copermittees to be able to, on a jurisdictional basis, determine if there are modifications and/or improvements needed to maximize the JRMP and, ultimately, the WQIP effectiveness will be severely limited.

4. The reporting required pursuant to the Form is not linked to the priorities within the WQIP and, is therefore, additive and will require the Copermittees to develop the related data collection and reporting infrastructure without a commensurate benefit for the management of the programs.

5. The Form seems to restrict the reporting capabilities of the Copermittees and requires the compilation of cumbersome and uninformative numbers such as "number of existing developments in residential inventory" and "number of priority development projects in review".

6. Although the Fact Sheet identifies Attachment D as an "example", this is not clearly stated within the provisions. If the Copermittees can develop their own JRMP reporting form that would be aligned with the WQIP priorities and strategies, then this should be clarified within the Tentative Order.

As a result, it is unclear how this new reporting requirement will improve upon existing reporting processes and/or provide information that would inform management decisions at the jurisdictional or watershed scale. Allowing the Copermittees to develop their own jurisdictional reporting to support the overarching WQIP will still be consistent with the reporting requirements identified in 40CFR 122.42(c). The County is recommending that the jurisdictional reporting be aligned with the WQIP reporting and either delete Attachment D or make it optional.

The County recommends the following language changes:

F. Reporting
3. Progress Reporting
b. Annual Reports [add the following provision]
(1)(e) For each Water Quality Improvement Plan, the progress of implementing the corresponding Jurisdictional Urban Runoff Management Programs. Each Copermittee should report on the items listed below. The individual JRMP annual reports may be included as attachments to the corresponding WQIP annual report. The JRMP annual report should include, but not be limited to, the following:

(i) The water quality improvement strategies that were implemented and/or no longer implemented by each of the Copermittees during the reporting period and previous reporting periods, and are planned to be implemented during the next reporting period,

(ii) Proposed modifications to the water quality improvement strategies, with public input received and rationale for the proposed modifications,

(iii) Previously proposed modifications or updates incorporated into each Copermittee's jurisdictional runoff management program document and implemented by the Copermittees in the Watershed Management Area, and

(iv) Proposed modifications or updates to each Copermittee's jurisdictional runoff management program document;

(f) ~~A completed Jurisdictional Runoff Management Program Annual Report Form (Attachment D or accepted revision) for each Copermittee in the Watershed Management Area, certified by a~~

~~Principal Executive Officer, Ranking Elected Official, or Duly Authorized Representative.~~

F. Reporting
3. Progress Reporting
b. Annual Reports
(2) ~~Each Copermittee must complete and submit a Jurisdictional Runoff Management Program Annual Report Form (Attachment D or accepted revision) no later than October 31 of each year until the first Annual Report is required to be submitted~~. <u>Until the Copermittees have updated their jurisdictional runoff management programs consistent with Provision F.2.a, the Copermittees must continue to utilize the current jurisdictional runoff management program annual reporting format.</u> Each Copermittee must submit the information on the Jurisdictional Runoff Management Program Annual Report Form specific to the area within its jurisdiction in each Watershed Management Area.

F. Reporting
3. Progress Reporting
c. Regional Monitoring and Assessment Report

[This provision should be moved to section F.5.c since it is a part of the ROWD assessment]

Delete Attachment D or make it an "example" of what the Copermittees can prepare for each Watershed Management Area.

60. Provision F.3 (Page 112 of 120) – The Annual Reporting Section Should Be Modified To Distinguish Between The Reporting That Is Conducted During The Transitional Period And The Reporting That Is Conducted Afterward

The language in Provision F.3.b should be clarified to provide additional direction to the Copermittees regarding the transitional period annual reporting and the post-transitional annual reporting requirements.

The County recommends the following language changes:

F. Reporting
3. Progress Reporting
b. Annual Reports
<u>(1) Transitional Period JRMP Reports: Each Copermittee must complete and submit a Jurisdictional Runoff Management Program Annual Report no later than October 31 of each year prior to the implementation of updated JRMP programs pursuant to F.2.a. Each Copermittee must submit the information on the Jurisdictional Runoff Management Program specific to the area within its jurisdiction in each Watershed Management Area</u>.

<u>(2) Transitional Period Monitoring Report: The transitional period monitoring conducted pursuant to D.1.a and D.2.a. shall be reported in a single report that covers the entire reporting period from the initiation of the transitional period monitoring (as described in D.1.a and D.2.a.), through September 30th following approval of the Water Quality Improvement Plan. The Transitional Period Monitoring Report shall include the assessments required per D.4.a.(1)(a), D.4.b.(1)(a) and D.4.b.(2)(a); and be submitted by January 31st following completion of the above mentioned transitional period.</u>

(3) <u>Post-Transitional Annual Reports – Following the initial transitional period after enrollment into this Order, the</u> Copermittees for each Watershed Management Area must submit a <u>combined</u> Annual Report for each reporting period no later than January 31 of the following year. The annual reporting period consists of two periods: 1) July 1 to June 30 of the following year for the jurisdictional runoff management programs, 2) October 1 to September 30 of the following year for the monitoring and assessment programs. ~~The first Annual Report must be prepared for the reporting period beginning July 1 after commencement of coverage under this Order, and upon San Diego Water Board determination that the Water Quality Improvement Plan meets the requirements of this Order to June 30 in the following year for the jurisdictional runoff management programs, and September 30 in the following year for the monitoring and assessment programs.~~ Annual Reports must be made available on the Regional Clearinghouse required pursuant to Provision F.4. Each Annual Report must include the following:

61. Provision F.4 (Page 115 of 120) –The Copermittees Should Be Able To Define The Geographic Coverage Of And Utilize Established Web-Based Mechanisms As Their Regional Clearinghouse

The Tentative Order requires the Copermittees to develop, update, and maintain an internet-based Regional Clearinghouse, however it does not define what geographic area is covered by a Regional Clearinghouse or if the Copermittees can utilize their existing web-based systems and/or linkages that have been developed over the last four permit terms. The Copermittees should be able to define what geographic area is covered by the Regional Clearinghouse, which could include, but not be limited to, watershed management areas, County jurisdictions and/or the San Diego Regional Water Quality Control Board jurisdiction. In addition, the Copermittees should be able to utilize existing, established mechanisms and linkages, in whole or in part, as their Regional Clearinghouse so that they do not, necessarily, need to expend resources in developing new infrastructure.

The County recommends the following language changes:

F. Reporting
4. Regional Clearinghouse
The Copermittees must develop, update, and maintain an internet-based Regional Clearinghouse that is made available to the public no later than 18 months after the effective date of this Order. <u>The Copermittees may elect to develop and maintain the clearinghouse(s) provided by other Copermittees or agencies</u>.

Add a definition for "Regional Clearinghouse" in Attachment C

ATTACHMENT C
Acronyms, Abbreviations, and Definitions

62. Attachment C (Entire Attachment; Begins Page C-1) – Attachment C Should Clarify The Meaning Or Intent Of Specific Terms Used Within The Order

In addition to the acronyms and abbreviations, Attachment C also includes definitions that may provide an explanation or description of the meaning or intent of specific terms or phrases that are used within the Order. The County recommends the addition and/or modification of the following definitions in order to assist in describing the meaning or intent of these terms and to avoid unnecessary confusion.

The County recommends the following language changes:

This term did not have a definition.

***Channel Rehabilitation and Improvement** – Remedial measures or activities for the purpose of improving the environmental health of streams, channels, or river systems. Techniques may vary from in-stream restoration techniques to off-line stormwater management practices installed in the system corridor or upland areas. Rehabilitation techniques may include, but are not limited to the following: riparian zone restoration, constructed wetlands, bank stabilization, channel modifications, and daylighting of drainage systems. Effectiveness may be measured in various manners, including: assessments of habitat, reduced streambank erosion, and/or restoration of water and sediment transport balance.*

This definition should remain consistent with the Federal regulations.

***Copermittee** – A permittee to a NPDES permit that is only responsible for permit conditions relating to the discharge for which it is operator [40 CFR 122.26(b)(1)]. For the purposes of this Order, a Copermittee may include the following jurisdictions: a~~A~~n incorporated city within the County of Orange, County of Riverside, or County of San Diego in the San Diego Region, the County of Orange, the County of Riverside, the County of San Diego, the Orange County Flood Control District, the Riverside County Water Conservation and Flood Control District, the San Diego Regional Airport Authority, or the San Diego Unified Port District.*

This definition should provide additional clarification.

***Illicit Connection** – Any man-made conveyance or drainage system through which the discharge of any pollutant to the stormwater drainage system occurs or may occur. ~~Any connection to the MS4 that conveys an illicit discharge.~~*

This definition should remain consistent with the Federal regulations.

***Illicit Discharge** - Any discharge to a ~~the~~ municipal separate storm sewer ~~MS4~~ that is not composed entirely of storm water except discharges pursuant to a NPDES permit (other than the NPDES permit for discharges from the municipal separate storm sewer) and discharges resulting from fire fighting activities [40 CFR 122.26(b)(2)].*

This definition should provide additional clarification for the purposes of low impact development.

Infiltration *– Water other than wastewater that enters a sewer system (including sewer service connections and foundation drains) from the ground through such means as defective pipes, pipe joints, connections, or manholes. Infiltration does not include, and is distinguished from, inflow [40 CFR 35.2005(20)]. In the context of low impact development, infiltration may also be defined as the percolation of water into the ground. Infiltration is often expressed as a rate (inches per hour), which is determined through an infiltration test.*

This term did not have a definition.

Progressive Enforcement *– A series of enforcement actions that increase in severity commensurate with the violation. Such enforcement actions may include verbal and written notices of violation, fines, stop work orders, administrative penalties, criminal penalties, etc.*

This definition should provide additional clarification.

Redevelopment *- The creation, addition, and or replacement of impervious surface on an already developed site. Examples include the expansion of a building footprint, road widening, the addition to or replacement of a structure, and creation or addition of impervious surfaces. Replacement of impervious surfaces includes any activity that is not part of a routine maintenance activity where impervious material(s) are removed, exposing underlying soil during construction. Redevelopment does not include trenching and resurfacing associated with utility work; parking lots, resurfacing existing roadways; cutting and reconfiguring of surface parking lots; new sidewalk construction, pedestrian ramps, or bike lane on existing roads; and routine replacement of damaged pavement, such as pothole repair.*

This term did not have a definition.

Regional Clearinghouse *– A central location for the collection, classification, and distribution of information including, but not limited to, plans, reports, manuals, data, contact information, and/or links to such documents and information. The clearinghouse(s) may be organized by the following regions: Watershed Management Areas, County jurisdictions, and/or the San Diego Regional Water Quality Control Board jurisdiction.*

This definition should remain consistent with the Federal regulations.

Storm Water *– Per 40 CFR 122.26(b)(13), means storm water runoff, snowmelt runoff and surface runoff and drainage.* ~~*Surface runoff and drainage pertains to runoff and drainage resulting from precipitation events.*~~

This definition should remain consistent with the State regulations

Waters of the State *- Any* ~~*water,*~~ *surface water or groundwater* ~~*underground*~~*, including saline waters, within the boundaries of the s*~~*S*~~*tate [CWC section 13050 (e)]. The definition of the Waters of the State is broader than that for the Waters of the United States in that all water in the State is considered to be a Waters of the State* ~~*regardless of circumstances or condition*~~*.*

This term should clarify that a wet weather period should be preceded by a minimum dry weather period, unless defined differently in another regulatory mechanism.

Wet Weather – *Weather is considered wet if there is a storm event of 0.1 inches and greater ~~and the following~~ preceded by 72 hours of dry weather, unless otherwise defined by another regulatory mechanism, such as a TMDL.*

ATTACHMENT D
Jurisdictional Runoff Management Program Annual Report Form

63. Attachment D (Entire Attachment; Begins Page D-1) – The JRMP Annual Report Form Is Not Linked To The Watershed Priorities And Does Not Result In Meaningful Reporting

(See Comments on Provision F.3.b)

ATTACHMENT E
Specific Provisions for Total Maximum Daily Loads

64. Attachment E (Entire Attachment; Begins Page E-1) – Permit Provisions Must Be Consistent With The Corresponding Basin Plan Amendments (BPAs)

The Regional Board has adopted two Basin Plan Amendments (BPAs) to establish Total Maximum Daily Loads (TMDLs) where the Copermittees are identified as Responsible Parties and assigned wasteload allocations (WLAs): (1) Indicator Bacteria in Baby Beach in Dana Point Harbor[66] and (2) Indicator Bacteria, Project I - Twenty Beaches and Creeks in the San Diego Region (Including Tecolote Creek)[67] (Beaches and Creeks Bacteria TMDL).

However, there are several fundamental and substantive discrepancies between the adopted TMDL BPAs and the provisions of the Tentative Order. These inconsistencies negate the Basin Planning process that occurred to establish the TMDLs and clearly contradict the Board's intent for how the TMDLs would be incorporated into the MS4 Permit. As the TMDLs have been incorporated into the Basin Plan, the TMDLs constitute the "program of implementation needed for achieving water quality objectives"[68] and the provisions in the MS4 Permit must therefore be consistent with the Basin Plan.

For example:

- Both the Baby Beach and Beaches and Creeks TMDLs clearly establish mass-based wasteload allocations. These wasteload allocations are entirely absent from the Tentative Order (see additional comments below for further discussion). Instead, the Tentative Order establishes water quality based effluent limits (WQBELs) based upon an effluent concentration (set equal to the numeric targets).

- For the Beaches and Creeks TMDL, the Tentative Order is not consistent with the compliance schedule approach provided for the comprehensive load reduction plans (CLRPs) established in the BPA. The CLRPs that will be submitted by Copermittees will propose interim compliance dates, as allowed by the BPA, to meet the 50% reduction milestone for dry and wet weather. The CLRPs submitted by Copermittees may not all propose the same interim compliance dates and the Tentative Order should

[66] Resolution R9-2008-0027
[67] Resolution R9-2010-0001
[68] Water Code section 13050(j)

acknowledge the flexibility allowed by the TMDL[69]. In fact, this scheduling flexibility was a primary "incentive" for Copermittees to develop CLRPs instead of Bacteria Load Reduction Plans (BLRPs).

- For the Baby Beach TMDL, the BPA includes two paths for the implementation of the TMDL – one where the beach has been delisted from the 303(d) list and one where the beach remains impaired[70]. Where a beach has been delisted, the BPA requires that Responsible Copermittees monitor and continue implementation of existing implementation actions "to ensure REC-1 water quality objectives are maintained" (i.e., the beach is not placed back on the 303(d) list). Only if the beach is placed back on the 303(d), the NPDES permit is to be revised to include "requirements consistent with these TMDLs." As Baby Beach is not on the most recent 303(d) list for REC-1 bacteria objectives, the requirements for Responsible Copermittees must be limited to monitoring and implementation of existing implementation actions. The Tentative Order does not recognize the approach for delisted beaches or recognize that Baby Beach is delisted.
- For the Beaches and Creeks TMDL, the BPA clearly establishes that no additional actions are required for beaches that are delisted[71]. This language is not included in the Tentative Order.
- Monitoring requirements in the Tentative Order must be consistent with the requirements of the BPAs. Both the Baby Beach TMDL and the Beaches and Creeks TMDL provide certain flexibility in monitoring, via the BLRPs and CLRPs, respectively, and this flexibility is not captured in the Tentative Order.
- Both the Baby Beach TMDL and the Beaches and Creeks TMDL clearly acknowledges that exceedances in the receiving water may not be from the MS4 and contains specific compliance language to address such a situation. This language is not provided in the Tentative Order.

These examples are not exhaustive of the inconsistencies between the BPAs and the Tentative Order (additional inconsistencies are identified and modified language is proposed in **Attachment B**).

During the workshops on the Tentative Order, Regional Board members raised the question of feasibility of attaining the TMDLs. The Basin Plan Amendments included many considerations and requirements that cumulatively result in a more feasible program of implementation. If many of the requirements of the BPAs are modified or not included in the MS4 permit, such as the mass-based WLAs, flexible monitoring programs, no further action for delisted beaches, and reconsideration of the TMDLs through reopeners, the Tentative Order establishes requirements that are not only inconsistent with the BPAs, but that make attainment of the TMDLs infeasible.

*The County recommends that the Regional Board modify the requirements in Attachment E to establish provisions that are consistent with the adopted Basin Plan Amendments. Specific modifications to address these inconsistencies are provided in **Attachment B**. Certain key inconsistencies are noted in the subsequent comments below. Additional inconsistencies are also captured in the modifications detailed in **Attachment B**.*

[69] Page 68 of Attachment A of the Basin Plan Amendment
[70] See BPA pg. A-12
[71] See the Basin Plan Amendment, pgs. A2, A12, A66

65. Attachment E (Entire Attachment; Begins Page E-1) – The Tentative Order's Numeric WQBELs Violate the Requirements of Law Because They are Infeasible

The Tentative Order's numeric WQBELs are not feasible. The 2010 EPA Memorandum on TMDLs[72] recommends "where feasible, the NPDES permitting authority exercise its discretion to include numeric effluent limitations as necessary to meet water quality standards."[73] This position is based on 40 CFR §122.44(k), which authorizes the use of BMPs "when numeric limitations are infeasible." In 1991, the State Board concluded that "numeric effluent limitations are infeasible as a means of reducing pollutants in municipal storm water discharges, at least at this time."[74]

Although this determination was made over twenty years ago, the State Board's position on this issue has not changed since then, as evidenced by its adoption of the Caltrans MS4 permit in September of 2012. Citing the fact sheet for the Caltrans MS4 permit, the State Board affirmed that "it is not feasible at this time to set enforceable numeric effluent criteria for municipal BMPs and in particular urban discharges."[75]

The Caltrans MS4 permit's fact sheet also supports the use of BMP-based WQBELs as a means of meeting TMDLs and other quality standards. The Caltrans MS4 permit is also subject to TMDLs adopted by the Regional Board and USEPA. If this aspect of the Tentative Order is not corrected, Orange County MS4 Copermittees will be compelled to comply strictly with numeric WQBELs and receiving water limitations while Caltrans need only implement WQBEL BMPs to achieve compliance with the same TMDLs. This inconsistency lacks any justification.

66. Attachment E (Entire Attachment; Begins Page E-1) – The Tentative Order's WQBELs Were Improperly Formulated

The Tentative Order fails to provide adequate justification for incorporating numeric water quality based effluent limitations in the Tentative Order for each of the incorporated TMDLs to which they apply. A WQBEL is an enforceable translation in an MS4 permit for attaining compliance with a TMDL WLA, which serves to protect beneficial uses of a receiving water[76]. The Tentative Order fails to establish that an adequate requisite Reasonable Potential Analysis ("RPA") has been conducted.

The Tentative Order fails to establish if discharges from any individual permittee's MS4 have the reasonable potential to cause or contribute to an excursion above any "State water quality standard including State narrative criteria for water quality." Page 2 of the 2010 EPA Memo states:

[72] U.S. Environmental Protection Agency, Memorandum, *Revisions to the November 22, 2002 Memorandum "Establishing Total Maximum Daily Load (TMDL) Waste d Allocations (WLAs) for Storm Water Sources and NPDES Permit Requirements Based on Those WLAs,"* (Nov. 12, 2010) (*2010 EPA Memo*).
[73] EPA Memo, p. 2 (emphasis added).
[74] State Water Resources Control Board Water Quality Order 91-03, page 49.
[75] Fact Sheet for NPDES Permit and Waste Discharges Requirements for State of California Department of Transportation, NPDES Permit No. CAS000003, Order No. 2012-0011-DWQ, September 7, 2012, page 9.
[76] 40 C.F.R. § 130.2.

> "Where the NPDES authority determines that MS4 discharges *have the reasonable potential to cause or contribute to a water quality excursion*, EPA recommends that, where feasible, the NPDES permitting authority exercise its discretion to include numeric effluent limitations as necessary to meet water quality standards."

There are two generally accepted approaches to conducting an RPA. According to USEPA guidance, "A permit writer can conduct a reasonable potential analysis using effluent and receiving water data and modeling techniques, as described above, or using a non-quantitative approach."[77]

Neither the administrative record nor the Tentative Order's fact sheet contains any evidence of that an RPA has been performed in accordance with the two foregoing approaches. Regarding the first approach, such an analysis would in any case have been impossible to perform given that no outfall (effluent) monitoring has been required for any prior Orange County MS4 permit. No modeling appears to have been conducted either.

Beyond this, federal regulations not only require that an RPA be performed to determine if an excursion above a water quality standard occurred, but also that the storm water discharge must be measured against an "allowable" ambient concentration[78].

A WQBEL is a means of attaining a TMDL WLA, a translation of a WLA into prescribed actions or limits which has in the past been typically expressed as a BMP. Before a WQBEL can be developed, however, a need for it must be established. As the Writers' Manual points out:

> The permit writer should always provide justification for the decision to require WQBELs in the permit fact sheet or statement of basis and must do so where required by federal and state regulations. *A thorough rationale is particularly important when the decision to include WQBELs is not based on an analysis of effluent data for the pollutant of concern*. NPDES Permit Writers' Manual, September 2010, page 6-23 (emphasis added).

No such rationale is provided in the Fact Sheet, which in the absence of effluent data derived from outfall monitoring, would have been absolutely necessary to justify the need for a numeric WQBEL.

Finally, the 2010 EPA Memo is clear that reliance on numerics should be coupled with the "disaggregation" of different storm water sources within permits. The Tentative Order fails to adequately disaggregate storm water sources within applicable TMDLs regarding numeric WQBELs and for receiving water limitations, further making the imposition of numeric standards inappropriate.

67. Attachment E (Entire Attachment; Begins Page E-1) – WQBELs Are Incorrect For Both Baby Beach Bacteria TMDL And Beaches And Creeks TMDLs As They Are Inconsistent With The WLAs

Federal regulations require that NPDES permits contain effluent limits consistent with the assumptions and requirements of all available WLAs[79]. As currently established in the

[77] NPDES Permit Writers' Manual, September 2010, page 6-23.
[78] 40 C.F.R. §122.44(d)(iii).
[79] 40 CFR 122.44(d)(1)(vii)(B)

Tentative Order, the WQBELs are not consistent with the WLAs and are therefore not consistent with federal regulations.

The Tentative Order establishes WQBELs based upon the numeric targets (set equal to water quality objectives), not the mass-based WLAs established by the TMDL. To justify this approach, the Fact Sheet states (emphasis added):

> *"Because **numeric targets** for TMDLs typically include a component that will be protective of water quality standards, a TMDL will likely include one or more numeric receiving water limitations and/or effluent limitations as part of the assumptions or requirements of the TMDL. **Any numeric receiving water limitations and/or effluent limitations developed as part of the assumptions or requirements of a TMDL must be incorporated and included as part of a WQBELs for the MS4s.**" Pg. F-38.*

However, federal regulations require that the WLAs, not the numeric targets, are incorporated into the Tentative Order. Further, federal regulations do not require that any receiving water limitation or effluent limitation developed as part of the TMDL must be incorporated. Rather, federal regulations require that the WQBELs are consistent with the assumptions and requirements of the WLAs.

40 CFR 122.44(d)(1)(vii)(B) states (emphasis added).

> *When developing water quality based effluent limits under this paragraph the permitting authority shall ensure that: (B) Effluent limits developed to protect a narrative water quality criterion, a numeric water quality criterion, or both, **are consistent with the assumptions and requirements of any available wasteload allocation** for the discharge prepared by the State and approved by EPA pursuant to 40 CFR 130.7.*

While in most cases the numeric targets are a component of the allocations, there are numerous additional assumptions and requirements of the WLAs that are also a component of the WLAs. Wasteload allocations take into account various considerations, including the multiple sources of a pollutant, flow rates, critical conditions, and margin of safety. By only incorporating the numeric target component of the WLAs, the Tentative Order fails to include all of the other assumptions and requirements of the WLAs, which is required by federal regulations. Only incorporating the numeric targets negates the entire TMDL analysis and Basin Planning process. Otherwise, TMDLs would be as simple as assigning numeric effluent limitations to MS4 discharges equal to the numeric objectives in the Basin Plan, which is essentially what this Tentative Order is proposing to do, and which is explicitly contrary to the TMDLs that have been established in the Basin Plan.

In fact, simply defining the WQBELs as the numeric targets of the TMDL is contrary to the purpose of the Basin Plan itself, which not only requires the establishment of water quality objectives, but also the program of implementation needed to achieve the water quality objectives[80]. A TMDL, once incorporated into the Basin Plan, is exactly that – a program of implementation needed for achieving water quality objectives.

Per the Beaches and Creeks Bacteria TMDL BPA:

[80] See Water Code section 13050(j) and as stated in the Beaches and Creeks Bacteria TMDL (Resolution, Pg.2): "A "Water Quality Control Plan" or "Basin Plan" consists of a designation or establishment for the waters within a specified area of all of the following: (1) Beneficial uses to be protected, (2) Water quality objectives and (3) A program of implementation needed for achieving water quality objectives."

> *"TMDLs must be established at levels necessary to attain and maintain the applicable narrative and numerical water quality standards with seasonal variations and a margin of safety which takes into account any lack of knowledge between effluent limitations and water quality." – Resolution, Pg. 2*

Per the Baby Beach Bacteria TMDL BPA:

> *"The loading capacities are defined as the maximum amount of fecal coliform, total coliform and Enterococcus that the waterbody can receive and still attain water quality objectives necessary for the protection of designated beneficial uses. Each TMDL must accommodate all known sources of a pollutant, whether from natural background, nonpoint sources, or point sources, and must include a margin of safety (MOS) to preclude pollutant loading from exceeding the actual assimilative capacities of the waterbodies. The TMDL calculations also account for seasonal variations and critical conditions and were developed in a manner consistent with guidelines published by USEPA." – Resolution, Pg. 4*

In both the Baby Beach Bacteria TMDL and the Beaches and Creeks Bacteria TMDL, the WLAs clearly take into consideration factors other than the numeric targets, such as flow rates as the WLAs are expressed as mass-based limits. If it was the Regional Board's intent to establish a concentration-based TMDL, then the WLAs would be expressed as a concentration. However, by establishing mass-based WLAs, the TMDL purposefully and explicitly establishes WLAs that incorporate many other factors than just the concentrations of the numeric targets. Therefore, establishing WQBELs that fail to incorporate the mass-based WLAs fails to be consistent with all of the assumptions and requirements of the WLAs as well as failing to be consistent with the intent of the Basin Plan itself.

<u>Baby Beach Bacteria TMDL</u>

In addition to the universal issues identified above, there are additional concerns with the WQBELs specific to the Baby Beach Bacteria TMDL.

Of particular concern are the WQBELs established for wet weather for total coliform (TC) and fecal coliform (FC). The BPA establishes WLAs for those indicators based upon existing conditions as the loading capacity was determined to be greater than the current discharges and clearly states that no further reductions are necessary. The BPA states (pg. A-23)*:*

> *"According to Tables 7-26 and 7-27, no wet weather wasteload reductions are required for total and fecal coliform indicator bacteria. This means that according to the wet weather models for Baby Beach, REC-1 water quality objectives for total and fecal coliform indicator bacteria are not expected to be exceeded due to discharges from the MS4s. The only wet weather wasteload reductions required for MS4s discharging into the receiving waters along the shoreline at Baby Beach is for Enterococcus indicator bacteria.".*

These existing conditions WLAs were based upon a *load assessment, not a concentration assessment* (e.g., the numeric targets). The final compliance date for these WLAs was set equal to the effective date of the TMDL, given that the WLAs were set to existing conditions and no further reductions were required. Therefore, not only are the WLAs in the Tentative Order not incorporated properly as mass-based WQBELs, but the Copermittees are not provided any time to attain these new and inappropriately established concentration-based WQBELs as the effective date, and therefore final compliance date, was 2009.

<u>Beaches and Creeks Bacteria TMDL</u>

In addition to the universal issues identified above, there are additional concerns with the WQBELs specific to the Beaches and Creeks Bacteria TMDL.

Attachment E specifies WQBELs for dry weather flows as both receiving water and effluent limitations, in terms of zero allowable exceedances of the single sample maximum and the 30-day geometric mean. However, the dry weather component of the TMDL only considered the 30-day geometric mean and did not consider the single sample maximum within its calculation. Incorporating single sample effluent limitations into the Tentative Order goes beyond the TMDL requirements.

In addition, if the TMDL had included single sample limits, there would have been a corresponding allowable exceedance frequency, just as for wet weather. The 22% allowable exceedance rate for wet weather was based on a reference beach within the Los Angeles Region, and although not used in the technical approach for the San Diego Beaches and Creeks TMDL, the reference beach also exhibits exceedances during dry weather, which is incorporated into beach TMDLs in the Los Angeles region.

The County recommends that the Tentative Order is modified to be consistent with the assumptions and requirements of the WLAs by incorporating the WLAs into the Permit. See ***Attachment B*** *for the specific requested modifications.*

68. Attachment E (Entire Attachment; Begins Page E-1) – WQBELs Should Only Be Defined as Effluent Limitations

There is a significant legal distinction between the Receiving Water Limitations established in Provision A (Discharge Prohibitions) and the Receiving Water Limitations established as part of the WQBELs in Attachment E (TMDL provisions). As currently (inappropriately) defined, WQBELs include receiving water limitations based on the numeric targets (set equal to WQOs) and not based upon the WLAs.

Ensuring that MS4 discharges do not cause or contribute to exceedance of WQOs is already and more appropriately addressed via Provision A.2. When an exceedance occurs under Provision A (Discharge Prohibitions), there is the potential for enforcement action and the Regional Board has discretion with enforcement (e.g., issuing a Notice of Violation). However, where an exceedance occurs for a WQBEL, the Copermittees may be subject to Mandatory Minimum Penalties (MMPs) where the Regional Board does not have discretion.

As established in comments above, the WQBELs have been inappropriately defined to be based upon concentrations, not the mass-based WLAs. And ensuring that discharges do not cause or contribute to exceedances of WQOs is already addressed via Provision A.2. Therefore, the inclusion of concentration-based receiving water limitations in the definition of the WQBELs is inconsistent with the assumptions and requirements of the WLAs and unnecessarily exposes Copermittees to MMPs without any requisite change to the protection of water quality. Throughout the Beaches and Creeks Bacteria TMDL, the BPA consistently refers to attaining the numeric targets (e.g., the water quality objectives) via receiving water limitations. Therefore, establishing the mass-based WLAs as the WQBELs and the numeric targets as receiving water limitations, is consistent with federal regulations for the incorporation of WLAs and the BPA for establishing the receiving water limitations.

The WQBELs should be defined only as the mass-based effluent limitations, consistent with the WLAs in the BPAs. While the Copermittees prefer that the receiving water limitations are simply addressed with a cross-reference back to Provision A.2, if the Regional Board prefers to keep the receiving water limitations as part of the TMDL provisions, they must be distinct from and excluded from the definition of the WQBELs.

The County recommends that the Tentative Order is modified to be consistent with the assumptions and requirements of the WLAs by incorporating the WLAs into the Tentative Order and defining the WQBELs as equal to the WLAs. Receiving water limitations should be excluded from the definition of WQBELs as they are not part of the WLAs. See ***Attachment B*** *for the specific requested modifications.*

69. Attachment E (Entire Attachment; Begins Page E-1) – Compliance Determination For Final WQBELs Should Be Based On The Implementation Of BMPs And Not Numeric Effluent Limitations

For interim water quality-based effluent limitations and receiving water limitations, A BMP-based path to compliance is provided via the implementation of an approved Water Quality Improvement Plan[81]. The Copermittees greatly appreciate and support this approach as it acknowledges the inherent challenges unique to stormwater management and provides appropriate flexibility to implement the necessary BMPs. However, the same approach is not applied to the final WQBELs.

A. Regional Board has Discretion to Establish BMP-Based Compliance

State and federal law do not require the use of numeric effluent limitations for MS4 Copermittees, but rather encourage flexible implementation of best management practices through an iterative process. Specifically, the choice to include either management practices or numeric limitations in MS4 permits is within the regulatory agency's discretion.

Over the last decade, EPA has issued a succession of policy memoranda and guidance documents regarding the incorporation of TMDLs into stormwater permits, including:

1) *Guidance for Developing TMDLs in California* (EPA Region 9). January 7, 2000
2) *Establishing Total Maximum Daily Load (TMDL) WLAs for Storm Water Sources and NPDES Permit Requirements Based on Those WLAs* (Wayland and Hanlon). November 22, 2002
3) *TMDLs to Stormwater Permit Handbook* (Draft) (EPA). November 2008
4) *Revision to the November 22, 2002 Memorandum "Establishing Total Maximum Daily Load (TMDL) Wasteload Allocations (WLAs) for Storm Water Sources and NPDES Permit Requirements Based on Those WLAs"* (Hanlon and Keehner). November 12, 2010
5) Untitled Letter (Kevin Weiss). March 17, 2011

In each of these EPA documents, EPA allows for discretion on the part of the permitting authority in the use of numeric effluent limitations for stormwater or BMP-based effluent limitations. This flexibility is a key aspect of both Wayland and Hanlon (2002), and Hanlon and Keehner (2010).

[81] Attachment E.5.e.(1)(f)); Attachment E.6.e.(1)(f)

Further, it is important to note that the EPA documents did not identify any differences in how interim and final WQBELs may be addressed by effluent limitations. In particular, the guidance did not limit BMP-based effluent limitation approaches to interim WQBELs.

EPA guidance does emphasize that NPDES provisions implementing TMDLs be enforceable, objective, and measurable. The Hanlon and Keehner memorandum notes that while numeric effluent limitations provide this type of accountability, effluent limitations expressed as BMPs can include objective and measurable elements. Such measurable elements might include as noted on page 3 of Hanlon and Keehner (2010), *"schedule for BMP installation or level of BMP performance"* or *"numeric benchmarks for BMPs and associated monitoring protocols or specific protocols for estimating BMP effectiveness."*

The Tentative Order provides for enforceable, objective, and measurable provisions via the Water Quality Improvement Programs (WQIPs). Establishing an additional compliance path for the final WQBELs would therefore be consistent with the approach already provided in the Tentative Order for interim WQBELs as well as guidance issued by EPA over the last decade in numerous policy memoranda and guidance documents.

B. Compliance Mechanism Matters

The Regional Board has the opportunity to exercise discretion in drafting and approving the compliance language in the Order; however, if the Regional Board continues to opt for numeric effluent limitations for final WQBELs, the Regional Board will no longer have discretion for enforcement decisions during implementation of the Order as Copermittees may be subject to Mandatory Minimum Penalties (MMPs). Such a limit on discretion matters both to Copermittees and the Regional Board.

Take for example a watershed where a group of Copermittees implement a suite of BMPs designed to achieve the final WQBELs. The Copermittees work closely with Regional Board staff and non-governmental organizations in developing and implementing the plan. Implementation of the BMPs achieves a 90% reduction in bacteria loads and results in the delisting of the waterbody from the State's 303(d) list, yet the reductions do not attain the WQBELs. Another Permittee does little to nothing to address the TMDL and achieves no reductions in bacteria loads, the waterbody continues to be listed as impaired on the State's 303(d) list, and the WQBELs are not attained.

If numeric effluent limitations continue as the compliance mechanism for final WQBELs, both Copermittees (the group that achieved the 90% reduction and the Copermittee that did little to nothing) would equally be out of compliance with the Order and equally subject to MMPs. If a BMP-based compliance option is provided for final WQBELs, the Regional Board would have the ability to exercise discretion. The Regional Board could continue to work with the group or Copermittees that are successfully implementing actions and evaluate appropriate additional actions. For the Copermittee that did little to nothing, the Regional Board would still be able to take appropriate enforcement action.

BMP-Based Compliance is not a request to decrease accountability or the efforts of the Copermittees or the commitment to water quality, it is a request for the Regional Board to utilize its discretion to establish Permit provisions that will support and reward actions taken by Copermittees that are achieving the intended purposes of the TMDLs.

C. Consistent with Regional Board Approach to Enforcement

A BMP-based compliance mechanism for final WQBELs is consistent with the Regional Board's stated approach to enforcement (as noted in the BPA establishing the Indicator Bacteria TMDL for Baby Beach):

> *"Regional Board typically implements enforcement through an escalating series of actions to:*
>
> > *(1) assist cooperative dischargers in achieving compliance; (2) compel compliance for repeat violations and recalcitrant violators; and (3) provide a disincentive for noncompliance." Baby Beach Bacteria TMDL BPA, pg. A-20*

The Regional Board can structure the final WQBEL compliance options to achieve this escalating approach to enforcement. A BMP-based compliance option can be provided via the implementation of the WQIPs where discrete milestones and actions are identified. For Copermittees that do not implement the WQIPs, this compliance mechanism would no longer be an option and Copermittees would be compelled to comply via the other mechanisms (essentially, no discharge or numeric effluent limitations). Such an approach achieves all three of the escalating compliance approaches identified by the Regional Board in the Baby Beach Bacteria TMDL, while numeric effluent limitations remove the Regional Board's discretion and will require that the Board treat cooperative dischargers and recalcitrant violators equally.

D. <u>Consistent with Basin Plan Amendments</u>

Establishing a BMP-based compliance path is also consistent with the Basin Plan Amendments for both TMDLs.

Beaches and Creeks TMDL (pg. A-41):

> *"The San Diego Water Board will revise and re-issue the WDRs and NPDES requirements for Phase I MS4s to incorporate the following:*
>
> *WQBELs consistent with the requirements and assumptions of the Municipal MS4 WLAs. WQBELs may be expressed as numeric effluent limitations, when feasible, and/or as a BMP program of expanded or better-tailored BMPs."*

Baby Beach Bacteria TMDL (emphasis added):

> *BPA, pg. A-14: WQBELs consistent with the requirements and assumptions of the bacteria WLAs described in Tables [Insert table numbers] and a schedule of compliance applicable to the MS4 discharges into the impaired shoreline segments described in Tables [Insert table numbers].* ***At a minimum, WQBELs shall include a BMP program to attain the WLAs.***
>
> *BPA, pg. A-15: If the WQBELs consist of BMP programs, then the reporting requirements shall consist of annual progress reports on BMP planning, implementation, and effectiveness in attaining the WQOs in impaired shoreline segments, and annual water quality monitoring reports.*
>
> *BPA, pg. A-19: The BLRPs are the municipal dischargers' opportunity to propose methods for assessing compliance with WQBELs that implement TMDLs.*

Additionally, the compliance schedule[82] anticipates revisions to the TMDL after the final compliance date, potentially through the Natural Sources Exclusion Approach (NSEA). It is inconsistent with the assumptions and requirements of the BPA to require strict compliance via numeric effluent limitations at Year 10 when the TMDL explicitly anticipates revisions occurring after that final date. The intent from the BPA is to have 10 years of implementation, evaluate progress, and assess if additional regulatory options (such as the NSEA) are necessary and/or

[82] BPA, pg. A-24

warranted. This approach can only be accomplished if BMP-based compliance is provided as an option for the final WQBELs.

E. BMP-Based Compliance is Not a "Safe Harbor"

The concept of "safe harbor" implies that Copermittees are not being held accountable, the requirements are not enforceable, and Copermittees will not be obligated to implement actions to address the TMDLs. However, BMP-based compliance can be structured to provide strict accountability and enforceability and require concrete and specific actions to be implemented. In fact, EPA guidance does emphasize that NPDES provisions implementing TMDLs be enforceable, objective, and measurable. The Hanlon and Keehner memorandum notes that effluent limitations expressed as BMPs can include objective and measurable elements. Such measurable elements might include as noted on page 3 of Hanlon and Keehner (2010), *"schedule for BMP installation or level of BMP performance"* or *"numeric benchmarks for BMPs and associated monitoring protocols or specific protocols for estimating BMP effectiveness."*

Additionally, the concept of "safe harbor" was raised during the hearing for the recently adopted Los Angeles Region MS4 Permit. The Regional Board as well as Executive Officer of the Regional Board directly addressed the question if BMP-based compliance, via the implementation of a Watershed Management Program (equivalent to the WQIPs), constituted a "safe harbor." Both the Board and Executive Officer clearly stated that BMP-based compliance was not a "safe harbor" for the Copermittees and the Watershed Management Programs provided objective and measureable elements whereby Copermittees would be required to implement actions and would have clear accountability.

F. Numeric Effluent Limitations are Not Feasible

Finally, in Hanlon and Keehner (2010) (EPA's policy memorandum regarding incorporation of TMDLs into stormwater Permits), states "EPA recommends that, where feasible, the NPDES permitting authority **exercise its discretion** to include numeric effluent limitations as necessary to meet water quality standards." (emphasis added). This statement highlights the basic principle that the Regional Board has discretion in how the WLAs are incorporated into the MS4 Permit. Further, the concept of feasibility relates to *achieving* the numeric effluent limitations, not to *calculating* a numeric effluent limitation. As all TMDLs have numeric WLAs, it would be "feasible" for most all TMDLs, from the very first TMDL ever established, to utilize numeric effluent limitations if simply calculating a WQBEL was the intended definition. As Wayland and Hanlon (2002) (EPA's policy memorandum regarding incorporation of TMDLs into stormwater Permits) noted EPA "expects that most WQBELs for NPDES-regulated municipal and small construction storm water discharges will be in the form of BMPs, and that numeric limits will be used only in rare instances." Therefore, in EPA's policy memoranda, the concept of feasibility is not related to the ability to simply calculate the WQBELs. The concept of "feasibility" really relates to whether or not *achieving* a numeric effluent limitations are feasible for the stormwater permit.

The State Water Resources Control Board convened a Blue Ribbon Panel in 2006 to investigate this very question – are numeric effluent limitations feasible for stormwater permits? This panel of national experts ultimately concluded that numeric limits were generally infeasible across all three stormwater activities (municipal, industrial, and construction), with a few exceptions.[83]

[83] *The Feasibility of Numeric Effluent Limits Applicable to Discharges of Stormwater Associated with Municipal, Industrial and Construction Activities, June 19, 2006*.

Therefore, without providing the BMP-based compliance option for Copermittees, the Tentative Order directly contradicts the State Water Resources Control Board's finding regarding the feasibility of achieving numeric effluent limitations for municipal stormwater discharges.

The County recommends that the Regional Board exercise its discretion and establish a BMP-based compliance path for final WQBELs by adding the following provisions as Attachment E.5.e(2)(f) and as Attachment E.6.e.(2)(e):

> *"The Responsible Copermittees have submitted and are fully implementing a Water Quality Improvement Plan, accepted by the San Diego Water Board, which provides reasonable assurance that the final compliance requirements will be achieved by the final compliance dates. A Responsible Copermittee that does not implement its WQIP in accordance with the milestones and compliance schedules shall demonstrate compliance with the final WQBELs pursuant to Attachment E.5.e(2)(a - e)/Attachment E.6.e(2)(a-d)."*

70. Attachment E (Entire Attachment; Begins Page E-1) – An Explicit Re-Opener Provision Is Necessary

In both the Baby Beach TMDL and the Beaches and Creeks TMDL, the BPAs have included an implementation schedule that defines a point at which the TMDL will be reconsidered to incorporate new information and potentially modify targets, allocations and/or implementation requirements. The intent of the approach is clear in both BPAs:

- **Beaches and Creeks TMDL:** There is an entire section of the Basin Plan Amendment that details modifications to the TMDL through a future Basin Plan Amendment. The BPA specifically notes (BPA pg. A49):

  "As the implementation of these TMDLs progress, the San Diego Water Board recognizes that revisions to the Basin Plan may be necessary in the future."

- **Baby Beach TMDL:** The intent to reassess this TMDL is built directly into several sections of the implementation plan as well as the compliance schedule (emphasis added):

  - *"The San Diego Water Board recognizes that there are potential problems associated with using indicator bacteria WQOs to indicate the presence of human pathogens in receiving waters free of sewage discharges. The indicator bacteria WQOs were developed, in part, based on epidemiological studies in waters with sewage inputs. The risk of contracting a water-born illness from contact with urban runoff devoid of sewage, or human-source bacteria is not known. Some pathogens, such as giardia and cryptosporidium can be contracted from animal hosts. Likewise, domestic animals can pass on human pathogens through their feces.* ***These and other uncertainties need to be addressed through special studies and, as a result, revisions to the TMDLs may be appropriate****." – BPA, pg. A-22*

  - *"Ultimately, the San Diego Water Board supports the idea of measuring pathogens (the agents causing impairment of beneficial uses) or an acceptable alternative indicator, rather than indicator bacteria (surrogates for pathogens). However, as stated previously, indicator bacteria have been used to measure water quality historically because measurement of pathogens is both difficult and costly. The San Diego Water Board is supportive of any efforts by the scientific community to perform epidemiological studies and/or investigate the feasibility of measuring pathogens directly.* ***The San Diego Water Board further supports***

subsequent modification of WQOs as a result of such studies. Ultimately, TMDLs will be recalculated if WQOs are modified due to results from future studies*."- BPA, pg. A-23*

- o Excerpt from Baby Beach Bacteria TMDL Compliance Schedule. Revisions to the TMDL are anticipated to occur in Year 10+ (after the final compliance date).

Table 1. Excerpt from Baby Beach Bacteria TMDL Compliance Schedule (BPA, pg. A-24). Revisions to the TMDL are anticipated to occur in Year 10+ (after the final compliance date).

Year (after OAL approval)	Required Wasteload Reduction	TMDL Compliance Action
10	100 percent *Enterococcus* reduction	• Water Quality Monitoring • Implement BMPs • Submit request for removal from 303(d) List • (if not requested and removed earlier)
10+	Same as above	• Water Quality Monitoring • Implement BMPs • **Submit request for TMDL revisions based on Natural Sources Exclusion Approach if supported by data (if not requested and recalculated earlier)** • Submit request for removal from 303(d) List (if not requested and removed earlier)

While the County is not advocating for technical revisions to the TMDL as part of the Tentative Order issuance (such revisions would appropriately occur through the Basin Plan Amendment process with any subsequent revisions incorporated into the Permit), there is a well documented level of uncertainty in the BPAs with the existing TMDLs where revisions to the targets, allocations, and implementation plans and schedules may be warranted. Such uncertainty should be incorporated into the provisions via an explicit re-opener in Provision H (Modifications of Programs) of the Tentative Order.

The explicit re-opener provision for the Tentative Order would serve two purposes:

- Provide a trigger to reconsider the compliance mechanism (BMP-based compliance in lieu of numeric effluent limits) prior to any compliance dates; and
- Ensure that the WQBELs are reconsidered, consistent with the intent of the TMDLs to revisit and revise as necessary the targets, allocations, and implementation actions prior to final compliance being required. This aspect is especially critical as the Beaches and Creeks re-opener would occur during this permit term (request must be made by Permittees by 2016) and the Baby Beach TMDL has final WQBELs compliance dates within the permit term (2014 and 2019).

While the County recognizes that the Regional Board has the authority to re-open the Permit at any time, the explicit re-opener captures the Regional Board's intent to revisit and revise as necessary the TMDL provisions, consistent with the assumption and requirements of the BPAs. Based upon the first year data summary for the on-going San Diego Regional Stream

Reference Study[84], such revisions may likely be warranted. The first year data show that during dry weather, the reference systems demonstrated a 34.1% exceedance rate of the single sample maximum and a 71% exceedance rate of the 30 day geometric mean for enterococci. The TMDL currently allows for a 0% exceedance rate during dry weather. During storm events, the reference systems had a 71% - 100% exceedance rate of the single sample maximum for enterococci. The TMDL currently only allows for a 22% exceedance rate during storm events. Providing the explicit reopener in the Permit will ensure that such compelling information, such as the results of the Reference Study, are considered prior to subjecting Copermittees to enforcement actions, such as Mandatory Minimum Penalties.

The explicit re-opener is consistent with the Regional Board's stated approach to enforcement, an escalating enforcement approach that contemplates "cooperative dischargers" as well as "recalcitrant violators." Lastly, such an approach was built into the recently adopted Los Angeles MS4 Permit[85].

The County recommends that an explicit Permit re-opener is provided, to capture the Regional Board's intent to revisit and revise as necessary the TMDL provisions prior to final compliance dates. The following additional language is requested as Provision H.6 and H.7:

H.6. Modifications of the Order shall be initiated to incorporate provisions as a result of future amendments to the Basin Plan, such as a new or revised water quality objectives or the adoption or reconsideration of a TMDL, including the program of implementation. As soon as practicable, but no later than 6 months of the effective date of a revised TMDL where the revisions warrant a change to the provisions of this Order, the Regional Water Board shall modify this Order consistent with the assumptions and requirements of the revised WLA(s), including the program of implementation.

H.7. Modification to the Order shall be considered 18 months prior to the compliance date for final WQBELs where the compliance mechanism is based upon numeric effluent limitations. The intent of the reconsideration is to include provisions or modifications to WQBELs in Attachment E of this Order prior to the final compliance deadlines, if practicable, that would allow an action-based, BMP compliance demonstration approach with regard to final WQBELs.

71. Attachment E (Entire Attachment; Begins Page E-1) – Compliance Mechanism Is Necessary Prior To Approval Of The Water Quality Improvement Plans

The Tentative Order currently provides for BMP-based compliance with interim WQBELs via the implementation of the WQIPs (Attachment E.5.e.(1)(f)); Attachment E.6.e.(1)(f)). However, as the BMP-based compliance mechanism is contingent upon implementation of an approved WQIP, the Copermittees are not provided with a BMP-based compliance mechanism during the development of the WQIPs. Without any modifications to the Tentative Order, the Copermittees would be subject to numeric effluent limitations for during WQIP development, then provided BMP-based compliance for interim WQBELs during WQIP implementation. Prior to the approval of the WQIPs, Copermittees should be provided a similar BMP-based compliance

[84] Southern California Coastal Water Research Project (SCCWRP). San Diego Regional Stream Reference Study, Monitoring Progress Report #3 and Year 1 Data Summary, October 2011 through November 2012. January 3, 2013.
[85] R4-2012-0175

mechanism while resources are devoted to plan development and the continuation with the implementation of the existing programs.

Recognizing that the shift to a watershed approach is an important and necessary shift in the management of stormwater, in the recently adopted Los Angeles MS4 Permit[86], such compliance was provided during the plan development phase.

The County recommends that the TO provide BMP-based compliance as a compliance option during the development of the WQIPs, the Copermittees request that the following provisions are added

- *Interim WQBELs Compliance (Attachment E.5.e(1) and Attachment E.6.e(1)):*

  Upon the effective date of this Order, a Copermittee's full compliance with all of the following requirements shall constitute a Copermittee's compliance with provisions pertaining to interim WQBELs with compliance deadlines occurring prior to approval of a WQIP.

  (1) Meets all interim and final deadlines for development of a WQIP,

  (3 Targets implementation of watershed control measures in its existing storm water management program, including watershed control measures to eliminate non-storm water discharges of pollutants through the MS4 to receiving waters, to address known contributions of pollutants from MS4 discharges that cause or contribute to the impairment(s) addressed by the TMDL(s), and

  (4) Receives final approval of its WQIP from the Regional Board.

- *If the Regional Board makes modifications to provide for a BMP-based compliance path for final WQBELs, the same revisions are requested to be added to Attachment E.5.e(2) and Attachment E.6.e(2).*

[86] R4-2012-0175

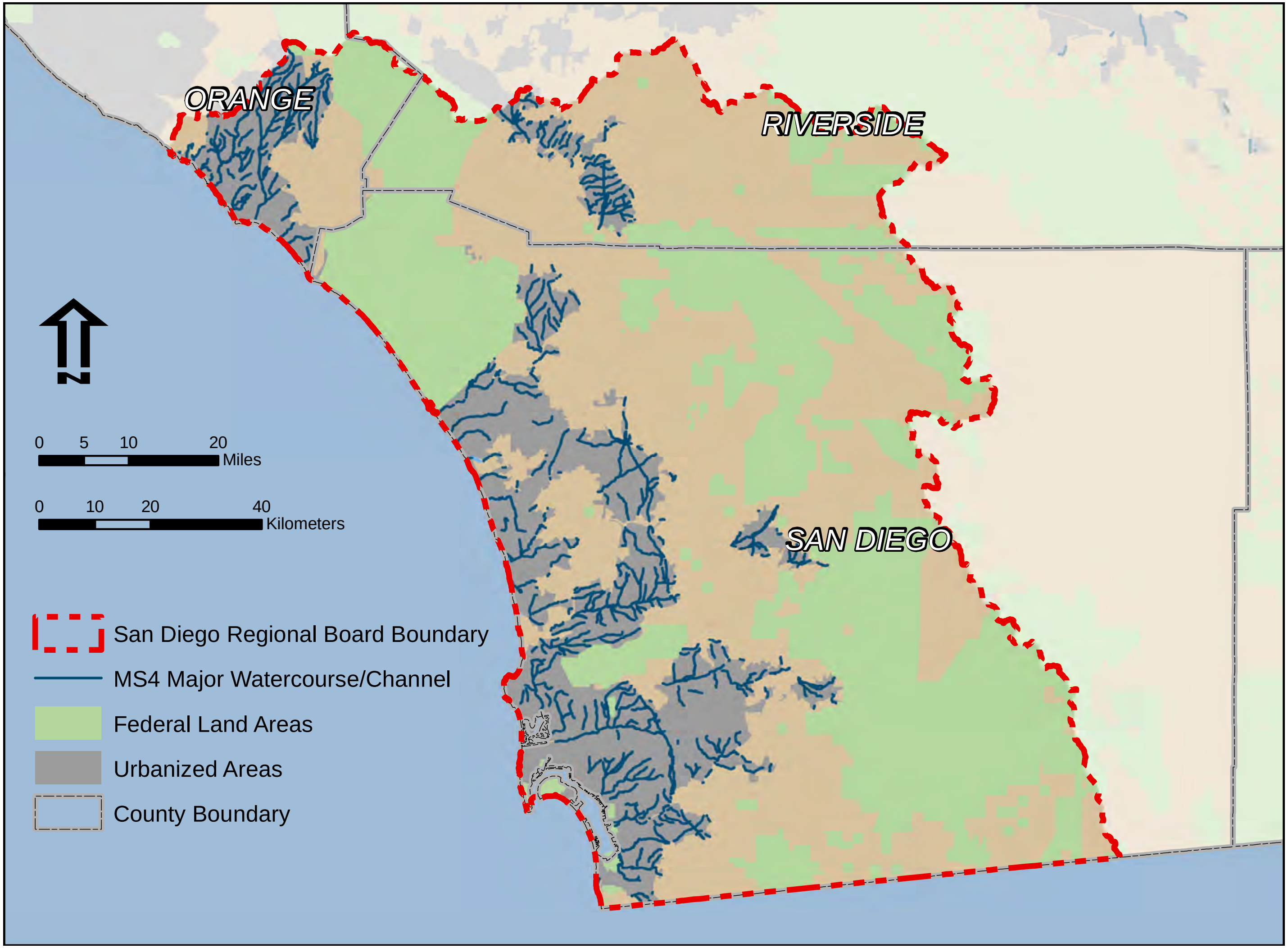
ATTACHMENT A

**ORANGE COUNTY LEGAL &TECHNICAL COMMENTS ON
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION
TENTATIVE ORDER No. R9-2013-0001
NPDES NO. CAS0109266**

Appendix A-1

Regional Map

April 10 and 11, 2013
Item No. 8
Supporting Document No. 5



April 10 and 11, 2013
Item No. 8
Supporting Document No. 5

ATTACHMENT A

ORANGE COUNTY LEGAL &TECHNICAL COMMENTS ON CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD SAN DIEGO REGION TENTATIVE ORDER No. R9-2013-0001 NPDES NO. CAS0109266

Appendix A-2

SCCWRP Report

April 10 and 11, 2013
Item No. 8
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HYDROMODIFICATION ASSESSMENT AND MANAGEMENT IN CALIFORNIA

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Southern California Coastal Water Research Project
Technical Report 667 - April 2012

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Hydromodification Assessment and Management in California

Commissioned and Sponsored by California State Water Resources Control Board Stormwater Program

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April 2012

Technical Report 667

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EXECUTIVE SUMMARY

Most jurisdictions in California are now required to address the effects of *hydromodification* through either a municipal stormwater permit or the statewide construction general permit. Hydromodification is generally defined as changes in channel form associated with alterations in flow and sediment due to past or proposed future land-use alteration. Hydromodification management has emerged as a prominent issue because degradation of the physical structure of a channel is often indicative of and associated with broader impacts to many beneficial uses, including water supply, water quality, habitat, and public safety. Conversely, reducing hydromodification and its effects has the potential to protect and restore those same beneficial uses. Although hydromodification has the potential to affect all water body types, this document focuses on assessing and managing effects to streams because they are the most prevalent, widely studied, and arguably most responsive type of receiving water.

Hydromodification by definition results from alteration of watershed processes; therefore, correcting the root causes of hydromodification ought to be most effective if based on integrated watershed-scale solutions. To date, such a watershed approach has not been adopted in California; most hydromodification management plans simply consist of site-based runoff control with narrow, local objectives and little coordination between projects within a watershed. Furthermore, each municipality is required to develop its own approach to meeting hydromodification management requirements rather than drawing from standard or recommended approaches that facilitate regional or watershed-scale integration. Long-term reversal of hydromodification effects, however, will require movement away from reliance on such site-based approaches to more integrated watershed-based strategies.

This document has two goals, and hence two audiences. The first goal is to describe the elements of effective hydromodification assessment, management and monitoring. The audience for this goal is primarily the State and Regional Water Boards, since meeting this goal will require integration of watershed and site-scale activities that are likely beyond the responsibility or control of any individual municipality. Success will require fundamental changes in the regulatory and management approach to hydromodification that will likely advance only iteratively and potentially require one or more NPDES permit cycles to fully implement. The second goal of this document is to provide near-term technical assistance for implementing current and pending hydromodification management requirements. This goal can be achieved by municipalities within the construct of existing programs and therefore the primary audience for this aspect of the document is local jurisdictions. Achieving this goal will facilitate greater consistency and effectiveness between hydromodification management strategies, giving them a stronger basis in current scientific understanding.

Watershed analysis should be the foundation of all hydromodification management plans (Figure ES-1). This analysis should begin with a documentation of watershed characteristics and processes, and past, current, and expected future land uses. The analysis should lead to identification of existing opportunities and constraints that can be used to help prioritize areas of greater concern, areas of restoration potential, infrastructure constraints, and pathways for potential cumulative effects. The combination of watershed and site-based analyses should be used to establish clear objectives to guide management actions. These objectives should articulate desired and reasonable physical and biological conditions for various reaches or portions of the watershed and should prioritize areas for protection, restoration, or management. Strategies to achieve these objectives should be customized based on consideration of current and expected future channel and watershed conditions. A one-size-fits-all approach should be avoided. Even where site-based control measures, such as flow-control basins, are judged appropriate, their location and design standards should be determined in the context of the watershed analysis.

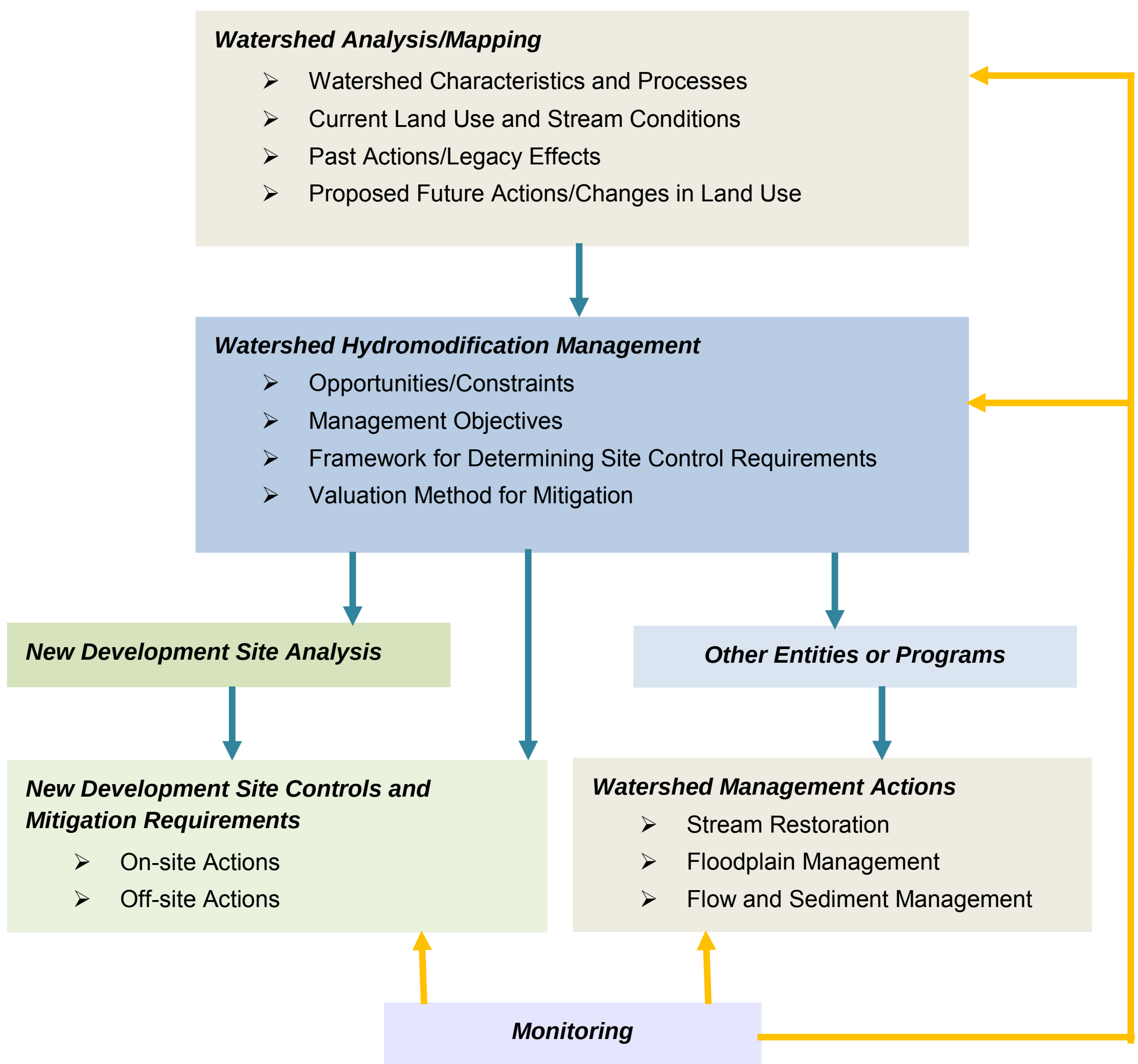


Figure ES-1. Framework for Integrated Hydromodification Management.

An effective management program will likely include combinations of on-site measures (e.g., low-impact development techniques, flow-control basins), in-stream measures (e.g., stream habitat restoration), floodplain and riparian zone actions, and off-site measures. Off-site measures may include compensatory mitigation measures at upstream locations that are designed to help restore and manage flow and sediment yield in the watershed.

Project-specific analysis and design requirements should vary depending on location, discharge point, and size. The range of efforts may include:

- Application of scalable, standardized designs for flow control based on site-specific soil type and drainage design. The assumptions used to develop these scalable designs should be conservative, to account for loss of sediment and uncertainties in the analysis and our understanding of stream impacts.
- Use of an erosion potential metric, based on long-term flow duration analysis and in-stream hydraulic calculations. Guidelines should specify stream reaches where in-stream controls would and would not be allowed to augment on-site flow control.
- Implementation of more detailed hydraulic modeling for projects of significant size or that discharge to reaches of special concern to understand the interaction of sediment supply and flow changes.
- Analysis of the water-balance for projects discharging into streams with sensitive habitat. This may include establishment of requirements for matching metrics such as number of days with flow based on the needs of species present.

Achieving these goals will require that hydromodification management strategies operate across programs beyond those typically regulated by NPDES/MS4 requirements. Successful strategies will need to be developed, coordinated, and implemented through land-use planning, habitat management and restoration, and regulatory programs. Regulatory coordination should include programs administered by the Water Boards, such as non-point source runoff control, Section 401 Water Quality Certifications and Waste Discharge Requirement programs, and traditional stormwater management programs. It should also include other agency programs, such as the Department of Fish and Game Streambed Alteration Program and the Corps of Engineers Section 404 Wetland Regulatory Program. Thus, all levels of the regulatory framework—federal, state, and local—will need to participate in developing and implementing such a program. The integrated watershed-based approach will likely take one or more permit cycles (i.e., at least ten years) to fully implement.

Short- and long-term recommendations for management are summarized in Table ES-1 below.

Table ES-1. Recommendations for implementing watershed-based hydromodification management.

Time Frame	Programmatic: State and Regional Water Boards	Local: City and County Jurisdictions
Short-term (<10 years)	• Establish consistent standards for HMPs • Promote use of watershed approaches in HMPs to move away from reliance on project-based management actions • Develop a valuation method to determine appropriate off-site mitigation • Transition to a broader set of monitoring endpoints including flow, geomorphology, and biology	• Implement watershed analysis of opportunities and constraints related to hydromodification • Implement a broader set of tools to improve on-site management actions • Develop institutional capacity to oversee and review modeling and assessment tools • Develop capacity for information/data management and dissemination
Long-term (1+ decades)	• Develop watershed-based regulatory programs and policies for hydromodification management • Integrate hydromodification management needs into other regulatory programs (e.g. TMDL, 401/WDR)	• Develop institution capacity to implement watershed-based hydromodification programs • Incorporate hydromodification and other water quality management into the land use planning process

To successfully accomplish these various recommendations for implementation, both agencies and private-sector practitioners will need to make use of a range of analytical tools. Such tools generally fall into three categories: descriptive tools, mechanistic models, and empirical/statistical models. Models may be used deterministically and/or in a probabilistic manner. These different types of tools can be selected or combined, depending on the specific objective, such as characterizing stream condition, predicting response, establishing criteria / requirements, or evaluating the effectiveness of management actions. Selection of tools should also consider the type of output, intensity of resource requirements (i.e., data, time, cost), and the extent to which uncertainty is explicitly addressed. It is important to note that deterministic modeling without accompanying probabilistic analysis may mask the uncertainties inherent in predicting hydromodification effects. Short-term and long-term recommendations for the application and improvement of tools to support the management framework are shown in Table ES-2.

Although there is sufficient scientific and engineering understanding of hydromodification causes and effects to begin implementing more effective management approaches now, improvements should be informed and adapted based on subsequent monitoring data. To be useful, monitoring programs should be designed to answer questions and test hypotheses that are implicit in the choice of management actions, such that practices that prove effective can be emphasized in the future (and those that prove ineffective can be abandoned). The focus of monitoring efforts, however, needs to be tailored to the time frame of the questions being addressed and the implementing agency (Table ES-3), reflecting the dual goals and audiences of this document.

Table ES-2. Recommendations for the application and improvement of tools in support of the proposed management framework.

Time Frame	Programmatic: State and Regional Water Boards	Local: City and County Jurisdictions
Short-term (<10 years)	• Develop quality control and standardization for continuous simulation modeling • Perform additional testing and demonstration of probabilistic modeling for geomorphic response • Pursue development of biologically- and physically-based compliance endpoints	• Work cooperatively with adjacent jurisdictions to implement hydromodification risk mapping at the watershed scale • Implement continuous simulation modeling for project impact analysis
Long-term (1+ decades)	• Improve tools for sediment analysis and develop tools for sediment mitigation design • Develop tools for biological response prediction • Improve tools for geomorphic response prediction	• Expand use of probabilistic and statistical modeling for geomorphic response • Apply biological tools for predicting and evaluating waterbody condition

Table ES–3. Recommendations for hydromodification monitoring.

Time Frame	Programmatic: State and Regional Water Boards	Local: City and County Jurisdictions
Short-term (<10 years)	• Define the watershed context for local monitoring (at coarse scale) • Evaluate whether permit requirements are making positive improvements	• Evaluate whether specific projects/ regulations are meeting objectives • Identify the highest priority action(s) to take
Long-term (1+ decades)	• Define watershed context and setting benchmarks for local-scale monitoring (i.e., greater precision, if/as needed) • Demonstrate how permit requirements can improve receiving-water "health," state-wide (and change those requirements, as needed)	• Evaluate and demonstrate whether actions (on-site, instream, and watershed scale) are improving receiving-water conditions • Assess program cost-effectiveness • Identify any critical areas for resource protection

Identifying and, ultimately, achieving the desired conditions in receiving waters requires multiple lines of evidence to characterize condition in an integrative fashion. At their most comprehensive, the chosen metrics should include measures of flow, geomorphic condition, chemistry, and biotic integrity. Biological criteria are key to integrative assessment: in general, biological criteria are more closely related to the designated uses of waterbodies than are physical or chemical measurements. This understanding is reflected in the State's proposed bio-objectives policy, which includes explicit links to hydromodification management.

In summary, transitioning from the current site-based to a more effective watershed-based approach to hydromodification management that addresses both legacy and future impacts will require cooperation between the State and Regional Water Boards and local jurisdictions. Both technical and regulatory/program approaches will need to be updated or revised altogether over the next several permit cycles to realize this long-term goal. Substantial resources will be necessary to realize these goals; therefore, opportunities for joint funding and leveraging of resource should be vigorously pursued from the onset. This cooperative approach should replace the current fragmented efforts among regions and jurisdictions.

1. Overview and Intended Uses of the Document

1.1 Overall Objectives and Intended Audience

Regulation and management of hydromodification is in its infancy in California. As with any new endeavor, initial attempts to meet this need is unproven, inconsistent, and relatively narrow in focus. To improve on existing efforts, the State Water Resources Control Board (SWRCB) has engaged a team of experts to provide technical support to both regulators and permittees for development of Hydromodification Management Plans (HMPs) and their associated permit requirements. This resulting document has two goals and hence two audiences.

The first goal of this document is to provide broad perspectives on what would constitute effective hydromodification assessment, management and monitoring, based on our current best scientific understanding of the topic. The audience for this goal is primarily the State and Regional Water Boards, since meeting this goal will require integration of watershed and site-scale activities that are likely beyond the control or responsibility of any individual municipality. Success will require fundamental changes in the regulatory and management approach to hydromodification that will likely be possible only iteratively and potentially requiring one or more NPDES permit cycles to fully implement. The State and Regional Water Boards will need to provide leadership in implementing these changes, but they will also need to work cooperatively with permittees so that planning, management and monitoring programs can be adapted to operate in a more integrated manner over the broader spatial scales and longer time frames that are necessary to achieve genuine success. Furthermore, hydromodification management plans will need to address preexisting conditions from previous (i.e., legacy) land uses. Clearly, addressing such past effects will require approaches beyond regulation of new development.

This document provides broad perspectives on what would constitute effective hydromodification assessment, management and monitoring, based on our current best scientific understanding of the topic. The document also provides near-term technical assistance for implementing current and pending hydromodification management requirements.

The second goal of this document is to provide near-term technical assistance for implementing current and pending hydromodification management requirements. This goal can be achieved by municipalities within the construct of existing programs, and therefore the primary audience for this aspect of the document is MS4 permittees. Achieving this goal will facilitate greater consistency and effectiveness between HMPs, giving them a stronger basis in current scientific understanding, and will also serve as initial steps toward realizing the broader goal stated above.

1.2 Rationale and Justification

The process of urbanization has the potential to affect stream courses by altering watershed hydrology and geomorphic processes. Development and redevelopment can increase impervious surfaces on formerly undeveloped landscapes and reduce the capacity of remaining pervious surfaces to capture and infiltrate rainfall. The most immediate result is that as a watershed develops, a larger percentage of rainfall becomes surface runoff during any given storm. In addition, runoff reaches the stream channel much more efficiently, so that the peak discharge rates for floods are higher for an equivalent rainfall than they were prior to development. This process has been termed hydromodification. In some instances, direct channel alteration such as construction of dams and channel armoring has also been termed “hydromodification.” Such direct alterations are not the focus of this document. Rather, this document focuses on the geomorphic and biological changes associated with changes in land use in the contributing watershed, which in turn alter patterns and rates of runoff and sediment yield. These changes can result in adverse impacts to channel form, stream habitat, surface water quality, and water supply that can alter habitat and threaten infrastructure, homes, and businesses.

The State and Regional Water Boards have recognized the need to manage and control the effects of hydromodification in order to protect beneficial uses in streams and other receiving water bodies. This recognition has led to the inclusion of requirements for development of “hydromodification management plans” (HMPs) in many Phase 1 and some Phase 2 Municipal Stormwater (MS4) permits. Most HMPs require the permitted municipalities to develop programs and policies to assess the potential effects of hydromodification associated with new development and redevelopment, to require the inclusion of management measures to control the impacts of hydromodification, and to develop monitoring programs to assess the effectiveness of HMP implementation at controlling and/or mitigating the impacts of hydromodification.

Development of HMPs is challenging for several reasons. First, there are few accepted approaches for assessing the impacts of hydromodification. Traditional modeling tools are generally untested and may be difficult to apply or inappropriate for use in some California watersheds and streams. Responses of streams to hydromodification are difficult to assess, given inherent climatic variability and the highly stochastic nature of rainfall and the resulting response of streams to runoff events. There are few local examples or case studies from which to draw experiences or conclusions.

As a result of these challenges, individual HMPs to date have utilized a variety of approaches with little coordination or consistency between them. Little information is available on the relative efficacy of any of these approaches. Furthermore, where approaches and tools developed for HMPs in one region of the State (or even from a different region of the country altogether) have been used in subsequent HMPs elsewhere, there has been little or no consideration of the effect of regional climatological or physiographical differences on the transferability of analytical techniques and tools.

1.3 Need for an Expanded Approach

Current site-based hydromodification management approaches are limited in their ability to address the underlying processes that are responsible for most deleterious impacts of hydromodification. Hydromodification effects, by definition, are watershed-dependent processes that are influenced by water and sediment discharge, movement, and storage patterns that may be occurring up- or downstream of a specific project site. Ideally, then, the first step of any hydromodification management plan (HMP) should be a watershed analysis; management of processes at the site or project scale should be done only in the context of such a watershed analysis. Understanding larger-scale processes facilitates prioritization of activities in areas of greatest need and allows for management measures to be located where they have the largest potential benefit, even if that is not on or adjacent to the project site where the current impact is occurring. It also allows for expansion of site based management beyond simple flow control and/or channel stabilization toward strategies that consider flow, sediment, and biological conditions as an integrated set of desired endpoints.

Because watershed boundaries are often not the same as geopolitical boundaries of cities or counties, incorporation of watershed analysis will require leadership from the State and Regional Water Boards. Changes to the current regulatory structure may be necessary to accommodate inter-jurisdictional cooperation and regional information sharing. Similarly, program implementation by both large and small municipalities must include mechanisms that allow site-specific decisions to be informed by watershed-scale analysis.

This document is intended to help address some of these challenges and needs by providing technical recommendations, both to state and regional program developers and to local implementing agencies, for assessment, modeling, development of management strategies, and monitoring. This document can support current HMP development and, at the same time, serve as a first step toward achieving the longer term goals of more integrated, watershed-based hydromodification management.

Current site-based approaches are limited in their ability to address the underlying processes that are responsible for hydromodification impacts.

Effective management of hydromodification will require coordinated approaches across programs at the watershed scale that address all aspects of runoff, sediment generation and storage, instream habitat, and floodplain management.

Adopting this broader approach means that managing the effects of hydromodification cannot be the purview of the stormwater (MS4) program alone. Effective management of hydromodification will require coordinated approaches across programs at the watershed scale that address all aspects of runoff, sediment generation and storage, instream habitat, and floodplain management. Various SWRCB programs have the opportunity and ability to contribute to the goals of comprehensive hydromodification management, including the non-point source control program, water quality certifications, waste discharge requirements, basin planning, SWAMP, and the emerging State Wetland Policy and Freshwater Bio-objectives program. Each of these programs can take advantage of the tools and approaches outlined in this paper to contribute to coordinated management of hydromodification in order to protect beneficial uses and meet basin plan objectives. Furthermore, successful control and mitigation of hydromodification effects will support other programs by improving water quality, enhancing groundwater recharge, and protecting habitat. Therefore, hydromodification management can be a unifying element of many programs and support integrated regional watershed planning.

It is important to note that hydromodification has the potential to affect all water body types; therefore, HMPs should address potential effects to all streams and receiving waters. Because streams are most directly affected by hydromodification, they have been the focus of current regulatory requirements and, therefore, most HMPs. Consequently, this document emphasizes tools and approaches applicable to fluvial systems, which are broadly defined to include wadeable streams, large rivers, headwater streams, intermittent and ephemeral drainages, and alluvial fans (although new specific tools may be necessary for assessment and management of alluvial fans). We recognize, however, that hydromodification can also affect nearshore and coastal environments, including bays, harbors, and estuaries, by altering estuary channel structure, water quality, sand delivery, siltation, and salinity. These effects have been less extensively studied or documented and have received substantially less attention in current hydromodification requirements. Future efforts should more directly address hydromodification effects to all receiving waters, but the information is not presently available to provide equally comprehensive guidance here.

1.4 Scope and Organization

This document is not intended to be prescriptive or to serve as a "cookbook" for development of hydromodification management strategies. Rather, it is a resource to evaluate the utility of existing tools and approaches, and it proposes a framework for integrating multiple approaches for more comprehensive assessment and management. This framework should be used to aid in the development of HMPs that are appropriate for specific regions and settings and take advantage of the best available science. It can also be used to improve consistency in assessment and monitoring approaches so that information collected across regions and programs can be compiled and leveraged to provide more comprehensive assessments of the effectiveness of management actions. Ultimately, such consistency should improve the effectiveness of all programs.

The authors, a team of technical experts, developed the content for this document in consultation with agency staff and regulated entities. The document begins with a brief general discussion of the effects of hydromodification and stream response mechanisms, providing the best available science to support subsequent recommendations. The main body of the document focuses on presenting a proposed new management paradigm where site-based management is nested within an overall watershed assessment that accounts for past, current, and proposed future land use. The body of the document also includes a discussion of existing tools and how they can be used more effectively and appropriately to evaluate potential impacts and guide decisions on selection and design of management practices. The third major section of the document focuses on monitoring that includes evaluation of hydrologic, geomorphic, and biologic conditions with an overriding goal of adaptive management. The document concludes with several technical appendices that offer specific guidance on the appropriate application of tools and models within the existing HMP approaches, and a bibliography of resources.

2. HYDROMODIFICATION SCIENCE

2.1 Introduction

Land-use changes can alter a wide variety of watershed processes, including site water balance, surface and near-surface runoff, groundwater recharge, and sediment delivery and transport. Although alteration to these watershed processes (referred to collectively as hydromodification) can affect many elements of a landscape, the focus of this document is on impacts to stream systems. Furthermore, while this paper will often refer to urbanization, it is recognized that other types of land-use changes (grazing, agricultural, forestry, etc.) can have similar impacts. This section reviews relevant hydrologic processes and summarizes the impact of urbanization on hydrologic, biologic, and geomorphic systems, and it describes our current understanding of the physical mechanisms underlying these impacts. This provides a foundation for establishing assessment tools and predictive models, as well as for developing management and monitoring programs.

Although not addressed by this report, urbanization also has a range of effects on water quality (*Heaney and Huber* 1984, *Brabec et al.* 2002) by increasing pollutant loads (*Owe et al.* 1982), increasing nutrient loads (*Wanielista and Yousef* 1993, *Hubertz and Cahoon* 1999), and diluting dissolved minerals through increased runoff and decreased infiltration and soil contact (*Loucaides et al.* 2007). As a result of both its physical and chemical effects, urbanization also affects the integrity of biota (*Heaney and Huber* 1984) including fishes (*Klein* 1979, *Weaver and Garman* 1994, *Wang et al.* 2000) and invertebrates (*Sonneman et al.* 2001, *Wang and Kanehl* 2003). These impacts are acknowledged and evaluated in the discussion of monitoring Section 4, but the details of their interactions and effects are not otherwise addressed here.

Land-use changes can alter a wide variety of watershed processes, including site water balance, surface and near-surface runoff, groundwater recharge, and sediment delivery and transport. Alteration to these watershed processes are referred to collectively as hydromodification.

2.2 Hydrology Overview

To understand the effects of urbanization, the basic processes of the hydrologic system must be highlighted. A watershed's drainage system consists of all the features of the landscape that water flows over or through (*Booth* 1991). These features include vegetation, soil, underlying bedrock, and stream channels. Urban elements such as roofs, gutters, storm sewers, culverts, pipes, impervious surfaces such as parking lots and roads, and cleared and compacted surfaces fundamentally change the rate and character of hydrologic processes. Generally, the hydrologic changes associated with development and urbanization increases the speed and efficiency with which water enters and moves through the drainage system. In undeveloped watersheds, only a portion of the precipitation that falls ever enters the stream channel. Instead, precipitation may be: 1) evaporated off the ground surface or intercepted by vegetation and evaporated; 2) transpired from the soil; or 3) infiltrated deeply into regional aquifers. For the portion of precipitation that ultimately enters the stream, the rate and processes of delivery vary between watersheds, with important implications for how urbanization will affect runoff.

Flow can be classified as stormflow (or "quickflow") if it enters the stream channel within a day or two of rainfall (*Dunne and Leopold* 1978). Quickflow occurs through 1) infiltration excess (also called "Horton") overland flow, wherever rainfall intensity exceeds the infiltration capacity of the soil and water flows over the ground surface; 2) saturation excess overland flow, where overland flow occurs following filling of all pore space in surface soils; 3) shallow subsurface flow, where water flows relatively quickly through permeable shallow soils (but still more slowly than either Horton or saturation overland flow); and 4) precipitation directly into stream channels. Conversely, water that infiltrates more deeply is classified as delayed flow, because it travels slowly as deep groundwater and emerges into a stream slowly over time.

As a storm progresses, runoff patterns and rates can change, even within the same catchment. For example, surficial soils may become saturated during the course of a storm (or a storm season) as the water table rises, and this can induce a shift in runoff from shallow (or even deep) subsurface flow to the quickflow process of saturation excess overland flow (*Booth* 1991). Even under scenarios in which rainfall intensity exceeds infiltration capacity, Horton overland flow will not be connected to stream channels until surface depressions are filled.

2.3 Impacts of Urbanization

The archetypal model of development involves clearing vegetation; grading, removing, and compacting soils; building roads and stormwater sewers; constructing buildings; and re-landscaping. The specific ways in which these activities alter runoff processes are discussed below. Development may also directly alter stream, such as through channel straightening, levee construction, and flood control reservoirs; however, discussion of the impacts of these alterations is beyond the scope of this document.

2.3.1 Decreased Interception

When rainfall occurs in a watershed, some of the precipitation will be intercepted by vegetation and leaf litter and prevented from entering the stream channel network (Figure 2-1). The percentage of precipitation that can be intercepted varies according to cover type and the character of rainfall (rainfall intensity, storm duration, storm frequency, evaporation conditions) (*Dunne and Leopold* 1978). The effectiveness of interception decreases as a storm progresses because once the surface area of a tree is completely wetted, water will drip off leaves and run down the vegetation as stem flow. Typically, 10-35% of precipitation is intercepted by trees and 5-20% by crops, though these amounts vary widely (*Dunne and Leopold* 1978, *Xiao and McPherson* 2002, *Reid and Lewis* 2009, *Miralles et al.* 2010). In urban environments where vegetative cover is greatly reduced, landscape-scale interception may be lower by an order of magnitude (*Xiao and McPherson* 2002). Precipitation that is not intercepted enters the drainage system. Thus, the mere reduction in interception in urban areas may produce the hydrologic equivalent of a storm that is 10-30% larger.

Figure 2-1. Vegetation reduces runoff by intercepting a portion of the total rainfall and preventing water from entering the drainage system. (Illustration by Jennifer Natali).

The influence of urbanization on climate is complex and varied. For example, urbanization has been shown to increase temperature (*Kalnay and Cai* 2003), increase or decrease wind speeds (*Oke* 1978, *Balling and Brazel* 1987, *Grimmond* 2007), increase pan-evaporation rates (*Balling and Brazel* 1987), and increase shading of the ground surface (*Kalnay and Cai* 2003). In most studies of urban hydrology, the dynamics of evapotranspiration (ET) are typically, explicitly or implicitly, ignored (*Grimmond and Oke* 1999). This exclusion exists because of the widespread assumption that urban ET is negligible compared to rural areas with higher proportions of vegetation-covered soils (*Chandler* 1976, *Oke* 1979). In cases such as urban deforestation in the temperate Eastern United States, it is appropriate to assume a net loss of ET due to urbanization (*Bosch and Hewlett* 1982, *Sun et al.* 2005, *Roy et al.* 2009). However, spatial variability and the site-specific dynamics of climate, vegetation, and land-use should be considered carefully in arid and semi-arid regions where vegetation is limited prior to development. In drier climates (including much of southern California), primary productivity (and ET) may be substantially increased through the irrigation of urban landscaping (*Buyantuyev and Wu* 2008).

2.3.2 Decreased Infiltration

Infiltration in urban areas is decreased due to several factors: impermeable surfaces such as roads, parking lots, and roofs prevent infiltration by blocking water from reaching soils; heavy-equipment construction operations cause soil compaction and degrade soil structures; construction projects may remove surface soils and expose subsurface soils with poorer infiltration capacity; vegetation-clearing and bare-earth construction increase erosion and loss of topsoil (*Pitt et al.* 2008). The effect of impervious surfaces is intuitive, visible, and dramatic (*Booth and Jackson* 1997), but not all impervious areas affect runoff processes equally. For example, if an impervious surface is built over clayey soils with poor infiltration, the overall runoff rates will be less affected than if built over sandy soils with high natural infiltration rates. While the loss of pervious area has received substantial attention within scientific and policy communities, until recent years considerably less attention has been paid to the effects of compaction and the reductions in infiltration capacity of soils (*Pitt et al.* 2008). Commonly, an area of green is assumed to be permeable, but playing fields and even ornamental lawns may have very low infiltration capacities (*Pitt et al.* 2008). A study of urban runoff in Washington found that impervious areas generated only 20% more runoff than what appeared to be green, pervious areas of lawns (*Wigmosta et al.* 1994). Factors such as excavation and lawn-establishment methods appear to be more significant for infiltration than any other factor including grain size of the original sediments (*Hamilton and Waddington* 1999). Tillage may increase infiltration slightly, while compost or peat soil amendments can increase infiltration by 29 to 50 percent (*Kolsti et al.* 1995).

2.3.3 Increased Connectivity and Efficiency of the Drainage System

Rainfall in urban areas moves quickly as overland flow into storm sewers and the stream channel network (Figure 2-2). The delivery of precipitation into urban stream channels is extremely efficient, transforming essentially all precipitation into stormflow and creating nearly instantaneous runoff. Under natural conditions, in contrast, most runoff to streams is via groundwater paths that typically flow at least one or two orders of magnitude slower than surface water. Thus converting subsurface flow into surface stormflow has dramatic consequences. Furthermore, artificial surfaces such as roofs, pavement, and storm sewers are 1) straight, which shortens the travel distance required for delivery into the channel network; and 2) smooth, which decreases friction and allows flow to travel more quickly than in natural channels (*Hollis* 1975). Storm sewer systems increase the density of "channels," which further shortens runoff travel distances (Figure 2-3). In particular, upland regions that may not have had any surface channels prior to urbanization are frequently fitted with storm sewers, which dramatically increase delivery efficiency into the channel network (*Roy et al.* 2009). In sum, urbanization transforms watershed processes and flow paths that were once slow, circuitous, and disconnected into engineered and non-engineered systems that are highly efficient, direct, and connected.

In contrast to the slow measured runoff to natural streams by surface and subsurface pathways, the delivery of precipitation into urban stream channels is extremely efficient, transforming essentially all precipitation into stormflow and creating nearly instantaneous runoff.

2.3.4 Decreased Infiltration into Stream Beds

Concreting of bed and banks, channel narrowing, and channel straightening limit infiltration from a stream into the ground. Concrete channel margins create infiltration barriers, while channel narrowing and straightening limit the surface area accessible for infiltration and also create a less complex channel. Channel complexity such as pools, riffles, steps, and debris dams create hydraulics that slow flow velocities and also divert water into the subsurface (*Lautz et al.* 2005). In arid and semi-arid watersheds where streams may flow only occasionally, infiltration through bed, banks, and floodplain areas may significantly lower peak flows and may sustain aquifers vital to regional water supplies and natural habitats (*Kresan* 1988, *Dahan et al.* 2008). Increasing recognition is being paid in the scientific literature to the infiltration services provided by natural channels and floodplains (*Macheleidt et al.* 2006, *Schubert* 2006).

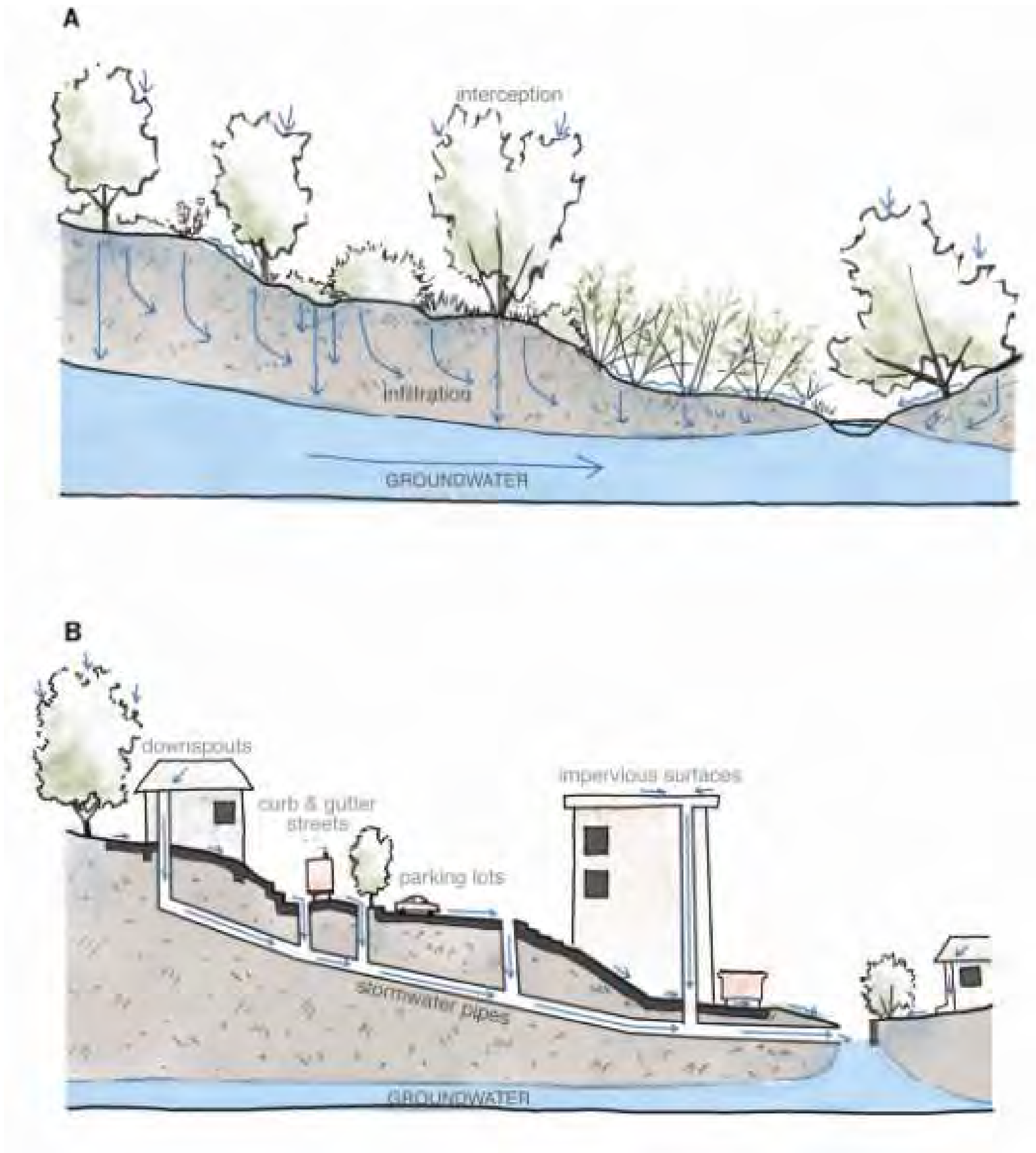


Figure 2-2. Stormwater flowpaths are shortened and quickened through paving, building, soil compaction, and sewer infrastructure. The rapid concentration of streamflow increases storm peaks. Rapid runoff and reduced infiltration prevent groundwater recharge. (Illustration by Jennifer Natali).

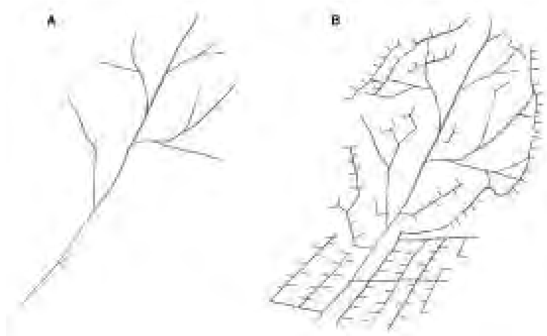


Figure 2-3. Increased surface runoff causes an extension of the channel network. This occurs through increased channel erosion or through constructed networks (to manage increased surface flow). The expanded channel network delivers runoff to downstream reaches much more efficiently. (Illustration by Jennifer Natali).

2.4 Changes in Instream Flow

The instream flow changes resulting from urbanization depend upon site-specific watershed and development characteristics, but typically they include modification of the timing, frequency, magnitude, and duration of both stormflows and baseflow. Urbanization has been shown to increase the magnitude of stormflows, increase the frequency of flood events, decrease the lag time to peak flow, and quicken the flow recession (Figure 2-4; *Hollis* 1975, *Konrad and Booth* 2005, *Walsh et al.* 2005). Because the effects of urbanization manifest differently for different components of the hydrograph, the hydrologic alterations of moderate storms, large storms, and baseflow are discussed individually below.

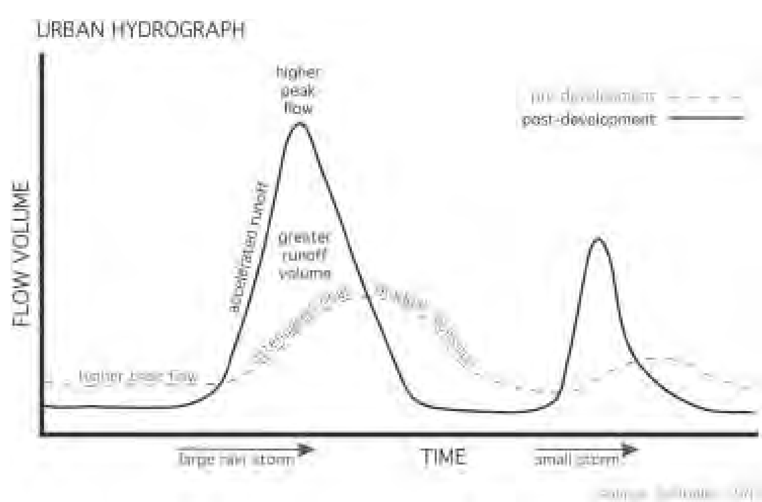


Figure 2-4. Increased runoff efficiency causes higher magnitude peak flows, shorter duration runoff events, decreased baseflow, and dramatic increases in small storms that may have generated little or no runoff under pre-development conditions. (Illustration by Jennifer Natali).

2.4.1 Moderate Stormflow

Urbanization of a watershed can drastically increase the frequency and magnitude of small and moderate flow events (Hawley and Bledsoe 2011). The magnitude of flow amplification increases generally in proportion to the amount of impervious area (*Leopold* 1968, *Hollis* 1975). For example, flows with a return period of one year or longer were shown to be unaffected by paving 5% of the watershed, yet the magnitude of a one-year flow could be more than ten times higher when 20% of a watershed is paved (*Hollis* 1975). In undeveloped watersheds, small storms may not generate any overland flow or streamflow increase at all, because interception, infiltration, soil absorption, and evapotranspiration contain all the precipitation.

Urbanization of a watershed can drastically increase the frequency, duration, and magnitude of small and moderate flow events by factors of 10 or more.

The change to a flashier regime with larger magnitude streamflow generated from small and moderate storms has two primary consequences. First, the stream power and sediment-transport capacity of the stream increase significantly, potentially creating channel erosion and/or stressing instream biota. Second, the season of stormflow is likely to be extended. In undeveloped watersheds, early or late-season storms typically do not generate significant runoff because soils are dry, can effectively absorb most precipitation, and therefore do not generate overland flow or streamflow. Antecedent moisture conditions are less important in urban watersheds where overland flow is generated regardless, and streamflow is generated by even a small storm in a dry watershed. Through magnifying small and moderate storms, urbanization may increase the duration of sediment-transporting and habitat-disturbing flows by factors of 10 or more (*Booth* 1991, *Booth and Jackson* 1997).

2.4.2 Large, Infrequent Storms

In large storms with return intervals of 10 or more years, the influence of urbanization is less pronounced though still present. Whereas a 1-year stormflow may be increased by ten times by paving 20% of the watershed, historical data from humid-region watersheds suggest that the peak magnitude of a 100-year flood would not even be doubled (*Hollis* 1975). The diminishing influence of urbanization on floods of higher recurrence intervals is understood by recognizing that the hydrologic processes of large storms resemble the processes of urban runoff. Essentially, a 100-yr flood is an event that is long in duration, severe in intensity, and likely occurs when soils are already wet. Even in an undeveloped watershed, a storm of this magnitude can typically generate (saturation) overland flow and transport water efficiently into the channel network in a manner more generally comparable to an urban setting.

2.4.3 Baseflow

Urbanization does not affect instream baseflows consistently. Many studies have documented baseflow reductions and/or lowered groundwater levels that have been attributed to decreased infiltration (*Simmons and Reynolds* 1982, *Ferguson and Suckling* 1990) and groundwater extraction (*Postel* 2000). In extreme cases, baseflow in urban watersheds can disappear completely during drought years, dry seasons, or even between storm events during the wet season. The effect of reducing infiltration may be counteracted in urban and suburban landscapes, however, through irrigation of lawns, parks, golf courses, and other water inputs such as septic systems, leaky pipes, and sewage treatment outflow which typically import water from outside the watershed and contribute to both streamflow and groundwater recharge (*Konrad and Booth* 2005, *Walsh et al.* 2005, *Roy et al.* 2009). Indeed, imported water volumes in very dense cities may be an order of magnitude greater than precipitation. Lerner (2002) judged that leakage in water importation and delivery infrastructure typically ranges from 20-50%, and in general this leakage will increase groundwater recharge in urban areas. Similarly, other studies have found municipal irrigation capable of raising groundwater levels and causing surface flooding (*Rushton and Al-Othman* 1994) and changing ephemeral streams into perennial streams (*Rubin and Hecht* 2006, *Roy et al.* 2009). In summary, the magnitude and direction baseflow and groundwater recharge alteration depends on climate, land use, water use, and the infrastructure system of the watershed. There are no simple "rules."

2.5 Changes in Sediment Yield

The role of watershed sediment yield in the behavior of watersheds was first characterized systematically by Wolman (1967) in a three-part conceptual framework of how rivers respond to urban development, in which 1) pre-development quasi-equilibrium conditions are followed by 2) a period of active construction involving grading, vegetation removal, and bare earth exposed to erosion; and 3) the establishment of an urban landscape consisting of pavement, houses, gutters and sewers etc. The construction period is marked by an increase in sediment (typically 2-10 times pre-development rates) produced from bare surfaces and the disturbances associated with construction (*Chin* 2006). The sediment produced during construction is often deposited within stream channels, initiating aggradation and/or channel widening. Following the construction period, sediment production decreases (Figure 2-5) and runoff increases, resulting in increased transport capacity and the potential for severe channel erosion that can result in channel enlargement of commonly 2-3 (and as much as 15) times the original channel cross-section (*Chin* 2006). Changes in post-construction sediment production rates are not well studied, though case studies have found sediment yields in post-construction watersheds to be somewhat higher than rural, undeveloped basins.

The combination of increased runoff and decreased sediment production can result in channel enlargement of commonly 2-3 (and as much as 15) times the original channel cross-section.

Post-construction sediment loads are typically derived from channel enlargement as a result of increased peak flows and the legacy of construction-phase disturbance (*Trimble* 1997, *Nelson and Booth* 2002). The rate of decline in post-construction sediment yields is therefore predominantly controlled by the degree of channel instability caused by the construction phase and the effect of increased peak flows. If the channel margins are armored, densely vegetated, or otherwise erosion resistant, sediment yields may decline quickly following urbanization. If channel instability ensues, elevated sediment yields may persist for decades or more.

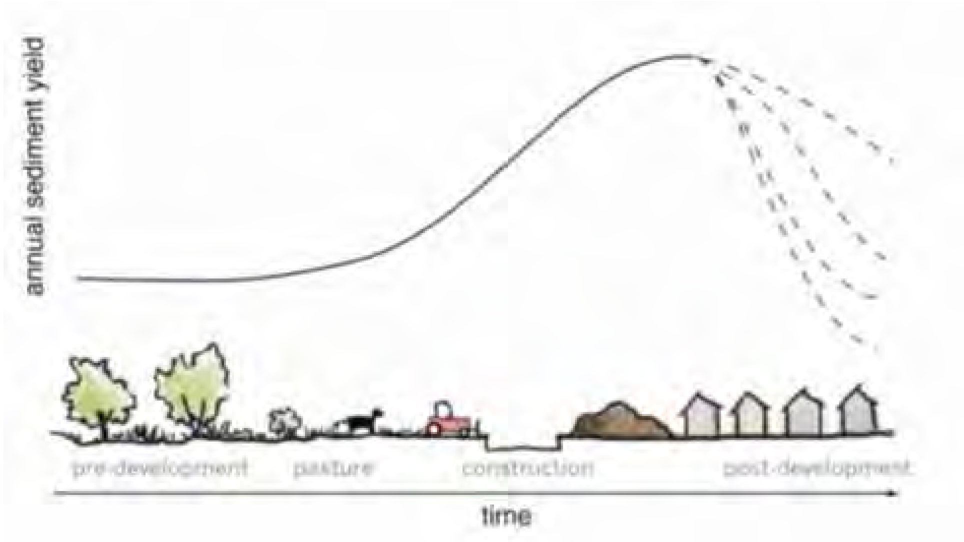


Figure 2-5. Increased sediment yields occur during the land-clearing and construction phases of development. Post-construction sediment yields decrease, though the rate of decrease varies considerably depending on the degree of channel instability caused by the construction phase and by increased runoff. (Illustration by Jennifer Natali).

2.6 Impacts on Channel Form and Stability

Channel form and stability reflect both hydrologic and geomorphic processes. Changes to runoff characteristics and sediment supply can affect all aspects of stream morphology, including planform, cross-sectional geometry, longitudinal profile, bed topography (e.g., pools, riffles), and bed sediment size and mobility. While many factors influence the type and degree of impacts (discussed below), a suite of commonly observed morphological changes due to hydromodification include channel enlargement (incision and widening), decreased bank stability, increased local sediment yield from eroding reaches, overall simplification of stream habitat features such as pools and riffles, changes in bed substrate conditions, loss of connectivity between channel and floodplain (*Segura and Booth* 2010), and changes in sediment delivery to coastal waters (*Jacobson et al.* 2001). Impacts may also propagate upstream as headcuts resulting from reductions in base level due to excess erosion. Likewise, tributaries entering downstream of a developed area may also experience the upstream propagation of headcuts due to base level reductions of the mainstem.

In addition to Jacobson *et al.* (2001), two well-researched literature reviews of morphological impacts (as well impacts to riparian habitat and biota) can be found in: “Impacts of Impervious Cover on Aquatic Systems” by The Center for Watershed Protection (2003) and “Physical Effects of Wet Weather Flows on Aquatic Habitats: Present Knowledge and Research Needs” published by Water Environment Research Foundation (*Roesner and Bledsoe* 2003). Note that these two studies differ significantly in how they synthesize and interpret the reviewed literature, and the CWP publication acknowledges that it does not necessarily apply to streams in the arid west.

2.6.1 Physical Principles Underlying Channel Impacts

A convenient conceptual framework for the physical impacts of hydromodification on stream morphology is “Lane’s Balance” (*Lane* 1955; Figure 2-6). This framework encapsulates a fundamental (albeit qualitative) relationship between the hydrologic and geomorphic processes that balance water flow and sediment in a channel. It expresses the condition of sediment transport capacity, as controlled by water discharge and slope, in broad balance with the supplied load and size of bed sediment for a channel in equilibrium. An increase in streamflow or a decrease in sediment supply (for example) will typically initiate a corresponding decrease in slope and/or increase in grain size in order to reestablish equilibrium. That decrease in slope is expressed by channel incision or degradation. In contrast, an increase in sediment supply or decrease in streamflow will typically result in aggradation and a corresponding increase in slope.

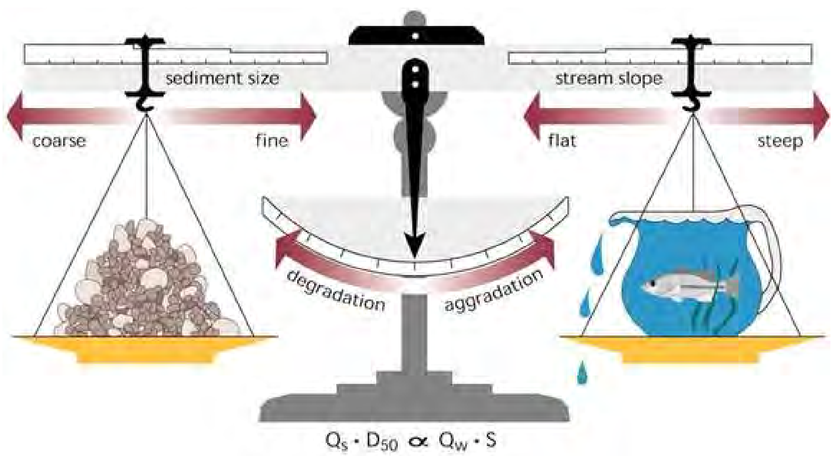


Figure 2-6. Lane’s Balance, showing the interrelationship between sediment discharge (Q_s), median bed sediment size (D_{50}), water discharge (Q_w), and channel slope (S).

Slope and grain size are not the only modes of adjustment, as stream channels have many more degrees of freedom in responding to changes in streamflow and sediment supply. For example, Schumm (1969) extended Lane’s Balance to include width, depth, sinuosity, and meander wavelength. More quantitatively (and more complexly), adjustments to channel form resulting from hydromodification are controlled by interactions among flow-generated shear stresses (described by hydraulic equations for open channel flow, as a function of channel geometry, roughness, and longitudinal slope), inflowing sediment load, and the shear strength of the bed and bank sediments (a function of their size distribution and cohesiveness).

2.6.2 Natural Variability in Stream Systems

Understanding natural variability in streams is critical to predicting and assessing anthropogenic impacts. A stream may be considered "stable" or "at equilibrium" when its overall planform, cross-section and profile are maintained with no net degradation or aggradation within a range of variance, over extended timeframes (*Mackin* 1948, *Schumm* 1977, *Leopold and Bull* 1979, *Biedenharn et al.* 1997). Such systems can often withstand short-term disturbances without significant change. Even without discrete disturbances, natural streams may be in a state of dynamic equilibrium (*Schumm* 1977), where the channel exhibits stability over the long term even while actively migrating laterally such that erosion of outer banks is accompanied by sediment deposition and bar building on inner banks. Streams may also be fluctuating between aggradation/ degradation/ stability, all within a limited range of conditions. A large-scale event, like a flood or landslide, can cause dramatic changes in channel form, but the channel will often re-established its pre-event planform, geometry and slope over time.

In contrast, a persistent alteration like hydromodification can cause the rate of change to increase. As a result, the channel may begin an evolutionary (or catastrophic) change in morphology, leading to enlargement and instability. A geomorphic threshold is the condition at which there is an abrupt and significant channel adjustment or failure because the channel has evolved to a critical situation. It is the condition at which the proverbial straw breaks the camel's back. Channels that are near a geomorphic threshold can exhibit significant adjustments in response to a relatively small degree of hydromodification. For example, a channel with banks that are near the height and angle for geotechnical failure may widen abruptly due to slight incision.

2.6.3 The Role of Sediment Transport and Flow Frequency in Channel Morphology

Extensive research has been devoted to establishing specific relationships between flow frequency and characteristics of channel morphology. The concept of "effective discharge" was introduced by Wolman and Miller (1960), using a magnitude-frequency analysis to assess the effectiveness of flow events to transport sediment. They concluded that, for the rivers in their analysis, relatively frequent events (occurring on average about 1 times/year) are most effective over the long term in transporting sediment. This concept has formed the basis for a large body of literature (and occasional controversy) over the subsequent five decades relating to the relationships between these flow frequencies and principal channel dimensions (e.g., bankfull stage, width-to-depth ratio), and the application of these relationships to stream design and restoration, as well as prediction and control of hydromodification impacts. Much of the controversy has related to the use of a single event ("dominant discharge" or "bankfull flow") as the basis for such applications, with the implicit assumption that control for that single discharge will result in commensurate channel changes regardless of the distribution of flow frequencies and flow durations over a wider range of discharges.

More recently, the concept of a *range* of moderately frequent, "geomorphically significant" flows that transport the majority of the sediment over the long term (King County 1990, *Bledsoe* 2002, *Roesner and Bledsoe* 2003) was proposed to replace the focus on a single event. The geomorphically significant flow range is considered to be the most influential in determining channel form, as this collective group of flows typically does the most "work" on the channel boundary over engineering time scales. Controlling changes to the frequency of flows within this range is therefore critical to reducing impacts to stream morphology, and is the scientific basis for the "flow-duration" control criteria discussed in the following sections. A flow-duration criterion aims to match the pre-development volumes, durations, and frequencies of this critical range of sediment transporting flows over a period of many decades. Even this concept, however, relies on the implicit assumption that infrequent large events, no matter how dramatic their effects, typically occur "too infrequently" to reset channel morphology and habitat over the timescales of concern in meeting regulatory requirements. These events are typically managed through traditional flood control practices as opposed to hydromodification management.

A flow-duration management approach aims to match the pre-development volumes, durations, and frequencies of this critical range of sediment transporting flows over a period of many decades.

2.6.4 Applicability to California Streams

The traditional concepts of dynamic equilibrium in streams and geomorphically significant flows, discussed above, derive largely from studies on perennial streams in humid areas. An important question is: to what extent do these concepts apply to managing hydromodification impacts to streams within arid and semi-arid areas (such as large portions of California, and particularly the southern and eastern regions)? In such climate regions, precipitation is highly variable, with low annual totals and episodic, large events. Many streams are ephemeral or intermittent and located in a setting of extremely high sediment production associated with erosive geology resulting from high rates of tectonic uplift, sparse vegetative cover and frequent fires (*Graf* 1988, *Stillwater Sciences* 2007). These streams are often characterized by multi-thread sand-bed channels that are inherently unstable and readily respond to changes in flow conditions. In the ephemeral streams described by Bull (1997), for example, the natural behavior is one of alternating periods and locations of aggradation and degradation, varying both temporally and spatially. In such "episodic" streams, the vast majority of sediment may be moved by extreme, highly infrequent events. The importance of understanding the role of episodic events has been emphasized for semi-arid and arid fluvial systems (e.g., *Wolman and Gerson* 1978, *Brunsden and Thornes* 1979, *Yu and Wolman* 1987). The latter authors reviewed concepts of frequency and magnitude in geomorphology research and noted that episodic behavior hinges on frequency of episodic events relative to the time required to return to an "equilibrium" channel form. Episodic behavior is more prevalent where the average long-term disturbance is low but the year-to-year variability is high, a characteristic of arid and semi-arid climates.

Although the morphology of arid and semi-arid streams may be more strongly influenced by extreme events under natural conditions, hydromodification has nevertheless been shown to cause rapid and significant physical changes in such California streams (*Trimble* 1997, *Coleman et al.* 2005, *Hawley and Bledsoe* 2011). Such dramatic responses to the effects of urbanization on relatively frequent flows, often over periods of a decade or less, have profound implications for aquatic life and physical habitat. Despite the flashy streamflow regimes, high sediment supplies, and steep gradients of many streams in the region, the responses of California streams are controlled by the same physical processes as those in other regions that have been studied more extensively. As such, the key controls of stream response can be identified and managed to mitigate the chronic effects of hydromodification between infrequent extreme events. However, it is always advisable to ensure that the application of tools and approaches for prediction and assessment should be based on reference data and empirical models (where applicable) drawn from stream types that are similar in both hydrologic and geomorphic characteristics.

2.6.5 Factors Determining Extent of Impacts

The extent and nature of impacts to stream morphology and habitat from a given change in runoff and sediment supply vary widely, depending on the channel geometry, longitudinal slope, channel material type(s) and size(s), and the type and density of channel vegetation (*Center for Watershed Protection* 2003, *Roesner and Bledsoe* 2003). For example, increased flows within a deep, narrow channel may result in significantly higher shear stresses at the bed; this same increase in a wide, shallow channel may become predominantly overbank flow, with less effect on bed shear stress. Where all other factors are equal, fewer impacts would be expected where flows have access to broad overbank areas (i.e., floodplains) during relatively common floods (*Segura and Booth* 2010), channel materials are more resistant, and stabilizing riparian vegetation is present. Conversely, where erosion and bank instability result in the loss of vegetation reinforcement, a positive feedback response may cause erosion to be accelerated. Furthermore, the relative erosive resistance of bed and bank materials will influence the extent of lateral versus vertical channel adjustments (*Simon and Rinaldi* 2006, *Simon et al.* 2007). For example, if bank resistance is lower than bed resistance, then the channel will tend to widen rather than deepen.

The extent of impacts will also depend on the stream's physiographic context and spatial and temporal patterns of urban development within the watershed (Konrad and Booth 2005). Large-scale studies of hydrologic responses to urbanization (Chin 2006, Poff et al. 2006) also highlighted the regional variation in these responses and reinforced the need to understand local watershed and channel characteristics when managing hydromodification impacts. The presence of road crossings and other infrastructure can provide local grade control and create sediment bottlenecks which often translate to exacerbated erosion in the immediately downstream areas.

The extent and nature of impacts to stream morphology and habitat from a given change in runoff and sediment supply vary widely, depending on the channel geometry, longitudinal slope, channel material type(s) and size(s), and the type and density of channel vegetation, and the spatial and temporal patterns of urban development

An additional consideration relates to the pre-development balance between sediment and streamflow, which is dependent on precipitation patterns, the location of a stream reach within the watershed, the associated sediment behavior of that reach (i.e., production, transport or deposition zone), and local rates of sediment production.

While many of these factors may be quantified for a given time and location, stream systems are enormously complex both spatially and temporally. The existence of physical thresholds and feedback systems can cause an incremental change to result in a disproportionately large response (*Schumm* 1977, 1991). Furthermore, there may be significant temporal lags between the point in time at which land use is altered and when channel impacts are observed (*Trimble* 1995, 1997). In recognition of these effects and the associated uncertainty, predictive models and management tools may present results in terms of probabilities or within the context of a risk-based approach, as discussed further in this document. Such effects also have substantial implications for the design of assessment and monitoring programs.

There may be significant temporal lags between the point in time at which land use is altered and when channel impacts are observed.

2.6.6 Impacts on Other Types of Receiving Waters

Although outside the scope of this document, hydromodification impacts to other water body types are recognizable and should be the subject of additional research and future consideration.

Wetlands, Estuaries, and Coastal Ecosystems. Urbanization can alter water quality, quantity and sediment delivery to wetlands and sensitive coastal ecosystems. Urbanization has led to loss or degradation of wetlands and estuaries as a result of 1) draining and conversion to agriculture (*Dahl*, 1997); 2) upstream alterations to flow and sediment regimes that can change the magnitude, frequency, timing, duration, and rate of change of estuarine salinity, turbidity, freshwater flooding, freshwater baseflow, and groundwater recharge dynamics (*Azous and Horner* 2001); and 3) contaminated runoff from urban areas (*Paul and Meyer* 2001, *J Brown et al.* 2010). Urbanization may also lead to coastal erosion in circumstances where reservoir sediment trapping or post-development decreases in sediment yield reduce the sediment supply to the coast (*Pasternack et al.* 2001, *Syvitski et al.* 2005).

Alluvial Fans. Alluvial fans are dynamic landforms that are under increased development pressure in recent decades, particularly in the expanding cities of the American West. Upstream urbanization, and the resultant flashier flow regime, shortens the time available for infiltration and groundwater recharge in alluvial fans. Furthermore, development on fans themselves results in channel straightening and/or construction of concrete flood conveyance channels that also reduce or eliminate infiltration. The reduction in infiltration amplifies the flood risk further downstream. Additionally, alluvial fans may be more vulnerable than other landscapes to channel instability resulting from hydromodification, because they lack intrinsic geologic controls on channel gradient, and commonly have little vegetation or bank cohesion to provide stability in the purely alluvial deposits (*Chin* 2006).

2.6.7 Influence of Scale

The ability to detect impacts from land-use changes depends upon the spatial and temporal scale at which they are measured. Issues of hydrograph timing and the relative size of the storm system with respect to the watershed area may confound relationships at larger spatial scales. Furthermore, a number of fluvial geomorphic features that are commonly used as metrics of geomorphic condition are scale-dependent. For example, width-depth ratio, tendency toward braiding, and channel depth relative to stable bank height all commonly increase downstream. Other factors, such as the influence of vegetation, depend on protrusion relative to width and rooting depth relative to bank height. The temporal scale over which channel changes occur will be influenced by precipitation variability, in addition to the many physical factors already discussed.

These scale considerations, as well as previous discussion of factors influencing stream response, are important when determining the choice of both management tools and monitoring approaches. It is generally much easier to predict the direction of response than the magnitude. Accurate, detailed predictions of response are difficult to make, and they are generally only possible when applied to specific locations, using extensive data input, to answer very specific questions; even then they are subject to uncertainty. Policies or assessment methods aimed to address a range of streams and geographic conditions are better suited to probabilistic approaches that explicitly acknowledge uncertainty, as described further in subsequent sections.

2.7 Impacts on Fluvial Riparian Vegetation

Stream channel form and stability is closely linked with the ecology of instream and floodplain habitats (Figure 2-7). Spatial and temporal distributions of plant communities are tied to moisture availability and seasonality. The ability of vegetation to stabilize soils, trap sediments, and reduce flow velocities (*Sandercock et al.* 2007) can create positive feedback that promotes further vegetation establishment and enhancement of these stabilizing features. This can result in a strong influence on channel geometric features, specifically channel narrowing (*Anderson et al.* 2004). The change in frequency of overbank flows resulting from channel incision will also affect riparian processes, including nutrient transfer and seed dispersal. For example, it is believed that *Tamarix* dominance over native species along Western US rivers would be less extensive if not for anthropogenic alteration of streamflow regimes (most recently supported by Merritt and Poff (2010)).

Impacts to stream biota may occur through the alteration of habitat structure and habitat dynamics caused by hydrologic and geomorphic changes, as well as directly from hydrologic alteration.

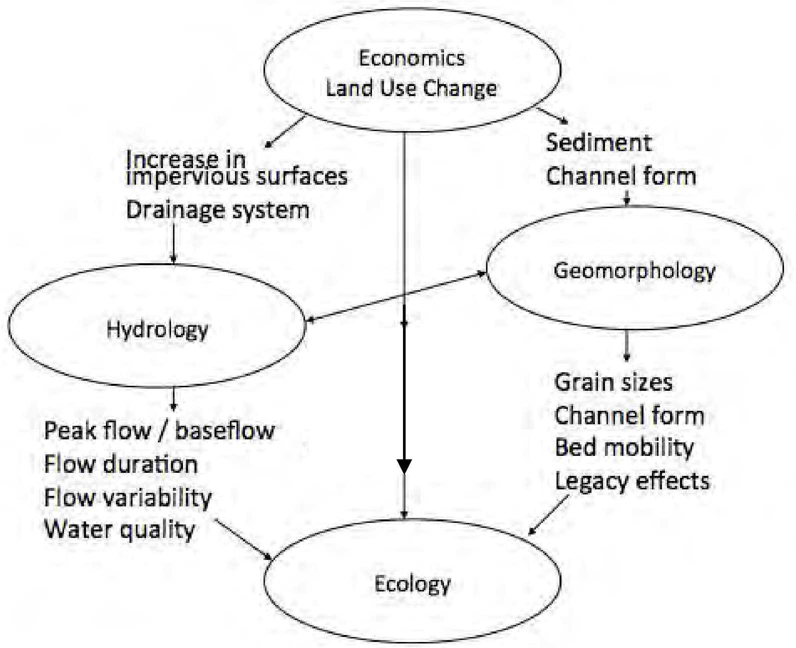


Figure 2-7. Land use changes, hydrology, geomorphology and ecology are closely and complexly interrelated. (Adapted from Palmer *et al.* 2004).

Vegetation changes not only are a result of morphological impacts but also can result directly from changes in streamflow. These findings continue to be supported by recent studies; for example, increases or decreases in baseflow or changes to the seasonal availability of water can determine the extent and type of riparian vegetation capable of thriving in that environment (*White and Greer* 2006). Vegetation changes can have cascading effects on indigenous fauna that require native plants for food or nesting (*Riley et al.* 2005). Channel incision can also result in phreatic draining of adjacent wetland and floodplain habitats and result in loss of key riparian species (*Scott et al.* 2000).

2.8 Impacts on In-Stream Biota

As shown in Figure 2-7, impacts to stream biota may occur through the alteration of habitat structure and habitat dynamics caused by hydrologic and geomorphic changes, as well as directly from hydrologic alteration. (The term biota is used here to refer to a range of non-plant species including algae, macroinvertebrates, amphibians, fishes, etc.) Because of these relationships, the condition of in-stream biota is considered to reflect the effects of all other impacts and has been recommended as an integrative measure of stream health (discussed further in Section 5).

Studies continue to build on Poff *et al.* (1997), who highlighted the importance of the "natural flow regime" and its variability as critical to ecosystem function and native biodiversity. Streamflow pattern or "regime" interacts with the geomorphic context to control the physical and biological response of streams to hydromodification. The basic characteristics of streamflow regimes are typically described in five ways: magnitude, frequency, duration, timing, and rate of change. There is a large body of science linking one or more of these five elements of flow regimes to geomorphic processes, physical habitat, and ecological structure and function. A few examples of linkages with physical habitat are provided in Table 2-1; these linkages describe the mechanisms by which flow changes can impact stream ecology through morphological alterations.

Table 2-1. Examples of Relationships between Flow Regime Attributes and Physical Habitat Characteristics (adapted from Roesner and Bledsoe 2002).

Flow Attribute	Example Relationships with Physical Habitat
Magnitude	• Determines extent to which erosion/removal thresholds for substrate, banks, vegetation, and structural habitat features are exceeded • Determines whether floodplain inundation/exchange occurs • Habitat refugia may become ineffective during extreme events
Frequency	• Flashiness can affect potential for recovery of quasi-equilibrium channel forms between events, bank stability, and streambank/riparian vegetation assemblages • Frequency of substrate disturbance can act as a major determinant of fish reproductive success and benthic macroinvertebrate abundance and composition
Duration	• Determines the impact of a threshold exceeding event, e.g., scour depths • Urbanization frequently increases the duration of geomorphically effective flows which also affect bank vegetation establishment and maintenance • Extended durations of high suspended sediment concentrations can act as chronic and acute stressors on fish communities
Timing	• The temporal sequence of flow events affects channel form and stability as geomorphic systems may be “primed” for abrupt changes. • Stream biota may use flow timing as a life-cycle cue • Predictability of flow can affect utilization of habitat refugia
Rate of Change	• Affects bank drainage regimes (bank stability) and sedimentation processes, e.g., re-suspended fine sediment concentrations during storm hydrographs, embeddedness, armoring • Rapid drawdown can result in stranding of instream biota • Rise and fall rates control riparian water table dynamics and seedling recruitment

The mechanisms of such impacts are also well detailed by Center for Watershed Protection (2003); for example, increased flows are related to a reduction in habitat diversity and simplification of habitat features such as pools; this in turn reduces the availability of deep-water cover and feeding areas.

Many studies support the conclusion that stream biota are also directly impacted by altered flow regimes, independent of channel instability and erosion. Konrad and Booth (2005) identified four hydrologic changes resulting from urban development that are potentially significant to stream ecosystems: increased frequency of high flows, redistribution of water from baseflow to stormflows, increased daily variation in streamflow, and reduction in low flow. They caution that ecological benefits of improving physical habitat and water quality may be tempered by persistent effects of altered streamflow and sediment discharge, and that hydrologic effects of urban development must be addressed for restoration of urban streams. Walsh *et al.* (2007) concluded that low-impact watershed drainage design was more important than riparian revegetation with respect to indicators of macroinvertebrate health. Bioengineered bank stabilization can also have positive effects on habitat and macroinvertebrates, but it cannot completely mitigate impacts of urbanization with respect to stream biotic integrity (*Sudduth and Meyer* 2006). Walters and Post (2011) and Brooks *et al.* (2011) found impacts to benthic macroinvertebrates due to upstream water abstractions, including reductions in total biomass of insects and reductions in abundance respectively.

2.9 Conclusions

Alterations in streamflow and sediment transport as a result of land use change can have severe impacts on streams. Common responses include changes in water balance, surface and near-surface runoff timing and magnitude, groundwater recharge, sediment delivery and transport, channel enlargement, widespread incision, and habitat degradation. The extent and consequences of these impacts depend on stream type, watershed context, and local controls on channel adjustment; as such, stream responses to hydromodification are complex and difficult to predict with any precision. Due to the direct impacts of streamflow modification on vegetation and biota, channel morphology cannot be the sole measure of hydromodification impacts. Thus, mitigation efforts that are narrowly focused on channel stability may be insufficient for sustaining key ecological attributes. Likewise, reach-scale stabilization of streams will not necessarily result in the return of comparable habitat quality and complexity (Henshaw and Booth 2000, Roesner and Bledsoe 2003). Hydromodification management should be considered in the context of an overall watershed-scale strategy that targets maintenance and restoration of critical processes in critical locations in the watershed. Furthermore, it is imperative that monitoring and adaptive management be focused on achieving desired objectives for aquatic life and overall stream “health” in addition to simply measures of geomorphic response.

3. Framework for Hydromodification Management

3.1 Introduction and Overview

The current approach to managing hydromodification impacts on a project-by-project basis is not sufficient to protect beneficial uses of streams. This section outlines a comprehensive, alternative framework that begins with watershed analysis and uses the results to guide the site-based management decisions that are the current focus of most hydromodification management strategies. It also recommends the implementation of a compensatory mitigation program in support of hydromodification management objectives identified in the watershed analysis. Figure 3-1 summarizes this approach and illustrates how current site-based management relates to the larger framework.

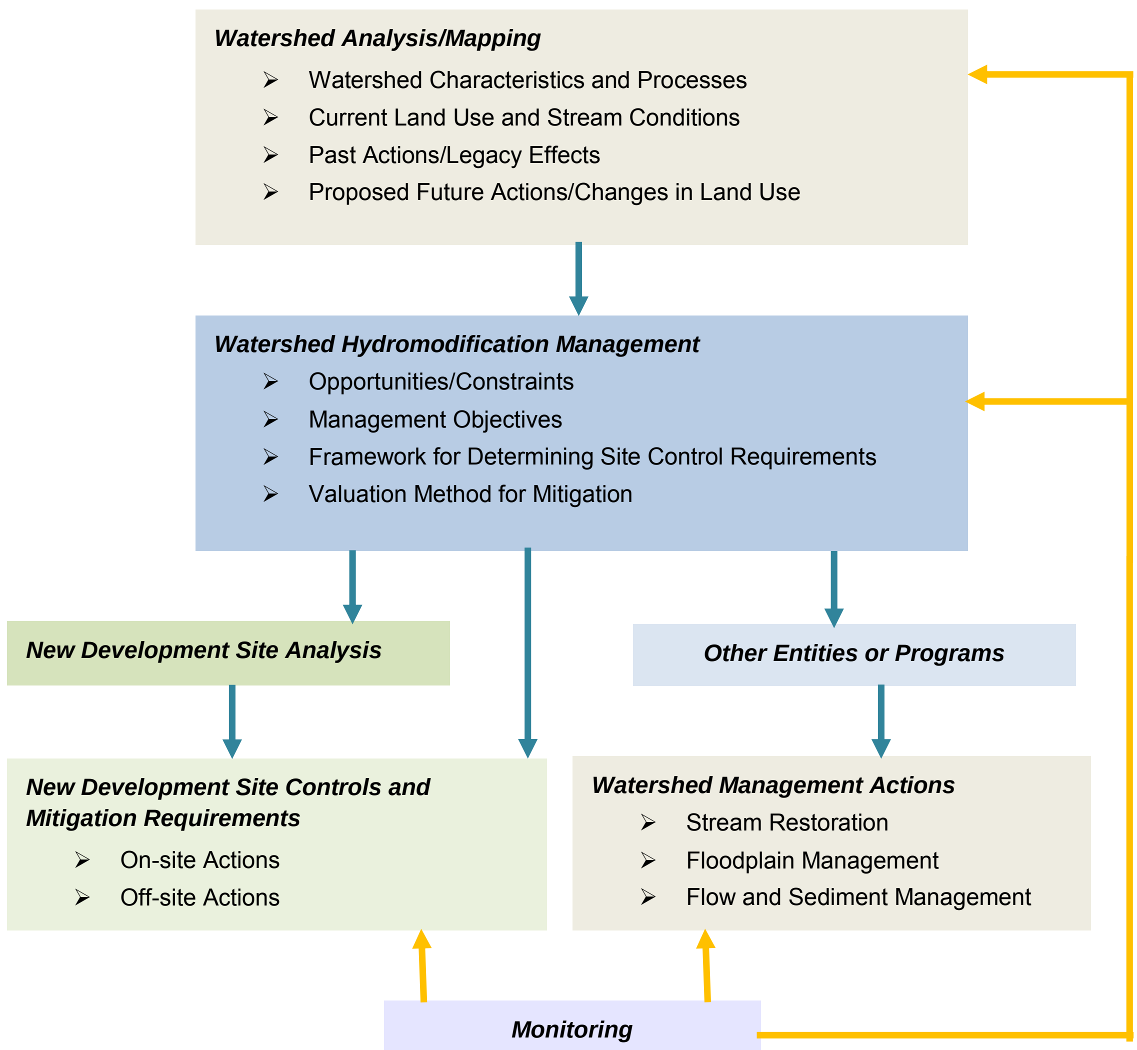


Figure 3-1. Framework for Integrated Hydromodification Management.

This section discusses the details of the integrated framework proposed in Figure 3-1. Key features of this comprehensive approach to hydromodification management are:

- Hydromodification management needs to occur primarily at the watershed scale. The foundation of any hydromodification management approach should be an analysis of existing and proposed future land use and stream conditions that identifies the relative risks, opportunities, and constraints of various portions of the watershed. Site-based control measures should be determined in the context of this analysis.
- Clear objectives should be established to guide management actions. These objectives should articulate desired and reasonable physical and biological conditions for various reaches or portions of the watershed. Management strategies should be customized based on consideration of current and expected future channel and watershed conditions. A one-size-fits-all approach should be avoided.
- An effective management program will likely include combinations of on-site measures (e.g., low-impact development techniques), in-stream measures (e.g., stream habitat restoration), and off-site measures. Off-site measures may include compensatory mitigation measures at upstream locations that are designed to help restore and manage flow and sediment yield in the watershed.
- Management measures should be informed and adapted based on monitoring data. Similarly, monitoring programs should be designed to answer questions and test hypotheses that are implicit in the choice of management measures, such that measures that prove effective can be emphasized in the future (and those that prove ineffective can be abandoned).
- Hydromodification potentially affects all downstream receiving waters; therefore, there generally should be no areas exempted from hydromodification management plans. However, the variety of types and conditions of receiving waters should result in a range of requirements. This also means that objectives, and the management strategies employed to reach them, will need to acknowledge pre-existing impacts associated with historical land uses.

A watershed-based approach to hydromodification management will allow integration of objectives with related programs such as water quality management, groundwater management, and habitat management and restoration through mechanisms such as Integrated Regional Water Resources Management Plans.

Implementation of this approach will likely require changes in the current administration of hydromodification management plans statewide, both in the development and promulgation of regulations by the State and Regional Water Boards and in the administration and execution of those regulations by local jurisdictions (Table 3-1). In the short term, municipalities will need to broaden the approaches to on-site management measures and expand monitoring and adaptive management programs based on the tools described in this document. In the long term, regulatory agencies will need to develop watershed-based programs that allow for implementation of management measures in the locations and manner that will have the greatest impact on controlling hydromodification effects. A watershed-based approach will also allow the integration of hydromodification management objectives with related programs such as water quality management, groundwater management, and habitat management and restoration through mechanisms such as Integrated Regional Water Resources Management Plans.

Table 3-1. Recommendations for implementation of watershed-based hydromodification management, organized by the scale of implementation and the time frame in which useful results should be anticipated.

Time Frame	Programmatic: State and Regional Water Boards	Local: City and County Jurisdictions
Short-term (<10 years)	• Define the watershed context for local monitoring (at coarse scale) • Evaluate whether permit requirements are making positive improvements	• Evaluate whether specific projects/ regulations are meeting objectives • Identify the highest priority action(s) to take
Long-term (1+ decades)	• Define watershed context and setting benchmarks for local-scale monitoring (i.e., greater precision, if/as needed) • Demonstrate how permit requirements can improve receiving-water "health," state-wide (and change those requirements, as needed)	• Evaluate and demonstrate whether actions (on-site, instream, and watershed scale) are improving receiving-water conditions • Assess program cost-effectiveness • Identify any critical areas for resource protection

3.2 Background on Existing Strategies and Why They are Insufficient

Current hydromodification approaches and strategies, such as flow and sediment-control basins, have been long-recognized as insufficient to fully address hydromodification impacts (e.g., Booth and Jackson 1997, Maxted and Horner 1999). Present understanding of the causes and effects of urbanization suggest that such approaches must be expanded to include integrated flow and sediment management at the watershed scale, along with stream corridor/floodplain restoration (NRC 2009).

Flow management has its origins in flood-control basins intended to reduce peak discharge through stormwater detention (Dunne and Leopold 1978). A key shortcoming of these approaches for hydromodification management is that they do not address (and may exacerbate) cumulative erosive forces on the receiving channel because they trap sediment and release sediment-starved water to downstream areas. Simple detention can increase the frequency and duration with which channels are exposed to erosive effects (McCuen and Moglen 1988, Bledsoe *et al.* 2007), resulting in an increase in the downstream impacts of hydromodification.

Since the late 1980's in parts of the US, hydromodification management plans began to explore "flow-duration" control standards as a way to address this shortcoming. These standards require that the post-project discharge rates *and durations* may not deviate above the pre-project discharge rates and durations by more than a specific (and typically quite small) percent, across a broad range of discharges at and above the presumed threshold of instream erosion and sediment transport, as averaged over a multi-year period of measured (or simulated) record. This approach is a dramatic improvement over earlier methods, although it does not adequately address the issues of sediment deficit associated with urbanization (Chin 2006). In addition, current flow-duration standards do not fully account for the effects of flow alteration on in-stream habitat and biological functions (e.g., they do not address the seasonality of peak flows, rates of hydrograph rise and recession, low-flow magnitude and duration) and therefore may not be protective of all beneficial uses of downstream waterbodies.

Current strategies are also insufficient with respect to how municipal stormwater permits apply hydromodification standards. Currently, development triggers are established to determine if a project is subject to the standards. These triggers are generally specified by either project land use type in conjunction with size, or by project size alone (e.g., 20 units or more of single family residential housing, or 10,000 square feet or more of new impervious area). The exemption of many small projects from hydromodification controls can result in cumulative impacts to downstream waterbodies (see Booth and Jackson, 1997, for an example from western Washington of the cumulative effects of a small-project exemption); a move to include LID requirements that apply to all projects, regardless of size, is a positive development to begin to address this issue. There is usually also an exemption for projects discharging to hardened channels or waterbodies; however these exemptions may not be supportive of future stream restoration possibilities, and do not address the impacts of hydromodification on lentic and coastal waterbodies (as yet not fully understood). A further limitation of the current permit structure is that there is no consideration of project characteristics such as position within the watershed, sensitivity of the receiving stream reach, or level of coarse sediment production on the proposed project site. Finally, current programs rely solely on regulating new development and re-development to prevent hydromodification impacts without addressing pre-existing conditions which may limit the effectiveness of future management actions.

Shortcoming of current hydromodification standards that may limit their effectiveness include the exemption of many small projects, which can result in cumulative impacts to downstream waterbodies, and the reliance solely on regulating new development and re-development without addressing pre-existing conditions which may limit the effectiveness of future management actions.

When flow-control measures of whatever regulatory standard have failed to protect streams from erosion, hydromodification “management” typically consists of bank or channel armoring, drop structures, and other hard engineering approaches. Although these methods may reduce local hydromodification impacts, it is typically at the expense of other in-stream or riparian functions or beneficial uses. For example, channel armoring can reduce habitat and water conservation functions and services by direct habitat removal, increased bed scour, and decreased connectivity between the channel and its floodplain. In addition to loss of biological and physical stream function, many armoring solutions degrade or fail over time because they address only the localized channel instability rather than the overarching processes that led to the instability (Kondolf and Piegay 2004). For example, drop structures constructed to stabilize a specific channel reach will tend to shift downstream the consequences of an insufficient sediment load—the reach immediately upstream of the drop structure is "protected," but that immediately downstream is degraded even more severely. In extreme cases, the structure itself can be undermined by downstream erosion and headcutting that is exacerbated by the sudden shift in velocity and associated eddy effects (i.e., hydraulic jump) that often occurs downstream of grade stabilization (Chin 2006). Bank armoring can also fail due to being undermined by erosion at the toe of slope, which can lead to scour (Figure 3-2). In both cases, structural failures often lead to a sequence of incremental increases in the size and extent of the structural solution in an attempt to continually repair increasing channel degradation. In extreme cases, catastrophic failure of bank or grade stabilization can lead to sudden and dramatic changes in channel form, which can be associated with devastating loss of habitat, infrastructure, and property.

Figure 3-2. Undermining of grade control and erosion of banks downstream of structures intended to stabilize a particular stream reach. Left photo is looking upstream at drop structure; right photo is looking downstream from the drop structure.

3.3 Development of Comprehensive Hydromodification Management Approaches

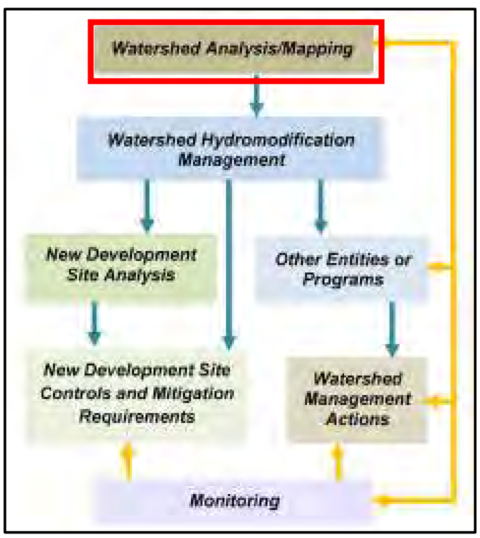
The goal of hydromodification management should be to protect and restore overall receiving water conditions, by maintaining or reestablishing the watershed processes that support those conditions, in the face of urbanization. Achieving these goals will require that hydromodification management strategies operate across programs beyond those typically regulated by NPDES/MS4 requirements. Successful strategies will need to be developed, coordinated, and implemented through land-use planning, non-point source runoff control, and Section 401 Water Quality Certifications and Waste Discharge Requirement programs in addition to traditional stormwater management programs. Thus, all levels of the regulatory framework—federal, state, and local—will need to participate in developing such a program, with program development occurring mainly through regulatory and resource protection agencies and program implementation occurring mainly through local jurisdictions.

As shown in Figure 3-1, watershed-scale hydromodification management should include all of the following key elements:

> **The goal of hydromodification management should be to protect and restore overall receiving water conditions, by maintaining or reestablishing the watershed processes that support those conditions, in the face of urbanization.**

- Watershed-wide assessment of the condition of key watershed processes, to understand the natural functioning of the watershed and what has been (or is at risk of being) altered by urbanization.
- Watershed-wide assessment of hydromodification risk, to categorize areas based on the likelihood of hydromodification impacts and to identify opportunities for restoration or protection of key reaches or sub-basins.
- Appropriate management objectives for various stream reaches and/or portions of the watershed.
- Process for selecting management actions and mitigation measures for project sites and stream reaches.
- Monitoring program that is consistent with the goals of the HMP so that information generated can be used to improve the HMP over time.

3.4 Watershed Mapping and Analysis – Identification of Opportunities and Constraints



Watershed analysis should be the foundation of all hydromodification management plans. Analysis should identify the nature and distribution of key watershed processes, existing opportunities and constraints in order to help prioritize areas of greater vs. lesser concern, areas.

"Watershed analysis" has several steps, of which the first is mapping. Mapping may occur at the watershed or regional (i.e., multiple watersheds) scale. Mapping should include data layers to facilitate the following analyses. Most of these data layers are freely available as online. Further information on analysis tools is provided in the next section. These maps should be designed for iterative updates over time as new information becomes available:

- Dominant watershed processes – analysis of topography (10-m digital elevation model), hydrology, climate patterns, soil type (NRCS soil classifications) and surficial geology can be used to identify the location and type of dominant watershed processes, such as sediment source areas and areas where infiltration is important or where overland flow likely dominates. This can provide a template for the eventual design of management measures that correspond most closely to the pre-development conditions, which support processes that promote long-term channel health. The Central Coast Hydromodification Control Program (the "Joint Effort"; see Booth *et al.* 2011) provides an example of this type of analysis.

- Existing stream conditions – At a minimum the National Hydrography Database (NHD) can provide maps of streams and lakes in the watershed. Additional information on stream condition should be included to the extent that it is available. This could include major bed material composition, channel planform, grade control locations and condition, and approximate channel evolution stage. These maps can also be used to conduct general stream power evaluations.

- Current (Past) and anticipated future land use - Current land use and land cover plus proposed changes due to general or specific plans. Historical information on past land use practices or stream conditions should be included if it is readily available. Classified land cover (NLCD 2006) is available from the Multi-Resolution Land Characteristics Consortium (MRLC).

- Potential coarse and fine sediment yield areas – methods such as the Geomorphic Land Use (GLU) approach (Booth *et al.* 2010) can be used that to estimate potential sediment yield areas based on geology, slope and land cover.

- Existing flood control infrastructure and channel structures – maps should include major channels, constrictions, grade control, etc. that affect water and sediment movement through the watershed. Any available information on water quality, flood control or hydromodification management basins should also be included.

- Habitat – both upland and in-stream and riparian habitat should be mapped to help determine areas of focus for both resource protection and restoration. This may be based on readily available maps such as the National Wetlands Inventory and National Land Cover Database, aerial photo interpretation, or detailed local mapping.

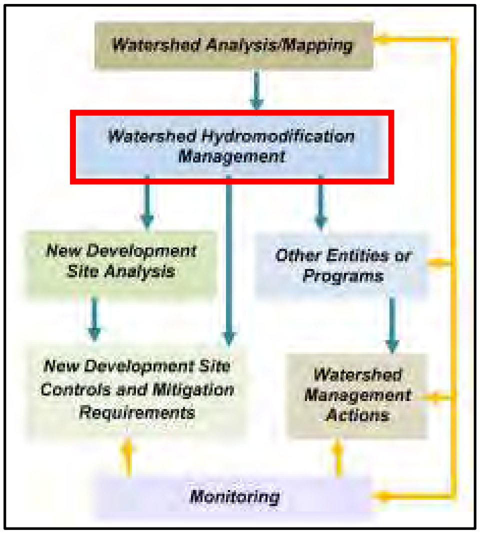
- Areas of Particular Management Concern – these may include sensitive biological resources, critical infrastructure, 303(d) listed waterbodies, priority restoration areas or other locations or portions of the watershed that have particular management needs.

- Economic and social opportunities and constraints – comprehensive watershed management includes consideration of opportunities for improving community amenities associated with streams, economic redevelopment zones, etc. Details on this are beyond the scope of this paper, but emphasize the need to include planning agencies in the development of hydromodification management plans.

Substantial resources will be necessary to implement a watershed analysis approach; therefore, opportunities for joint funding and leveraging of resources should be vigorously pursued.

Watershed analysis will be challenging especially for smaller municipalities with limited resources or where their jurisdiction only encompasses a portion of the watershed. Substantial resources will be necessary to implement this approach; therefore, opportunities for joint funding and leveraging of resource should be vigorously pursued. A cooperative approach should replace the current fragmented efforts among regions and jurisdictions. Furthermore, the State and Regional Water Boards should support completion of these maps and common technical tools as the foundation for future hydromodification management actions.

3.5 Defining Management Objectives



Results of the watershed analysis should be used to determine the most appropriate management actions for specific portions of the watershed. Management strategies should be tailored to meet the objectives, desired future conditions, and constraints of the specific channel reach being addressed.

Decisions should be based on considerations of areas suitable for specific ecosystem services, opportunities, and constraints as described above. Management objectives may be aimed at reducing effects of proposed future land use or mitigating for the effects of past land use, and they may apply to stream reaches or upland areas. Potential management objectives for specific stream reaches may include: protect, restore, or manage as a new channel form.

The specific manifestation of each of these strategies will differ by location, based on constraints of the stream, watershed plan objectives, etc. Decisions about appropriate objectives will need to consider current and future opportunities and constraints in upland, floodplain, and in-stream portions of the watershed. General definitions are provided below as a starting point for case-specific refinement.

Management strategies should be tailored to meet the objectives, desired future conditions, and constraints of the specific channel reach being addressed. Objectives for specific stream reaches may include:

- **Protect**
- **Restore**
- **Manage as a new channel form**

3.5.1 Protect

This approach consists of protecting the functions and services of relatively unimpacted streams in their current form through conservation and anti-degradation programs. This strategy should not be used if streams are degraded, or nearing thresholds of planform adjustment or changes in vegetation community. This strategy may apply following natural disturbances such as floods depending on the condition of the stream reach and the ability for natural rehabilitation to occur (due to how intact watershed processes are). The goal of this strategy is not to create an artificial preserve (such as a created stream running through an urban park) but rather a naturally function river system. Fully channelized systems are not considered in this framework. Examples of specific actions include:

- Preserving intact channel systems through easements, restrictions, covenants, etc. This should be considered in the watershed context to ensure adequate connectivity with upstream and downstream reaches of similar condition, and to ensure that the watershed processes responsible for creating and maintaining instream conditions will persist.
- Providing appropriate space for channel processes to occur (e.g., floodplain connectivity).
- Establishing transitional riparian and upland buffer zones that are protected from encroachment by infrastructure or development.

3.5.2 Restore

There are many definitions of "restoration". For the purposes of this document, restoration is considered re-establishing the natural processes and characteristics of a stream. The process involves converting an unstable, altered, or degraded stream corridor, including adjacent riparian zone (buffers), uplands, and flood-prone areas, to a natural condition. In most cases, restoration plans should be based on a consideration of watershed processes and their ability to support a desired stream type. The watershed analysis discussed above should be used to determine how and where watershed process should be protected or restored in order to best support stream and stream-corridor restoration. This process should be based on a reference condition/reach for the valley type and includes restoring the appropriate geomorphic dimension (cross-section), pattern (sinuosity), and profile (channel slopes), as well as reestablishing the biological and chemical integrity, including physical processes such as transport of the water and sediment produced by the stream's watershed in order to achieve dynamic equilibrium. Design of restoration structural elements must be based on existing and anticipated upstream land uses, and reflect the modified hydrology resulting from these uses. Restoration should apply to streams that are already on a degradation trajectory where there is a reasonable expectation that a more stable equilibrium condition that reflects previously existing conditions can be recreated and maintained via some intervention. Creating a stream system that differs from "natural conditions" is not considered restoration. All elements of the "protection" strategy should also be included once the restoration actions are complete. Examples of specific actions include:

- Floodplain and in-stream measures that restore natural channel form consistent with current and/or anticipated hydrology and sediment yield. Examples include recontouring, biotechnical slope stabilization, soft-grade control features (e.g., woody debris).
- Revegetation of stream banks and beds, including removal of invasive species.
- Preserving intact channel systems through easements, restrictions, covenants, etc. This should be considered in the watershed context to ensure adequate connectivity with upstream and downstream reaches of similar pristine condition.

- Providing appropriate space for channel processes to occur (e.g. channel migration at allowable levels, floodplain connectivity, and development of self-sustaining riparian vegetation).
- Establishing transitional riparian and upland buffer zones that are protected from encroachment by infrastructure or development.

3.5.3 Manage as New Channel Form

Once a stream channel devolves far enough down the channel evolution sequence, it is extremely difficult to recover and restore without substantial investment of resources. If critical thresholds in key structural elements, such as planform or bank height, are surpassed, streams should be allowed to continue progressing toward a new stable equilibrium condition that is consistent with the current setting and watershed forcing functions, if such progress does not pose a danger to property and infrastructure. Substantial alteration of flow or sediment discharge, slope or floodplain width may make it improbable that a stream can be restored to its previous condition. In such circumstances, it may be preferable to determine appropriate channel form given expected future conditions and “recreate” a new channel to match the appropriate equilibrium state under future conditions. For example, a multi-thread braided system may not be the appropriate planform based on new runoff and sediment pattern; instead, a single-thread channel or step-pool structure may be a more appropriate target. Examples of specific actions include:

- In-channel recontouring or reconstruction of channel form.
- Floodplain recontouring or reconstruction that improves connectivity with the channel.
- In extreme circumstances based on channel condition, position in the watershed, etc. this may involve hardening portions of the channel and focusing “mitigation” measures at off-site measures at a different part of the watershed. Off-site mitigation can be informed by “hydromodification risk mapping”.
- Re-establishing longitudinal connectivity for sediment transport and ecological linkages.
- Preserving intact channel systems through easements, restrictions, covenants, etc. This should be considered in the watershed context to ensure adequate connectivity with upstream and downstream reaches of similar pristine condition.
- Providing appropriate space for channel processes to occur (e.g. floodplain connectivity).
- Establishing transitional riparian and upland buffer zones that are protected from encroachment by infrastructure or development.

Several authors have previously noted that in urban systems, natural channel state often can no longer be sustained under changed hydrological conditions. Thus, different management goals are probably appropriate for watersheds at varying stages of development (Booth, 2005) and at varying degrees of adjustment (Chin and Gregory 2005). In this context, identifying which channels are suitable for protection, restoration, or alternative channel form can be used to guide restoration and management efforts (Booth *et al.* 2004).

Upland objectives should be established to support management objectives for stream reaches. These objectives will have direct implications and will influence site-specific control requirements (discussed below). Potential management objectives for upland areas may include:

- *Conserve open space for infiltration*: Infiltration reduces the magnitude and duration of runoff to the stream channel and allows flow to re-enter the stream through diffuse overland flow, shallow subsurface flow, or groundwater recharge. This in turn reduces the work (energy) on the channel bed and banks and helps promote stability.
- *Conserve open space for stream buffers*: Buffers allow many of the same infiltration processes discussed above to occur. In addition, they provide space for channel migration and overbank flow, both of which function to reduce energy and allow the channel to better withstand potentially erosive forces associated with high flow events.
- *Conserve open space for coarse sediment production*: Course sediment functions to naturally armor the stream bed and reduce the erosive forces associated with high flows. Absence of coarse sediment often results in erosion of in-channel substrate during high flows. In addition, coarse sediment contributes to formation of in-channel habitats necessary to support native flora and fauna.
- *Encourage development on poorly-infiltrating soils*: The difference between pre and post development runoff patterns is less when development occurs on soils that have low infiltration rates and functioned somewhat like paved surfaces. Focusing development on these areas reduces changes in hydrology associated with transition to developed land uses.
- *Encourage urban infill*: Urban infill reduces the effect on watershed processes by concentrating development on previously impacted areas. This reduces disruption of hydrology and sediment process compared to developing on open space or other natural areas.

3.6 Selecting Appropriate Management Objectives

The combination of expected force acting on the stream channel (in terms of higher flow and less sediment) and estimated resistance (in the form of channel and floodplain condition) can be used to inform selection of an appropriate management objective for a specific stream reach, as shown in Figure 3-3. This figure represents a conceptual approach to selecting appropriate management objectives, in which modifications to runoff and sediment are compared against stream reach conditions. By weighing these factors within the context of watershed opportunities, constraints and resources, management objectives and specific actions can be determined. More complete decision support systems or guidance will need to be developed for individual

Selection of appropriate management objectives should consider changes to runoff and sediment, and existing stream reach conditions, within the context of watershed opportunities, constraints and resources.

hydromodification management plans that account for other considerations such as upstream and downstream conditions, cost, infrastructure constraints, availability of floodplain area for restoration, presence of downstream sensitive resources, etc. All decisions should be made in the context of the watershed position of a project site relative to existing opportunities and constraints as discussed above.

A number of tools are available to be used in conjunction with watershed mapping to inform this prioritization process. For example, GLU mapping (Booth *et al.* 2010) and hydromodification risk mapping can be used to assign high, medium or low ratings to watershed resistance (i.e., susceptibility to change). Similarly, field based tools such as the hydromodification screening tool (Bledsoe *et al.* 2010) or European tools such as Fluvial Audit or River Habitat Survey can be used to assign a rating of high, medium or low at the reach scale. In addition to geomorphic assessments, habitat assessments such as the California Rapid Assessment Method (CRAM; Collins *et al.* 2008) or biological evaluations via an index of biotic integrity (IBI; e.g., Ode *et al.* 2005) should be used as measures of biological condition to provide a more complete stream assessment. The next section provides an overview of hydromodification assessment and prediction tools, as well as further details on specific tools to support the selection of management objectives.

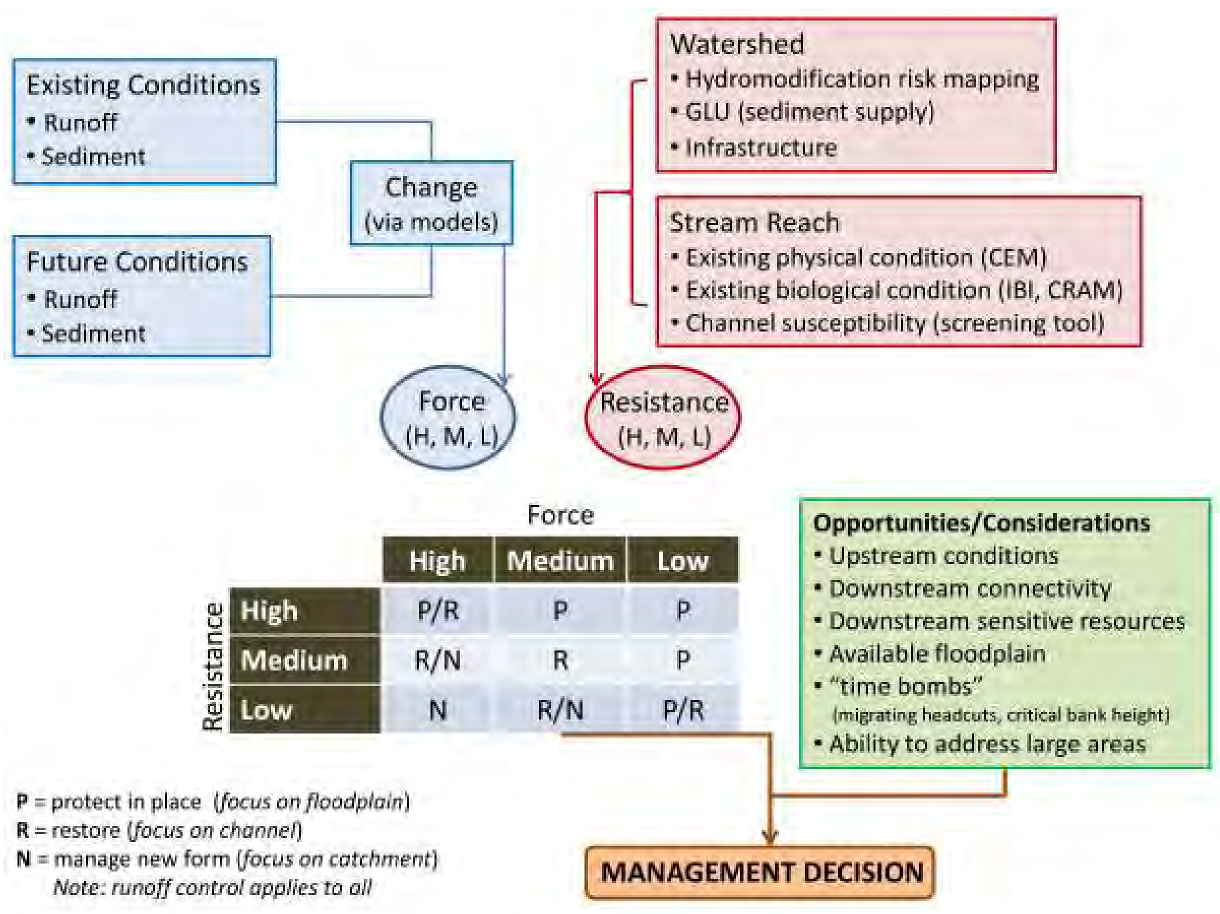
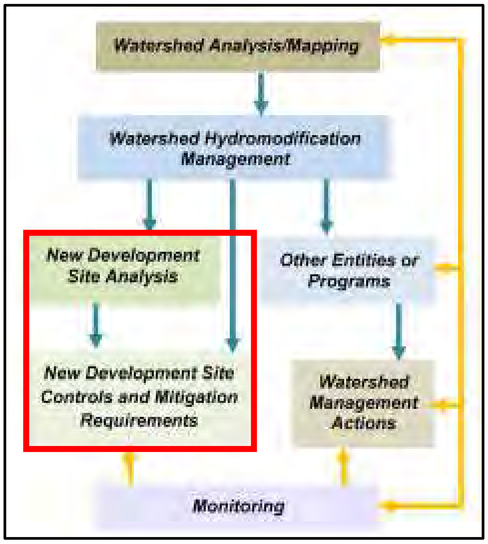


Figure 3-3: Example of a hydromodification management decision-making process.

3.7 Framework for Determining Site-Specific Control Requirements



Once the watershed analysis is complete and opportunities, constraints and management objectives have been identified for both upland areas and stream reaches, a framework should be developed for site-specific project analyses and control requirements. The level of detail required for the analysis of proposed projects should be based on a combination of factors including project size, location within the watershed, and point of discharge to receiving waterbody.

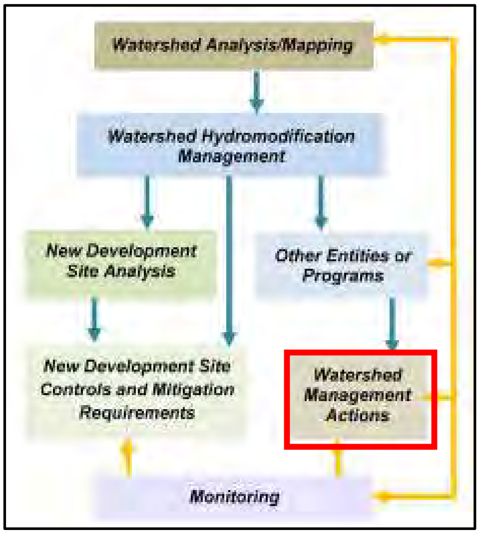
The HMP should specify how these factors will be evaluated within the context of the identified management objectives to determine analysis requirements. The HMP should also ideally contain scalable BMP designs (based on conservative assumptions and consistent with prevailing watershed conditions) that can be applied by small projects where appropriate to avoid overly burdensome requirements for site-specific analysis. The framework should include the following components:

- A set of standard on-site management measures/BMPs that should apply to all projects; no projects should be exempted from these measures as they will have broader water quality benefits beyond helping to control the effects of hydromodification. These management actions consist of reducing the effects of urbanization on catchment runoff and sediment yield. On-site management measures should attempt to reduce excess runoff, maintain coarse sediment yield (if possible) and provide for appropriate discharge to receiving streams to support in-stream biological resources. In some cases, common features or facilities may be able to accommodate these objectives. In other cases, separate features or facilities will be necessary to deal with distinct objectives. On-site measures should ***generally be applied in all cases*** as allowed by site-specific geotechnical constraints, with specific management practices informed by the watershed processes most important at particular locations in the watershed, as well as by the nature of downstream receiving waters:
    - Low impact development (LID) practices.
    - Disconnecting impervious cover through infiltration, interception, and diversion.
    - Coarse sediment bypass through avoidance of sediment yield areas or measures that allow coarse sediment to be discharged to the receiving stream.
    - Flow-duration control basins to reduce runoff below a threshold value.

- Specification of the level of analysis detail and design requirements for the project, depending on project location, discharge point, and project size. Levels of analysis and design requirements may include:
  - Application of scalable, standardized designs for flow control based on site-specific soil type and drainage design. The assumptions used to develop these scalable designs should be conservative, to account for loss of sediment and uncertainties in the analysis and our understanding of stream impacts.
  - Use of an erosion potential metric, based on long-term flow duration analysis and in-stream hydraulic calculations. Guidelines should specify stream reaches where in-stream controls would and would not be allowed to augment on-site flow control.
  - Implementation of more detailed hydraulic modeling for projects of significant size or that discharge to reaches of special concern to understand the interaction of sediment supply and flow changes.
  - Analysis of the water-balance for projects discharging into streams with sensitive habitat. This may include establishment of requirements for matching metrics such as number of days with flow based on the needs of species present.
- Guidelines for prioritization of on-site or regional flow and sediment control facilities. Watershed analysis will help identify opportunities for regional flow or sediment control facilities, which may help to mitigate for existing hydromodification impacts.

Appendix A provides detailed guidance on the appropriate application of tools to meet site control requirements.

3.8 Off-site Compensatory Mitigation Measures



In some cases, on-site control of water and sediment will not be sufficient to offset the effects of hydromodification on receiving waters. In these cases, off-site compensatory mitigation measures will be necessary (similar to the concepts used in the Section 401/404 permitting programs). Off-site measures could be implemented by project proponents or through the use of regional mitigation banks or in-lieu fee programs.

Off-site mitigation may be necessary for several reasons:

- Off-site measures may be more effective at addressing effects or at achieving desired management goals. This may be particularly true for sites near the bottom of a watershed where upstream measures may be preferred

- Off-site measures may be necessary to supply compensation for residual project impacts where on-site measures are limited by site constraints or solutions are beyond the scope of what can be accomplished on an individual site.
- Off-site measures may be necessary where accomplishing specified management objectives is not practical using on-site measures alone. Off-site measures may be desired to remedy legacy effects of prior land use or to achieve desired beneficial uses.

Performance monitoring and adaptive management must be a part of compensatory mitigation given its inherent uncertainty.

In cases where on-site control of water and sediment will not be sufficient to offset the effects of hydromodification on receiving waters, off-site compensatory mitigation measures will be necessary. Implementation of this approach will require that the State Water Board develop a valuation method to help determine appropriate off-site mitigation requirements in light of the anticipated impacts of hydromodification on receiving streams.

The location and type of mitigation should be determined in the context of the watershed analysis and should account for the size and nature of the impact, location in the watershed, pre-existing conditions in the watershed, and uncertainty associated with the success of the proposed mitigation actions. In some cases these measures may be near the project site (e.g., restoring a stream reach downstream of the project site), but in other cases the off-site mitigation may be in the form of in-lieu fee or "mitigation bank" type contributions to a project located in a different portion of the watershed (e.g. upstream grade control, protection of sediment source areas). Such off-site mitigation relatively far from the site will only be possible if conducted in the context of an overall watershed plan, as discussed above. Off-site measures may include:

- Stream corridor restoration
- Purchase, restoration and protection of floodplain/floodway habitat
- Purchase and/or protection of critical sediment source or transport areas
- Regional basins or other retention facilities
- Upstream or downstream natural/bio-engineered grade control
- Retrofit or repair of currently undersized structures (e.g. culverts, bridge crossings)
- Removal or hydrologically disconnecting impervious surfaces

A valuation method will be necessary for assigning appropriate mitigation requirements in light of the anticipated impacts of hydromodification on receiving streams. The valuation method should be developed by the State Water Board.

To support the management approaches discussed above, HMPs should provide general guidance for application of models and other tools based on the questions being asked and the desired outcomes of the HMP. Models can also be used to help communicate levels of uncertainty in particular management actions and to guide restoration / in-channel management actions. Modeling and other tools are discussed in detail in Section 4 and Appendices A and B.

Management endpoints should articulate the desired physical and biological conditions for various reaches or portions of the watershed. To the extent possible, these desired conditions should be expressed in numeric, quantifiable terms to avoid ambiguity.

Finally, management endpoints should articulate the desired physical and biological conditions for various reaches or portions of the watershed. To the extent possible, these desired conditions should be expressed in numeric, quantifiable terms to avoid ambiguity. Additionally, since regulatory strategies will invariably rely on quantifiable measures to determine whether stormwater management actions achieve these desired conditions, identifying appropriate numeric objectives will support determinations of regulatory compliance. As desired physical and biological watershed conditions are expressed in quantifiable terms to the extent possible, a similar need would apply to site control requirements. Control measures should be linked to, a) a desired condition (or goal), b) the parameter(s) that best define that condition, and c) quantifiable measures that serve to evaluate performance of the control measure. Direct measures (e.g., volume of runoff to be retained) as well as indirect or surrogate measures (IBI scores) are appropriate if they are quantifiable.

4. Overview of Assessment and Prediction Tools

4.1 Introduction

The previous section discussed a number of potential actions for managing hydromodification impacts. These ranged from high-level watershed-scale characterization to the site-specific design of a proposed development. This section provides an overview of the current and emerging assessment and prediction tools available to inform these management actions. An organizing framework helps explain the appropriate application of these tools, as well as their strengths and weaknesses. Specific tools that support the selection of management objectives are also discussed. Examples of "suites" of tools that are commonly used together to predict stream responses and formulate management prescriptions for channels of varying susceptibility are presented in Appendix B. Appendix A provides detailed guidance on the appropriate application of tools to meet site control requirements.

Municipalities are the primary audience for this section, as they select and incorporate these tools into their HMPs. However, the State and Regional Water Boards should be aware of the overall capabilities, appropriate uses, and gaps in our current toolbox. The development of new and improved tools should ideally be coordinated at the State level for optimum cost effectiveness and widest applicability. The table below identifies the key actions necessary at both the programmatic and local level to address the considerations discussed above, within the context of the goals of the framework described in Section 3.

Table 4-1. Recommendations for the application and improvement of tools in support of the proposed management framework.

Time Frame	Programmatic: State and Regional Water Boards	Local: City and County Jurisdictions
Short-term (<10 years)	• Develop quality control and standardization for continuous simulation modeling • Perform additional testing and demonstration of probabilistic modeling for geomorphic response • Pursue development of biologically- and physically-based compliance endpoints	• Work cooperatively with adjacent jurisdictions to implement hydromodification risk mapping at the watershed scale • Implement continuous simulation modeling for project impact analysis
Long-term (1+ decades)	• Improve tools for sediment analysis and develop tools for sediment mitigation design • Develop tools for biological response prediction • Improve tools for geomorphic response prediction	• Expand use of probabilistic and statistical modeling for geomorphic response • Apply biological tools for predicting and evaluating waterbody condition

4.2 Background

In the context of hydromodification, tools and models are typically used to help answer one or more of the following questions involving an assessment of natural and human influences at various spatial and temporal scales:

- How does the stream work in its watershed context?
- Where is the stream going? For example, have past human actions induced channel changes? What are the effects on sediment transport and channel form? What is the magnitude of current and potential channel incision following land use conversion?
- How will the stream likely respond to alterations in runoff and sediment supply?
- How can we manage hydromodification and simultaneously improve the state of the stream?

Previous sections have underscored the variability and complexity of relationships among land use, the hydrologic cycle, and the physical and ecological conditions of stream systems. It follows that the process of assessing stream condition and predicting future conditions is highly challenging and subject to uncertainty. Therefore it is important to understand the inherent strengths and limitations of the available tools, especially with respect to prediction uncertainty and how it is expressed for various tools. Considerable judgment is needed to choose the appropriate model for the question at hand. In addition to prediction uncertainty, considerations in choosing the right model for a particular application include appropriate spatial and temporal detail, cost of calibration and testing, meaningful outputs, and simplicity in application and understanding (NRC 2001; Reckhow 1999a,b).

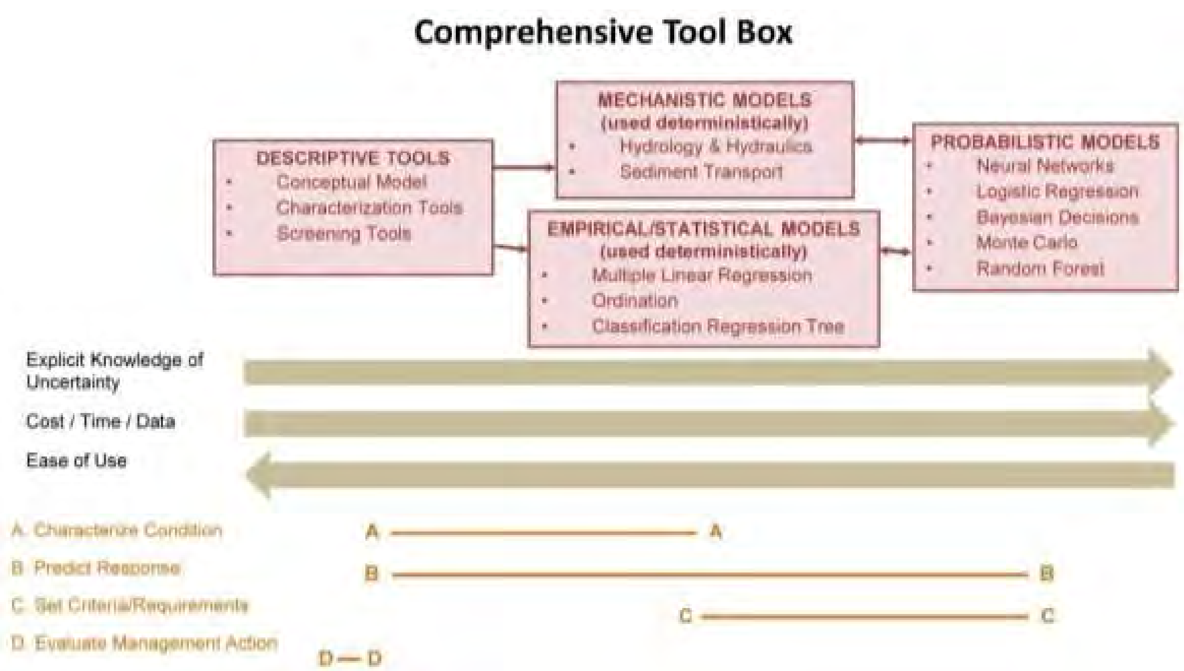


Figure 4-1. Organizing Framework for understanding hydromodification assessment and management tools.

4.3 Organizing Framework

Figure 4-1 presents an organizing framework by which to understand the available tools that may be applied in support of hydromodification management and policy development. Tools fall into three major categories: descriptive tools, mechanistic and empirical/statistical models that are used deterministically, and probabilistic models/predictive assessments with explicitly quantified uncertainty. The organizing framework relates these categories to the types of question the tools are designed to answer, specifically: characterization of stream condition, prediction of response, establishment of criteria/requirements, or evaluation of management actions. The framework also characterizes the tools according to the following features: intensity of resource requirements (i.e., data, time, cost), and the extent to which uncertainty is explicitly addressed. Subsequent sections of this section discuss each of the three major categories in turn, highlighting examples of specific tools within each category.

Given the uncertainty associated with predicting hydromodification impacts, probabilistic models should be incorporated into analysis and design, particularly where resource values or potential consequences of impacts are high.

Tools required to support the management framework presented in Section 3 include watershed characterization and analysis tools and project analysis and design tools. The level of resolution that is required will depend on the point in the planning process. At early stages, descriptive tools will be sufficient, but more precise tools will be required toward the design phase. Currently, most projects rely solely on deterministic models. However, given the uncertainty associated with predicting hydromodification impacts, probabilistic models should be incorporated into analysis and design, particularly where resource values or potential consequences of impacts are high.

4.3.1 Descriptive Tools

Descriptive tools include conceptual models, screening tools, and characterization tools. These tools are used to answer the question: *What is the existing condition of a stream or watershed?* Although descriptive tools are not explicitly predictive, they can be used to assess levels of susceptibility to future stressors by correlation with relationships seen elsewhere. The application of some type of descriptive tool, such as a characterization tool, is almost always necessary before applying a deterministic model. In particular, descriptive tools can aid in understanding the key processes and boundary conditions that may need to be represented in more detailed models.

Conceptual Models. A conceptual model, in the context of river systems, is a written description or a simplified visual representation of the system being examined, such as the relationship between physical or ecological entities, or processes, and the stressors to which they may be exposed. Conceptual models have been used to describe processes in a wide range of physical and ecological fields of study, including stream-channel geomorphology (Bledsoe *et al.* 2008). For example, Channel Evolution Models (CEMs) are conceptual models which describe a series of morphological configurations of a channel, either as a longitudinal progression from the upper to the lower watershed, or as a series at a fixed location over time subsequent to a disturbance. The incised channel CEM developed by

Schumm *et al.* (1984) is one of the most widely known conceptual models within fluvial geomorphology. This CEM documents a sequence of five stages of adjustment and ultimate return to quasi-equilibrium that has been observed and validated in many regions and stream types (ASCE 1998, Simon and Rinaldi 2000). The Schumm *et al.* (1984) CEM has been modified for streams characteristic of southern California, including transitions from single-thread to multi-thread and braided evolutionary endpoints (Hawley et al., in press).

Conceptual models also include planform classifications of braided, meandering and straight, and other general geomorphic classifications, which categorize streams by metrics such as slope, sinuosity, width-to-depth ratio, and bed material size. The qualitative response model described by Lane's diagram (1955), and discussed earlier in this report, is also a conceptual model.

Characterization Tools. Examples of characterization tools include baseline geomorphic assessments, river habitat surveys, and fluvial audits. A fluvial audit uses contemporary field survey, historical map and documentary information and scientific literature resources to gain a comprehensive understanding of the river system and its watershed. Fluvial audits, along with watershed baseline surveys are a standardized basis for monitoring change in fluvial systems. These types of comprehensive assessments are comprised of numerous, more detailed field methodologies, such as morphologic surveys, discharge measurements, and estimates of boundary material critical shear strength through measurements of resistance (for cohesive sediments) or size. Baseline assessments may also draw on empirical relationships such as sediment supply estimation models.

Screening Tools. Screening tools can be used to predict the relative severity of morphologic and physical-habitat changes that may occur due to hydromodification, as a critical first step toward tailoring appropriate management strategies and mitigation measures to different geomorphic settings. However, assessing site-specific stream susceptibility to hydromodification is challenging for several reasons, including the existence of geomorphic thresholds and non-linear responses, spatial and temporal variability in channel boundary materials, time lags, historical legacies, and the large number of interrelated variables that can simultaneously respond to hydromodification (Schumm 1991, Trimble 1995, Richards and Lane 1997).

Screening tools can be used to predict the relative severity of morphologic and physical-habitat changes due to hydromodification, as a critical first step toward tailoring appropriate management strategies and mitigation measures to different geomorphic settings.

Despite the foregoing difficulties, the need for practical tools in stream management have prompted many efforts to develop qualitative or semi-quantitative methods for understanding the potential response trajectories of channels based on their current state. For example, predictors of channel planform can be used to identify pattern thresholds and the potential for planform shifts (e.g., van den Berg 1995, Bledsoe and Watson 2001, Kleinhans and van den Berg 2010).

In addition, regional CEMs (discussed above) can partially address the needs of the hydromodification management community by providing a valuable framework for interpreting past and present response trajectories, identifying the relative severity of potential response sequences, applying appropriate models in estimating future channel changes, and developing strategies for mitigating the impacts of processes likely to dominate channel response in the future (Simon 1995).

More recent screening-level tools for assessing channel instability and response potential, especially in the context of managing bridge crossings and other infrastructure, have borrowed elements of the CEM approach and combined various descriptors of channel boundary conditions and resisting vs. erosive forces. For example, Simon and Downs (1995) and Johnson *et al.* (1999) developed rapid assessment techniques for alluvial channels based on diverse combinations of metrics describing bed material, CEM stage, existing bank erosion, vegetative resistance, and other controls on channel response. Although based on a strong conceptual foundation of the underlying mechanisms controlling channel form, these specific examples are either overly qualitative with respect to the key processes, or developed with goals and intended applications (e.g., evaluating potential impacts to existing infrastructure such as bridges or culverts) that differ from what is needed by current hydromodification management programs.

SCCWRP has recently proposed a general framework for developing screening-level tools that help assess channel susceptibility to hydromodification, and a new region-specific tool for rapid, field-based assessments in urbanizing watersheds of southern California (Booth *et al.* 2010, Bledsoe *et al.* 2010). The criteria used to assign susceptibility ratings are designed to be repeatable, transparent, and transferable to a wide variety of geomorphic contexts and stream types. The assessment tool is structured as a decision tree with a transparent, process-based flow of logic that yields four categorical susceptibility ratings through a combination of relatively simple but quantitative input parameters derived from both field and GIS data. The screening rating informs the level of data collection, modeling, and ultimate mitigation efforts that can be expected for a particular stream-segment type and geomorphic setting. The screening tool incorporates various measures of stream bed and bank erodibility, probabilistic thresholds of channel instability and bank failure based on regional field data, integration of rapid field assessments with desktop analyses, and separate ratings for channel susceptibility in vertical and lateral dimensions.

An example of a specific analysis component that predicts changes in post-development sediment delivery, and that can be applied within this screening tool framework, is a GIS-based catchment analyses of “Geomorphic Landscape Units” (GLUs). A GLU analysis integrates readily available data on geology, hillslope, and land cover to generate categories of relative sediment production under a watershed’s current configuration of land use. Those areas subject to future development are identified, and corresponding sediment-production levels are determined by substituting developed land cover for the original categories and reassessing the relative sediment production. The resultant maps can be used to aid in planning decisions by indicating areas where changes in land use will likely have the largest (or smallest) effect on sediment yield to receiving channels.

Effective screening tools for assessing the susceptibility of streams to hydromodification necessarily rely on both field and office-based elements to examine local characteristics within their broader watershed context. Proactive mapping of flow energy measures (e.g., specific stream power) throughout drainage networks has the potential to complement field-based assessments in identifying hotspots for channel instability and sediment discontinuities as streamflows change with land use. Such analyses may partially guide subsequent field reconnaissance; however, this approach also has limitations in that some geomorphic settings are inherently difficult to map using widely available digital elevation data. In particular, maps of stream power in narrow entrenched valleys and low gradient valleys (ca. <1%) with sinuous channels should be carefully field-truthed and used with a level of caution commensurate with the accuracy of the input data.

Moreover, spatial variability in channel boundary materials and form cannot be accurately mapped at present using remotely sensed data. Thus, boundary materials and channel width are typically assumed in watershed-scale mapping efforts, thereby introducing potential inaccuracies. Coupling desktop analysis with a field-based assessment when using such an approach can help resolve variation in site-specific features such as the erodibility of bed and bank materials, channel width, entrenchment, grade control features, and proximity to geomorphic thresholds.

4.3.2 Mechanistic and Empirical/Statistical Models with Deterministic Outputs

Mechanistic/deterministic models are simplified mathematical representations of a system based on physical laws and relationships (*link to next*). Empirical/statistical models use observed input and output data to develop relationships among independent and dependent variables. Statistical analyses determine the extent to which variation in output can be explained by input variables. Both types of models are typically used to generate a single output or answer for a given set of inputs. These tools can be used to help answer such questions as: *What are the expected responses in the stream and watershed given some future conditions? What criteria should be set to prevent future hydromodification impacts?* However, hydromodification modeling embodies substantial uncertainties in terms of both the forcing processes and the stream response. Deterministic representations of processes and responses can therefore mask uncertainties and be misleadingly precise, unless prediction uncertainty is explicitly characterized as described later in this section.

Although valuable, deterministic representations (such as those derived from continuous simulation modeling) of processes and responses can mask uncertainties and be misleadingly precise unless prediction uncertainty is explicitly characterized.

Hydrologic Models are used to simulate watershed hydrologic processes, including runoff and infiltration, using precipitation and other climate variables as inputs. Some models, such as the commonly-used HEC-HMS, can be run for either single-event simulations or in a continuous-simulation mode which tracks soil moisture over months or years. Other hydrologic models that are commonly used for event-based and continuous simulation modeling include HSPF and SWMM. It is widely accepted that continuous simulation modeling, rather than event-based modeling, is required to assess long term changes in geomorphically-significant flow events (Booth and Jackson 1997; Roesner *et al.* 2001).

Several HSPF-based continuous simulation models have been developed specifically for use in hydromodification planning. These include the Western Washington Hydrology Model (WWHM) and the Bay Area Hydrology Model (BAHM). Hydromodification Management Plans (HMPs) in Contra Costa County, San Diego County and Sacramento County have developed sizing calculators for BMPs based on modeling done using HSPF models. To illustrate the point about uncertainly in mechanistic models, HSPF contains approximately 80 parameters, only about 8 of which are commonly adjusted as part of the calibration process.

Hydraulic Models are used to simulate water-surface profiles, shear stresses, stream power values and other hydraulic characteristics generated by stream flow, using a geometric representation of channel segments. The industry standard hydraulic model is the HEC River Analysis System (HEC-RAS).

Coupled Hydrologic and Hydraulic Models represent a valuable tool in hydromodification management. Because the streamflow regime interacts with its geomorphic context to control physical habitat dynamics and biotic organization, it is often necessary to translate discharge characteristics into hydraulic variables that provide a more accurate physical description of the controls on channel erosion potential, habitat disturbance, and biological response. For example, a sustained discharge of 100 cfs could potentially result in significant incision in a small sand bed channel but have no appreciable effect on the form of a larger channel with a cobble bed. By converting a discharge value into a hydraulic variable (common choices are shear stress, or stream power per unit area of channel relative to bed sediment size), a “common currency” for managing erosion and associated effects can be established and applied across many streams in a region. Such a common currency can improve predictive accuracy across a range of stream types. As opposed to focusing on the shear stress or stream power characteristics of a single discharge, it is usually necessary to integrate the effects of hydromodification on such hydraulic variables over long simulated periods of time (on the order of decades) to fully assess the potential for stream channel changes. By using channel morphology to estimate hydraulic variables across a range of discharges, models like HEC-RAS provides a means of translating hydrologic outputs from continuous simulations in HEC-HMS, SWMM, or HSPF into distributions of shear stress and stream power across the full spectrum of flows.

Sediment Transport Models such as HEC-6T, the sediment transport module in HEC-RAS, CONCEPTS, MIKE 11 and FLUVIAL12, use sediment transport and supply relationships to simulate potential changes in channel morphology (mobile boundary) resulting from imbalances in sediment continuity. This means that hydraulic characteristics are calculated as channel form and cross-section evolve through erosion and deposition over time. Such models have high mechanistic detail but are often difficult to apply effectively. Although it is not a mobile boundary model, the SIAM (Sediment Impact Analysis Method) module in HEC-RAS represents an intermediate complexity model designed to predict sediment imbalances at the stream network scale and to describe likely zones of aggradation and degradation.

Statistical Models use descriptive tools and empirical data to develop relationships that quantify the risk of specific stream behaviors. For example, Hawley (2009) developed a statistical model to explain variance in channel enlargement based on measures of erosive energy and channel features such grade control and median bed sediment size. Such models often include independent variables based on input from the mechanistic models described above; however, a key difference is that statistical models do not explicitly represent actual physical processes in their mathematical structure. Instead, these models simply express the observed correlations between dependent and independent variables. Like mechanistic models, the output from these models is commonly treated as precise results in management decisions, despite the fact that predictions from most statistical models could be readily (and more accurately) expressed in terms of confidence intervals with a range of uncertainty.

Probabilistic/Risk-based Models integrate many of the tools discussed above, using modeled changes in hydrology as input to hydraulic models, which in turn provide input to various types of statistical models to predict response. However, the predictions are not represented as deterministic outputs, instead, the range of (un)certainty in the likelihood of the predicted response is explicitly quantified. Although not commonly used for hydromodification management at this time, there are well established models based on these principals currently in use in other scientific disciplines. An example of a probabilistic approach that has been used for hydromodification management is a logistic regression analysis that was used to produce a threshold "erosion potential metric" that can be used to quantify the risk of a degraded channel state. More details on this approach are provided in Appendix B.

Risk-based modeling in urbanizing streams provides a more scientifically defensible alternative to standardization of stormwater controls across stream types, and can inform management decisions about acceptable levels of risk.

Risk-based modeling in urbanizing streams provides a more scientifically defensible alternative to standardization of stormwater controls across stream types. A probabilistic representation of possible outcomes also improves understanding of the uncertainty that is inherent in model predictions, and can inform management decisions about acceptable levels of risk.

Predictive Tools for Habitat Quality and Stream Biota. The tools discussed above focus on physical stream impacts; however, as discussed in the preceding chapter, it is recognized that maintenance of stream "stability" does not necessarily conserve habitat quality and biological potential. In general, the knowledge base for biota/habitat associations is not generally adequate to allow for prediction of how whole communities will change in response to environmental alterations associated with urbanization. Making such predictions deterministically requires a thorough knowledge of species-specific environmental responses, as well as an adequate (accurate) characterization of habitat structure and habitat dynamics (both of which are modified by urbanization). However, recent studies have demonstrated that the effects of hydrologic alterations induced by urbanization on selected stream biota can be quantitatively described without a full mechanistic understanding, using stressor-response type relationships and empirical correlations from field-measured conditions (Konrad and Booth 2005, Konrad *et al.* 2008, DeGasperi *et al.* 2009).

In moving beyond a narrow focus on linkages between flow alteration and channel instability, scientific understanding of hydrologic controls on stream ecosystems has recently led to new approaches for assessing the ecological implications of hydromodification. The essential steps in developing quantitative "flow-ecology relationships" have been recently described in the Ecological Limits of Hydrologic Alteration (ELOHA) process (Poff *et al.* 2010), a synthesis of a number of existing hydrologic techniques and environmental flow methods. ELOHA provides a regional framework for elucidating the key hydrologic influences on biota of interest, and translating that understanding into relationships between hydromodification and biological endpoints that can be used in management decision making. This requires a foundation of hydrologic data provided by modeling and/or monitoring, and sufficient biological data across regional gradients of hydromodification. Although hydrologic–ecological response relationships may be confounded to some extent by factors such as chemical and thermal stressors, there are numerous case studies from the US and abroad in which stakeholders and decision-makers reached consensus in defining regional flow standards for conservation of stream biota and ecological restoration (Poff *et al.* 2010; http://conserveonline.org/workspaces/eloha).

4.3.3 Strengths, Limitations and Uncertainties

The Organizing Framework shown in Figure 4-1 shows the applicability of the three major categories of tools in support of various management actions. This section addresses a range of issues relating to strengths, limitations and uncertainty of the tools discussed above. Detailed analysis of individual models is beyond the scope of this document, but EPA/600/R-05/149 (2005) contains an extensive comparison of functions and features across a wide range of hydrologic and hydraulic models.

> **Explicit consideration, quantification, and gradual reduction of model uncertainty will be necessary to advance hydromodification management.**
>
> **The uncertainty inherent to hydromodification modeling underscores the need for carefully designed monitoring and adaptive management programs.**

General Considerations. The well-known statistician George Box famously said that "all models are wrong, some are useful." The usefulness of a model for a particular application depends on many factors including prediction accuracy, spatial and temporal detail, cost of calibration and testing, meaningful outputs, and simplicity in application and understanding. There is no cookbook for selecting models with an optimal balance of these characteristics. Models of stream response to land-use change will always be imperfect representations of reality with associated uncertainty in their predictions. In addition to the prediction errors of standard hydrologic models, common limitations and sources of uncertainties include insufficient spatial and/or temporal resolution, and poorly known parameters and boundary conditions. Ultimately, the focus of scientific study in support of decision making should be on the decisions (or objectives) associated with the resource and not on the model or basic science. Each model has limitations in terms of its utility in addressing decisions and objectives of primary concern to stakeholders. Prediction error, not perception of mechanistic correctness, should be the most important criterion reflecting the usefulness of a model (NRC 2001; Reckhow 1999a,b). The predictive models discussed above may be thought of as predictive scientific assessments; that is, a flexible, changeable mix of small mechanistic models, statistical analyses, and expert scientific judgment.

Region-Specific Considerations. Because all models are vulnerable to improper specification and omission of significant processes, caution must be exercised in transferring existing models to new regional conditions. For example, mobile boundary hydraulic models are mechanistically detailed but not generally well-suited to many southern California streams given the prevalence of near-supercritical flow, braiding and split flow (Dust 2009). In addition, bed armoring and channel widening resulting from both fluvial erosion and mass wasting processes are key influences on channel response in semi-arid environments. These processes are not well-represented and constrained in current mobile boundary models. Accordingly, the appropriateness of existing models for addressing a particular hydromodification management question should be empirically tested and supported with regionally appropriate data from diverse stream settings.

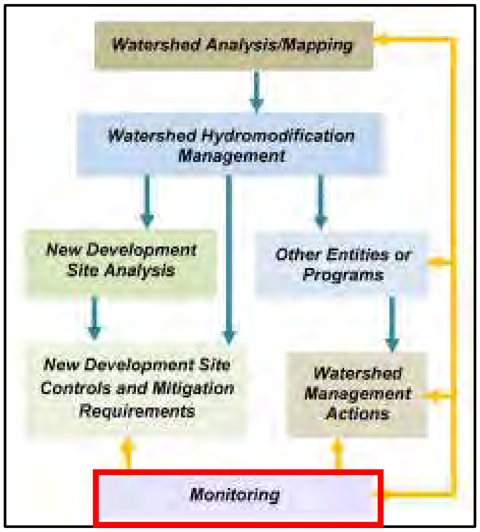
Managing Uncertainty. To date, hydromodification management has generally relied on oversimplified models or deterministic outputs from numerical models that consume considerable resources but yield highly uncertain predictions that can be difficult to apply in management decisions. Numerical models are nevertheless an important part of the hydromodification toolbox, especially in characterizing rainfall-response over decades of land-use change. It is challenging to rigorously quantify the prediction accuracy of these mechanistic numerical models; however, their utility of can be enhanced by addressing prediction uncertainties in number of ways (Cui *et al.* 2011). Candidate models can be subjected to sensitivity analysis to understand their relative efficacy for assessment and prediction of hydromodification effects. Moreover, it should also be demonstrated that selected models can reasonably reproduce background conditions before they are applied in predicting the future. Modeling results that are used in relative comparisons of outcomes are generally much more reliable than predictions of absolute magnitudes of response.

Hydromodification modeling embodies substantial uncertainties in terms of both the forcing processes and stream response. Deterministic representations of processes and responses can mask uncertainties and can be misleading unless prediction uncertainty is explicitly quantified. Errors may be transferred and compounded through coupled hydrologic, geomorphic, and biologic models. Accordingly, explicit consideration, quantification, and gradual reduction of model uncertainty will be necessary to advance hydromodification management. This points to two basic needs. First, there is a need to develop more robust probabilistic modeling approaches that can be systematically updated and refined as knowledge increases over time. Such approaches must be amenable to categorical inputs and outputs, as well as combining data from a mix of sources including mechanistic hydrology models, statistical models based on field surveys of stream characteristics, and expert judgment. Second, the uncertainty inherent to hydromodification modeling underscores the need for carefully designed monitoring and adaptive management programs, as discussed in Section 5.

A risked-based framework can provide a more rational and transparent basis for prediction and decision-making by explicitly recognizing uncertainty in both the reasoning about stream response and the quality of information used to drive the models. Prediction uncertainty can be quantified for any of the types of models described above; however, some types are more amenable to uncertainty analysis than others. For example, performing a Monte Carlo analysis of a coupled hydrologic-hydraulic model is a very demanding task. A simple sensitivity analysis of high, medium, and low values of plausible model parameters is much more tractable and still provides an improved understanding of the potential range of system responses. Such information can be subsequently integrated with other model outputs and expert judgment into a probabilistic framework. For example, Bayesian probability network approaches can accommodate a mix of inputs from mechanistic and statistical models, and expert judgment to quantify the probability of categorical states of stream response. Such networks also provide an explicit quantification of uncertainty, and lend themselves to continual updating and refinement as information and knowledge increase over time. As such, they have many attractive features for hydromodification management, and are increasingly used in environmental modeling in support of water quality (Reckhow 1999a,b) and stream restoration decision-making (Stewart-Koster *et al.* 2010).

Sediment Supply. As described above, a reduction in sediment supply to a stream may result in instability and impacts, even if pre- and post-land use change flows are perfectly matched. Thus, there is a need to develop management approaches to protect stream channels when sediment supply is reduced, and to refine and simplify tools to support these approaches. This continues to prove challenging because, the effects of urban development on sediment supply in different geologic settings are not well understood and poorly represented in current models. As a starting point, models used to analyze development proposals that reduce sediment supply could be applied with more protective assumptions with respect to parameters and boundary conditions (inflowing sediment loads). Effects of altered sediment supply on stream response could be addressed in a probabilistic framework by adjusting conditional probabilities of stream states to reflect the influence of reductions in important sediment sources due to land use change.

5. MONITORING



"Monitoring" can cover a tremendous range of activities in the context of stormwater management in general, and of hydromodification in particular. For example, the NPDES Phase 2 general permit for California (SWRCB, 2003 (*www.swrcb.ca.gov/**water**_issues/.../storm**water**/.../final_ms4_**permit**.p...)*, National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000004, p. 11) notes that the objectives of a monitoring program may include:

- Assessing compliance with the General Permit.
- Measuring and improving the effectiveness of stormwater management plans.
- Assessing the chemical, physical, and biological impacts on receiving waters resulting from urban runoff.
- Characterizing storm water discharges.
- Identifying sources of pollutants.
- Assessing the overall health and evaluating long-term trends in receiving water quality.

These objectives span multiple goals, ranging from verifying of compliance, evaluating effectiveness, characterizing existing conditions, and tracking changes over time. Each would likely require different monitoring methods, duration of measurement, and uses of the resulting data (Table 5-1). This variability emphasizes what we consider the key starting point of any monitoring program: to answer the questions, "What is the purpose of monitoring? How will the data be used?" Even secondary considerations can exert great influence over every aspect of the design of a monitoring program: "How quickly do you need to have an answer?" And, perhaps most influential of all, "What are the resources available to provide that answer?"

Table 5-1. The recommended purpose(s) of monitoring associated with hydromodification control plans, organized by the scale of implementation and the time frame in which useful results should be anticipated.

Time Frame	Programmatic: State and Regional Water Boards	Local: City and County Jurisdictions
Short-term (<10 years)	• Define the watershed context for local monitoring (at coarse scale) • Evaluate whether permit requirements are making positive improvements	• Evaluate whether specific projects/ regulations are meeting objectives • Identify the highest priority action(s) to take
Long-term (1+ decades)	• Define watershed context and setting benchmarks for local-scale monitoring (i.e., greater precision, if/as needed) • Demonstrate how permit requirements can improve receiving-water "health," state-wide (and change those requirements, as needed)	• Evaluate and demonstrate whether actions (on-site, instream, and watershed scale) are improving receiving-water conditions • Assess program cost-effectiveness • Identify any critical areas for resource protection

5.1 The Purpose of Monitoring

In the context of hydromodification assessment and management, we propose three interrelated purposes for monitoring that will guide the discussion and recommendations in this section:

- **Characterizing the conditions** of receiving waters downstream of urban development (including any trends in those conditions over time).
- **Evaluating the effectiveness** of hydromodification controls at protecting or improving the conditions of downstream receiving waters (and modify them, as needed).
- **Setting priorities** on the wide variety of hydromodification control practices, as promulgated by the State and Regional Boards and as implemented by local jurisdictions.

These needs give rise to several interrelated types of monitoring, all common to many watershed and stormwater monitoring programs. They are typically executed at different spatial and temporal scales, and if well-designed and executed they can collectively help guide management actions. We define them here, using terms and definitions that are common to the monitoring literature:

- **Performance monitoring,** by which is normally meant the evaluation of a particular stormwater facility relative to its intended (or designed) performance, but independent of whether that intended design is actually beneficial for downstream receiving waters.
- **Effectiveness monitoring,** by which we mean the assessment of how well specific management actions or suites of actions reduce or eliminate the direct impacts of stormwater on receiving waters. This type of monitoring can answer a question common to stormwater management: does a particular facility actually achieve its intended goal (e.g., flow releases from a stormwater facility protect the stream channel downstream from erosion)? More broadly, monitoring can evaluate the "effectiveness" of a suite of measures or an overall program designed to produce

beneficial outcomes (or avoid negative ones) in downstream receiving waters. In this context, the precise boundaries division between effectiveness monitoring and other types are blurry and unnecessarily artificial.

- **Trends monitoring,** by which we mean an integrative assessment of whether our "endpoint" indicators (physical, chemical, or biological) are showing any consistent, statistically significant change over time. Such monitoring rarely "proves" the direct impacts of a specific stressor on a receiving water, but it is critical to setting and evaluating progress towards integrative assessment endpoints at a regional scale. If well-designed, trend monitoring commonly provides useful information at smaller spatial scales as well, particularly in evaluating response to recent management actions or recovery from a prior disturbance.
- **Characterization monitoring**, by which is commonly meant the identification and (or) the quantification of various parameters in stormwater or a receiving-water body. Characterizing the condition of an outflow discharge or a water body at a particular time and place is always an outcome of the other kinds of monitoring; when it is called out as a goal in-and-of itself, however, it is can be useful to prioritize actions—but only if there is a preexisting standard for what constitutes a "good" or "acceptable" condition (also termed "status monitoring"), and a program to implement (or at least to set the priority for implementing) actions to improve the condition of waterbodies found to be "not good" or "unacceptable."

Without a context for evaluation, characterization monitoring is prone to generate large quantities of rarely used data. We strongly encourage that the purpose of any "characterization" monitoring be clearly articulated in hypothesis testing, priority setting, or systematic trend evaluation. As noted by NRC (2009, p. 508) with respect to this type of monitoring, "…monitoring under all three (NPDES municipal, industrial, and construction) stormwater permits is according to minimum requirements not founded in any particular objective or question. It therefore produces data that cannot be applied to any question that may be of importance to guide management programs, and it is entirely unrelated to the effects being produced in the receiving waters." We seek to proactively avoid this problem.

Monitoring should occur at two scales:

- **Regional or state-wide scale- this will require a time frame of one to several decades**
- **Local scale – this is required to evaluate the performance and effectiveness of specific management measures.**

In this sub-section, we focus our discussion on two interrelated scales at which these various types of monitoring should be applied as outlined in Table 5-1 at the beginning of this section. The first, which here and elsewhere in this document is termed "programmatic," has a regional or state-wide spatial scale; many of its key actions will require a time frame of one to several decades. Monitoring data from this scale should inform the broadly construed "health" of receiving waters to assess whether the range of hydromodification strategies being implemented is maintaining desired conditions across the (state-wide) range of physiography, climate, land-use change, and regulatory approaches of the regional boards. They should be used to identify particularly promising (or particularly ineffective) combinations of control strategies and landscape conditions. Finally, they should provide regionally tailored benchmarks for what constitutes "healthy watersheds" and "healthy receiving waters" so regulators and permittees alike know what still needs to be done, where it should be done, and how urgently it needs to happen.

The second scale of monitoring data we term "local." It comprises the generation of monitoring data to evaluate the performance and effectiveness of specific management measures (be they structural or nonstructural) at reducing the negative consequences of hydromodification on downstream receiving waters. Useful information at this scale will normally be generated in the time frame of an NPDES permit cycle (i.e., ~5 years) and should provide direct guidance on whether the evaluated management strategies are working, need refinement, or should be abandoned altogether. They should also provide guidance on the degree to which management efforts should be prioritized where regulatory flexibility exists, given the conditions (and, perhaps, the potential responsiveness) of downstream receiving waters. Over longer time frames, monitoring at this scale can also provide public demonstration of the value of regulatory and programmatic efforts, and it can also help identify the most cost-effective mix of publically funded projects and regulatory protection to achieve (or maintain) receiving-water health.

5.2 Programmatic Monitoring at the Regional Scale

5.2.1 Defining Watershed Context

Although not "monitoring" in the strictest sense of this word, establishing a watershed context for the measurement and evaluation of receiving waters is a hallmark of virtually all recommended monitoring strategies (e.g., Beechie *et al.* 2010, Brierley *et al*. 2010). Monitoring programs should be consistent with the watershed perspective that forms the basis for the management framework discussed in Section 3. In California (as in most other states), this can only be executed at a supra-jurisdictional scale, because most watersheds cross one or more city and/or county boundaries. This presents the long-term challenge that many jurisdictions do not have authority over parts of the landscape that can affect the quality of rivers and streams that pass through their boundaries; more immediately, however, it makes an inclusive watershed assessment almost impossible to execute at a local level.

5.2.2 Determining the Effectiveness of Permit Requirements

A second, more challenging contextual need at the regional scale is the definition of thresholds or endpoints against which to compare the results of monitoring or modeling. Both of these "assessment tools" can guide the application of hydromodification control strategies, evaluate their real or likely success, and predict the consequences of hydromodification on downstream receiving waters. However, they provide little insight into the question, "how good is good enough?" Answering this question requires a definition of "assessment endpoints" (borrowing the term from NRC 1994), which in turn requires objective, quantifiable criteria for evaluating progress or outright success.

Most existing HMPs require the permitted municipalities to develop programs and policies to assess the potential effects of hydromodification associated with new development and redevelopment, to include management measures to control the effects of hydromodification, and to implement a monitoring program that assesses the effectiveness of HMP implementation at controlling and/or mitigating the effects of hydromodification. Yet the appropriate objectives of such management measures, or a basis to evaluate success or failure of the HMP through monitoring data, are rarely provided in consort. Setting these endpoints is beyond the capacity of any but the largest municipalities—and even for those, neither the field of watershed science nor the arena of public policy is so clear that an unequivocally "correct" answer is likely to emerge without much additional work. Any such finding would also lack state-wide applicability; California is far too physically and ecologically diverse for an assessment endpoint developed in one part of the state to transfer everywhere without careful consideration.

For these reasons, we consider this aspect of monitoring at the regional scale to be a long-term, state-wide effort. This reflects the challenge of conducting meaningful characterization (or "status") monitoring: it requires a benchmark against which the measured condition can be compared, and to which an absolute rating ("good," bad," etc.) can be assigned.

In contrast, "trends" monitoring requires no such benchmark, only equivalent measurements undertaken at multiple times coupled with an understanding of what direction of change is desirable. For this reason, evaluating whether permit requirements are making positive improvements is a reasonable (and probably critical) short-term effort, one that can be conducted locally (see below). It should also be integrated and compiled at a regional level, however, the better to inform the continued development of hydromodification requirements.

5.3 Monitoring at the Local Scale

The needs of a monitoring program for local jurisdictions should complement those being satisfied at a regional scale. Showing net improvement is critical to maintaining support for regulatory actions and capital expenditures, but any monitoring program must reflect the typical constraints of showing rapid results while acknowledging constraints on staff resources and expertise (Scholz and Booth 2001). No less urgent is the need to identify what to do "next"—not necessarily establishing a multi-year capital improvement plan, but at least identifying key problems with one or two associated actions that would likely result in significant improvements in receiving-water conditions. Watershed characterization, as discussed above and applied to a specific jurisdiction, can provide useful guidance for such identification; even without it, local knowledge is commonly sufficient in-and-of itself. Targeted monitoring can normally confirm (or refute) such inferences in short order, which is why we place this monitoring application in the "short-term" category.

However, a monitoring program can also provide longer term guidance to local jurisdictions. When supported by the regional context of receiving-water conditions, local monitoring data can demonstrate trends over time that can lend support to (or indicate necessary changes to) hydromodification control plans. In combination with economic data, they can show long-term cost-effectiveness. Finally, site-specific monitoring data, when analyzed in the context of an appropriate scale of watershed characterization, can guide the stratification of less developed and undeveloped watershed areas into those where more assertive protection (or restoration) will be most worthwhile. None of these outcomes depend solely on collecting monitoring data, which is why none of them are presumed to be credible "short-term" applications of monitoring data. However, they have found expression in other parts of the country having long-term monitoring efforts, and they should provide similar benefits to California as well.

5.4 Developing a Monitoring Plan

"Monitoring" the effects of a management action, whether it is a new regulation, a change in operational procedures, or a constructed project, is commonly included by design or required by regulation. The collection of monitoring data may be seen as a worthwhile activity in its own right, but this discussion uses a more restrictive, implementation-based definition: any "monitoring" needs to demonstrate a direct connection to management actions, such that the results of monitoring are translated into on-the-ground management actions (or changes in management actions). This focus on the *use* of monitoring data requires clear linkages between a management action, the uncertainties associated with that action, the ways in which the effects of that action are expressed (and can be measured) in the world, and the management changes that should be implemented if monitoring results provide unanticipated (or equivocal) resolution to those uncertainties. This is the basis for establishing an "adaptive management" approach to hydromodification monitoring, discussed in more detail in Appendix C. Here, we discuss the design of a monitoring program and outline the variety of measurements that can be made, under the assumption that the intended use(s) of the monitoring data have already been established.

"Stormwater management would benefit most substantially from a well-balanced monitoring program that encompasses chemical, biological, and physical parameters from outfalls to receiving waters" (NRC 2009, p. 257). In pursuit of a comprehensive monitoring program we might also add regular documentation of weather and climate conditions and land-cover changes. As a practical matter, however, monitoring at a site scale is almost never coordinated with other equivalent efforts at other locations, nor placed in a broader spatial context being developed as part of a regional effort. For monitoring data to have greatest value, however, such coordination and context-setting is needed.

Stormwater management would benefit most substantially from a well-balanced monitoring program that encompasses chemical, biological, and physical parameters… (NRC, 2009)

5.4.1 Design of a Monitoring Plan

As noted at the beginning of this section, the overarching question that must be asked and answered at the beginning of any monitoring design effort is "What is its purpose?" The considerations enumerated below cannot be addressed without an explicit answer to this question, because the outcome of those considerations will depend on how the data are to be used. For certain common application of monitoring data we suggest guidance that will be widely appropriate, but there are no recommendations in this section (or any other monitoring guidance document) that apply universally.

Multiple authors have condensed their guidance for designing a monitoring plan into a short list of steps that should precede the first instance of field data collection (e.g., Shaver *et al.* 2007). Although all differ in details and intended audience, they share significant commonalities that can be distilled as follows:

- Articulate the purpose of the monitoring (the "management question").
- Identify key constraints, in particular the geographic range and scale over which the monitoring can occur, financial/staff resources available, and the time frame in which results must be generated.
- Evaluate existing information, model outputs, and/or regulatory requirements to identify promising metrics and specific sites appropriate to the management question.
- Identify the specifics of the monitoring plan: what parameter(s), where, for how often and for how long. This may include multiple iterations, wherein the guidance of Step 3 must align with the constraints of Step 2.

Most such guidance is written with site-specific, "local" monitoring in mind—the existing literature provides less direction for monitoring that is herein recommended to occur at a regional scale over the next one or more decades. However, the basic principles are the same at all scales: a coherent, explicit purpose needs to be articulated, resource constraints need to be acknowledged, and a credible strategy needs to be developed with its specifics fleshed out. Below we discuss some of the primary considerations in this last step, because they are common across a wide range of monitoring purposes, programmatic constraints, and indicator types.

5.4.2 Constraints (Step 2 of the Monitoring Plan)

Ideally, a monitoring program should be designed to detect trends, assess effectiveness and allow for source identification.

Scale. Ideally, a monitoring program should encompass multiple, nested scales of monitoring that are determined by the question(s) being addressed. For hydromodification applications, the broadest scale of monitoring is that of the integrated effect of stormwater impacts and stormwater management on receiving waters. *Trends monitoring* (and characterization monitoring, if regionally appropriate ranges of quality have been determined) addresses these questions, and it also allows stormwater and resource managers to measure the broad benefits obtained from management investments. Site-specific conditions normally cannot be traced back to specific generators of pollution (NRC 2009), and so monitoring at the broadest scales (i.e., many tens of square miles and larger) should not attempt to do so. Instead, identifying overall conditions and trends requires a broad spatial scale over long time frames (i.e., multiple years), the essence of trends monitoring. This level of effort is recommended as a regional responsibility, because the area(s) of interest will normally far exceed the geographic limits of any single jurisdiction.

If trends monitoring (or long-standing prior knowledge) indicates that there are impacts on beneficial uses, a second (and more site-specific) scale is invoked, that of *effectiveness monitoring:* which of our many stormwater-management actions are achieving the greatest reduction in downstream impacts (and which are not)? On the whole, such stormwater control measures, both structural and nonstructural, vary by land use—the measures suitable for a residential neighborhood will likely be impractical or ineffective (or both) in an industrial setting. We therefore anticipate that most effectiveness monitoring will be stratified by land use and conducted by individual jurisdictions (see, for example, such an approach in the Nationwide Stormwater Quality Database, which contains water-quality data from more than 8600 events and 100 municipalities throughout the country).

The finest scale of monitoring is that of *source identification*, a form of characterization monitoring: what specific locations and which parts of the landscape generate stormwater of sufficiently deleterious quantity and (or) quality to cause impacts to beneficial uses, be they direct or indirect effects? This question is widely posed in stormwater management programs, and a number of existing monitoring programs seek to provide answers. The science of stormwater already suggests where the greatest attention is probably warranted (NRC 2009), namely a particular focus on areas of well-connected (or "effective") impervious area, high vehicular traffic, and exposure to toxic chemicals. We therefore suggest these categories should define areas of highest priority for this type of targeted investigation, allowing even a resource-constrained jurisdiction to conduct a useful, well-focused monitoring effort with good efficiencies.

Siting. Site selection is most commonly guided by the location of the management action being evaluated while dictated by more mundane considerations of property ownership and access logistics. In general, sites need to meet a few following basic criteria.

- Appropriate scale: the upstream area should be dominated by, or at least significantly affected by, the management action of interest.
- Responsiveness: at the chosen location, the parameters being measured should be amenable to change in response to the management action (e.g., monitoring for geomorphic change in a concrete channel is ill-advised).
- Representativeness: the results at the chosen location should be credibly extrapolated to "similar" sites, and those sites in aggregate should constitute a widespread (or otherwise important) subset of the landscape as a whole.
- Access: the site should be easily reached by the appropriate personnel and equipment, and with a cost of doing so consistent with the frequency of measurements being made. Any equipment left unattended needs to be secure (or well-hidden).

There are institutional considerations in site selection as well. Multiple programs implement monitoring or impose monitoring requirements, and coordination can provide mutual benefits and efficiencies to all. In particular, monitoring driven by management actions at a particular location (i.e., a local scale) will always benefit from information from one or more regional-scale reference sites that can characterize natural or background variability. Local studies will rarely have resources to execute such an effort themselves, again emphasizing the importance of a nested (and coordinated) hierarchy of monitoring programs.

Time and Variability. Evaluating the effectiveness of management actions requires a preliminary judgment of the time frame over which effects can be recognized. For water-quality parameters, storm-specific grab samples or continuous flow-weighted sampling has been most common; for changes in geomorphic form or in the population attributes of benthic macroinvertebrates, one-time annual sampling that presumes to integrate the effects of the past year are typical. Flow metrics are normally extracted from "continuous" (i.e., 5-, 15-, or 60-minute) measurements of discharge. However, every measurement has some degree of variability, a consequence of "natural" variability, measurement errors, and induced change (i.e., the effects of the management action we are trying to perceive). Separating these components is a matter of statistical analysis (see next section) based on repeated measurements, either in time or in space (or both).

We note that many practices common to past monitoring efforts, particularly the use of individual grab samples to characterize stormwater quality, have yielded results with little to no subsequent value: "…to use stormwater data for decision making in a scientifically defensible fashion, grab sampling should be abandoned as a credible stormwater sampling approach for virtually all applications" (NRC 2009, p. 330).

The duration of a monitoring program is commonly determined by the desire for "timely" answers, although normally the ability to generate statistically significant results is a function of the system being evaluated and the indicators being measured. This often creates a conflict between the intended "mission" of the monitoring program and its ability to produce defensible results, a conflict that can only be avoided by a design that identifies meaningful variables to measure, conducts sufficiently frequent measurements to dampen random variability, and must persist~~s~~ for long enough to allow a management "signal" to emerge from the data. This is the essence of the iteration noted above in Step 4 of monitoring-plan design above.

The monitoring program design must persist long enough to a allow management "signal" to emerge from the data. Consequently, long-term records (i.e., one to several decades) will be needed to detect all but the most dramatic of trends in biological indicators.

In one of relatively few quantitative studies of variability in biological indicators, Mazor *et al.* (2009) found that year-to-year variability for the same site sampled in the same season showed a variability (i.e., ±1σ) was typically about 10 points for a benthic IBI. With average scores for their 5 sites ranging from 28–51 (on a 100-point scale), this reflects a coefficient of variation of about 25%. Individual metrics were even more variable. This emphasizes that long-term records (i.e., one to several decades) will be needed to detect all but the most dramatic of trends in biological indicators.

The duration of monitoring also needs to capture the events that are most important to the anticipated responses of the measured system. For evaluating the effects of hydromodification, frequent storms (i.e., those that are normally expected to occur one to several times per year) are commonly judged important and their effects would normally be captured by a monitoring effort of even just one or a few years' duration. Particularly in more semi-arid regions of the state, however, significant channel-altering events may occur only after many decades of relative quiescence and stability, and noticeable (or documentable) response of streams to hydromodification may only occur under certain circumstances or following specific combination of events. Therefore, the lack of channel response on an annual basis may not necessarily indicate that management actions are effective. Thus a long-term, ongoing monitoring effort is necessary to capture the responses to infrequent, stochastic events, but determining the likely duration of such a program requires some knowledge (or assumptions) of the critical drivers of those responses. It therefore requires a well-posed set of management questions underlying the monitoring effort as well.

For management questions concerning the effectiveness of hydromodification controls, monitoring will almost always benefit from long-term flow monitoring at multiple sites, especially those in the mid to upper watershed (and key tributaries, depending on the scale of the effort). Local rainfall measurements are nearly as essential, since flow data without rainfall data resolved at a similar spatial and temporal scale are useless at best, misleading at worst. Baseline (pre-project) monitoring normally is also invaluable. However, each of these elements will normally require some combination of a multi-scale, long-term, coordinated monitoring program with an investment of at least several years' duration in anticipation of (and follow-up after) a specific management action at a specific location. Despite the value for evaluating the effects of hydromodification (and hydromodification control efforts), such monitoring almost never occurs to this degree. To the extent this remains a practical constraint on implementation, the range of management questions needs to be commensurately narrowed as well.

Statistical Considerations. The statistical design of a monitoring program is beyond the scope of this section, because the range of possible requirements and approaches is tremendously broad. Several general principals are worth articulating, however, because they apply almost universally (and are commonly ignored):

- Although trends can be "suggested" by monitoring data, only statistically rigorous results can be offered as "proof." Thus, ignoring this dimension of monitoring program design severely limits future applicability of the results.
- Most natural parameters display high variability when measured outside a laboratory, and thus the magnitude of change caused by a management action also needs to be great before it can be recognized. There is a trade-off between the relative magnitude of change and the number of samples required to recognize it (i.e., large relative changes require fewer samples), but many monitoring efforts pay little attention to this basic fact. Where sampling can only occur during specified storm conditions or once during the same season each year, the duration of a monitoring campaign sufficient to detect even large changes in naturally variable parameters is likely to be a decade or longer. For many management applications, this is tantamount to generating no useful information at all (but is significantly more costly).
- The level of effort needed can be estimated *a priori* to help guide final monitoring design, but only if the degree of variability and the magnitude of change to be perceived are known or estimated ahead of time. One such example is given below, where the diagonal lines are labeled with the number of independent samples needed to achieve a typical level of statistical power for various combinations of permissible error from the "true" value (x axis), and the intrinsic variability in values across the population being measured (y axis) in Figure 5-1 below.

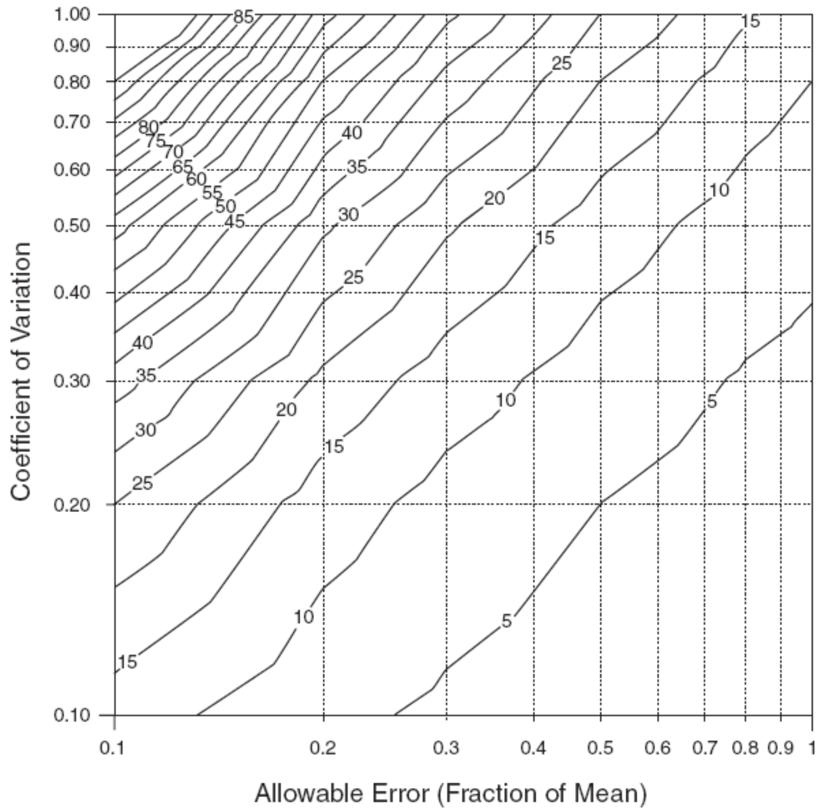


Figure 5-1. Sample requirements for confidence of 95% (α = 0.05) and power of 80% (β = 0.20). Figure from Pitt and Parmer 1995.

5.4.3 What to Monitor (Step 3 of the Monitoring Plan)

The choice of "what to monitor" follows from the choice of assessment endpoints, which in turn depends on the choice of management goals: for example, if "stable stream channels" is the intended outcome of an HMP, then measurement of the physical form of a channel over time would be appropriate. If diagnosing the cause of observed changes is also desired, then some evaluation of potential causal agents (e.g., hydrology, sediment input, or direct disturbance) would also be needed. Because management goals are now commonly (and appropriately) cast more broadly, however, they can embrace less clearly defined endpoints such as "watershed health" or "biological integrity." Many such endpoints fail the test of quantifiable objectivity.

However, these goals invoke a broad scope of concern, embracing not only physical stream conditions but also a range of chemical, hydrologic, and biological attributes. They encompass a broader catalog of receiving waters that may need to be evaluated. Finally, they emphasize the importance of looking more broadly to identify the cause of observed changes—both spatially, to conditions throughout a watershed that may have influence downstream; and temporally, to recognize ongoing adjustments to past disturbance (i.e., legacy effects) and to future environmental changes (e.g., climate change) that commonly lie well beyond the ability of local watershed managers to address. The imprecision of these goals should not obscure the importance of broadening the scope of stormwater and hydromodification assessments to include not only the traditionally emphasized characterization of selected water-quality constituents and channel stability, but also more integrative measures.

These considerations suggest two broad categories of assessments, which largely but not entirely align with the two scales of implementation (i.e., "programmatic" and "local") defined in Table 4–1:

- Integrative: defining an overall level of "health" of the watershed, as expressed in the condition(s) of its receiving waters. Current scientific consensus suggests that biological indicators are best suited to this scale of evaluation (Karr and Chu 1999), insofar as they integrate the consequences of multiple stressors on aquatic systems and because many management goals (and regulatory requirements) are cast in biological terms. To be meaningful, however, any such indicators need to be suitably chosen and stratified for their particular geo-hydro-climatological region (e.g., "ecoregions"; Omernick and Bailey 1997).
- Targeted: demonstrating the achievement of an established regulatory standard or a designated threshold (typically, a measured or modeled pre-development condition) by a particular parameter, commonly one or more chemical constituents or a specific hydrologic metric of flow. This can be evaluated at the outfall of a single stormwater facility, at the discharge point for a site, or in the receiving water itself. Many of these thresholds are important in their own right—to protect human health, to preserve riparian property from erosion, to avoid flooding of previously non-inundated lands. However, they should be recognized as providing only one-dimensional views of a much broader system. Thus, targeted monitoring can supplement but should not replace more integrative measures.

Integrative assessment endpoints require multiple lines of evidence to characterize receiving-water conditions. At their most comprehensive, they should include measures of flow, geomorphic condition, chemistry, and biotic integrity (Griffith *et al.* 2005, Johnson and Hering 2009). However, biological criteria are generally key to integrative assessment: "In general, biological criteria are more closely related to the designated uses of waterbodies than are physical or chemical measurements" (NRC 2001, p. 8). In most applications, such assessments are compared to one or more reference sites where conditions have been independently judged as "excellent," or where human disturbance is minimal and so best-quality conditions are assumed.

Integrative assessment endpoints require multiple lines of evidence to characterize receiving-water conditions. At their most comprehensive, they should include measures of flow, geomorphic condition, chemistry, and biotic integrity.

The task of identifying and quantifying reference conditions in California streams is presently being carried out by the Reference Condition Management Program (RCMP) of the State Water Board's Surface Water Ambient Monitoring Program (SWAMP; see 2009 Recommendations). About 600 sites have been recognized by this program as "reference" based on having minimal human disturbance, and they have been geographically stratified into the 12 Level III ecoregions mapped for the state of California (by USEPA 2000). The metrics chosen to characterize their biologic conditions should provide an appropriate list for the evaluation of impaired (or potentially impaired) streams.

An equivalent set of reference sites and conditions for other receiving-water types does not presently exist. California also presently lacks a systematic basis for defining relative categories of “poor,” “fair,” “good,” or “excellent” based on numeric values of biological indicators, such as exists in parts of the Pacific Northwest. Several regions, however, now have multimetric biological indicators with defined reference conditions (see below).

Elsewhere, however, there is as yet no context for setting assessment endpoints for biological indicators in California receiving waters. Such an effort is in progress, at least for streams, and its eventual completion to support the management application of more local monitoring results is a key recommendation of this report. Biological assessment endpoints will need to be established region by region on an as-needed basis; in the interim, locally collected data can be very useful for trend monitoring of receiving water but not for defining existing levels of “health.”

5.4.3.1 An Example from Washington State

The Puget Sound region of western Washington State provides an instructive example for identifying indicators and establishing desired assessment endpoints. Multiple agencies over the last two decades have sought to measure the overall ecological health of the region and to define targets for recovery. Following the most recent three-year process, the lead agency for the current effort released its set of 20 “dashboard indicators” designed both to express scientific understanding of conditions needed for ecological health and to communicate that understanding in a public-accessible manner (http://www.psp.wa.gov/pm_dashboard.php; accessed September 5, 2011). They cover physical, chemical, and biological indicators: all expressed in terms of relative improvement or quantified conditions to be reached by the year 2020.

This level of target-setting is possible only after extensive study and public discussion; it falls far beyond the scope of the present document. It is instructive for the state of California, however, in several regards as it looks to the future:

- The physiographic scope of the indicators and their target values is well-constrained to a particular geographic region with broadly similar geologic, hydrologic, and climatological attributes. Multiple parallel efforts would almost certainly be needed for a more diverse region (such as the entire state).
- Each indicator has a strong scientific basis for inclusion and at least some scientific basis for specific targets. Their communication value with the public was also an explicit criterion for inclusion.
- The most numerous indicators are biological, and they address multiple levels of the trophic chain from top predators to plants (a planktonic metric, however, was rejected as requiring too much additional scientific study and offering little communication value to the general public).
- Although emphasizing biology, the indicators are broadly distributed amongst biological, chemical, and physical metrics; most are broadly integrative in nature (e.g., reference to “bug populations” (the Puget Sound B-IBI) and a “freshwater quality index”).

- The set of physical indicators is most parsimonious for instream conditions, and excluding marine nearshore and estuary conditions is restricted to a single hydrologic metric (chosen for its presumed influence on fish). This stands in stark contrast to most existing hydromodification monitoring plans, which emphasize measures of channel geomorphology and a wider range of hydrologic metrics. Such indicators may provide useful performance measures, but they should not be mistaken for more integrative measures of ecosystem or watershed "health."
- Although each indicator has a specified, numeric goal to be reached by 2020, there are no articulated changes to the current management plan if any of those goals are not reached (or if interim measures suggest that they will not be reached). This is a recognized shortcoming of the present plan but there is no mechanism yet in place to address it. As such, it does not currently meet the test for "adaptive management" (see Appendix C).

In California, such a list of integrative assessment indicators (let alone quantified endpoints for those indicators) cannot presently be defined, except in a few specific localities where data collection and analysis have been ongoing for many years. Thus, we recognize the value of such targets but must guide the present development of monitoring in recognition of their near-complete absence. Rectifying this shortcoming is the central recommendation for long-term program development; in the interim, short-term monitoring at both the regional and local levels need to acknowledge the absence of an integrative context in which to interpret their results.

In California, a list of integrative assessment indicators (let alone quantified endpoints for those indicators) cannot presently be defined, except in a few specific localities. Rectifying this shortcoming is the central recommendation for long-term program development.

Regulatory standards are established on the assumption that "clean water" will result in "healthy streams," but the elements of a watershed are far too complexly interrelated to permit such a simplistic perspective. Although the inverse ("polluted water results in unhealthy streams") is almost always true, the challenge for inferring causality from typical monitoring data is that *many* such stressors can all yield the same, degraded outcome. For this reason, targeted monitoring can provide useful diagnostic information and demonstrate regulatory compliance, but it cannot provide sufficient information to address integrative assessment endpoints.

5.4.3.2 Indicators from Existing Programs

We now turn to some of the most common indicators used in monitoring programs today, recognizing that their suitability in any given application depends on the questions being asked, the characteristics of the natural system being measured, and the practical constraints imposed on the monitoring program.

Hydrologic Indicators. Historically, the effects of urbanization on flow were characterized exclusively in terms of peak flow increases (e.g., Leopold 1968, Hollis 1975). Study since those early works has emphasized the degree to which other attributes of a stream hydrograph are changed by watershed imperviousness, and the importance of assessing the *duration* of moderate flows that are capable of transporting channel sediments and the frequency with which those geomorphically active flows occur

(Section 2). Thus, monitoring relevant to a particular hydromodification management application will likely include a variety of flow metrics (e.g., Konrad and Booth 2005, Degasperi *et al*. 2009).

In moving beyond a narrow focus on linkages between watershed urbanization, flow alteration, and in-stream effects, scientific understanding of hydrologic controls on stream ecosystems has recently led to new approaches for assessing the ecological implications of hydromodification. For example, the ecological limits of hydrologic alteration (ELOHA) framework is a synthesis of a number of existing hydrologic techniques and environmental flow methods that allows water-resource managers and stakeholders to develop socially acceptable goals and standards for streamflow management (Poff *et al.* 2010). The central focus of the ELOHA framework is the development empirically testable relationships between hydrologic alteration and ecological responses for different types of streams. This requires a foundation of hydrologic data provided by gaging and/or monitoring, and sufficient biological data across regional gradients of hydromodification. Although hydrologic–ecological response relationships may be confounded to some extent by factors such as chemical and thermal stressors, there are numerous case studies from the US and abroad in which stakeholders and decision-makers have reached consensus in defining regional flow standards for conservation and ecological restoration of streams and rivers (Poff *et al.* 2010).

Hydrologic monitoring provides essential information needed for establishing flow–geomorphology–ecology relationships, validating conceptual models, and assessing effectiveness of management actions in developing watersheds. Implementing regional flow standards should proceed in an adaptive management context, where collection of monitoring data or targeted field sampling data allows for testing of flow alteration–geomorphic–ecological response relationships. This allows for a fine-tuning of flow management targets based on improved understanding of the actual mechanisms; however, such monitoring can be expensive and it may take many years to adequately characterize the full spectrum of streamflows. Thus, hydrologic monitoring programs should be carefully planned and executed so that they are cost-effective and address the key uncertainties In this paper we primarily focus on indicators that do not require additional, extensive data collection.

Hydrologic indicators provide essential information needed for establishing flow–geomorphology–ecology relationships, validating conceptual models, and assessing effectiveness of management actions in developing watersheds.

Geomorphic indicators have been long-recognized as simple, easy-to-measure, and relatively responsive indicators of changes to the flow regime or sediment supply of a river or stream.

Biological indicators provide an integrative view of river condition, or river health.

Hydrologic monitoring is feasible in the context of a short-term program only if the purpose is to evaluate the engineering performance of a particular facility. For most applications, however, at least two (and commonly many more) years are necessary to measure a range of variable conditions sufficient to capture significant geomorphic and/or biological effects. Measurement of precipitation, generally a less cost-intensive effort than flow monitoring, must occur in consort for the data to be useful. In an effort to minimize the cost of continuous long-term flow modeling, a hydrologic model may be calibrated on one or two years of actual data and then used *in lieu* of further data to predict flow conditions. Whether the level of imprecision so introduced is appropriate will depend on the management questions being asked, but in general such an approach is normally judged more appropriate for comparative results (e.g., did a specified flow magnitude increase in frequency or duration?) than for absolute results (what is the magnitude of the 2-year discharge?).

Geomorphic Indicators. Geomorphic indicators have been long-recognized as simple, easy-to-measure, and relatively responsive indicators of changes to the flow regime or sediment supply of a river or stream (e.g., Leopold 1968). They require little specialized equipment, many commonly can be measured "in the dry" (or close to it), they typically change little from week-to-week (and so are often measured only once per year), and the morphologic features of interest provide the physical template on which a wide range of biological conditions are expressed.

Scholtz and Booth (2000) recognized five geomorphological "channel features" commonly measured as part of monitoring programs:

- Channel geometry (cross sections, longitudinal profile).
- Channel erosion and bank stability.
- Large woody debris.
- Channel-bed sediment.
- In-stream physical habitat (pools, riffles, etc.).

To this list, others have also added:

- Floodplain connectivity.
- Channel planform (meandering, braiding, rates of channel shifting).

Each metric has well-defined methods for field (or, in some cases, airphoto) measurements that need not be repeated here. However, despite broad agreement on *how* to measure each parameter, there is substantially less agreement on the meaning of particular measurements, or indeed under what circumstances (if any) such measurements should be made at all. Most contentious are the various protocols for assessing instream physical habitat (#5 above)—seemingly the most "relevant" for a host of biological applications and for evaluating restoration success. However, a variety of studies have documented a high level of uncertainty imposed by observer bias:

> "Habitat-unit classification was not designed to quantify or monitor aquatic habitat. At the level necessary for use as a stream habitat monitoring tool, the method is not precise, suffers from poor repeatability, cannot be precisely described or accurately transferred among investigators, can be insensitive to important human land-use activities, is affected by stream characteristics that vary naturally and frequently, and is not based on direct, quantitative measurements of the physical characteristics of interest. Relying on habitat-unit classification as a basis for time-trend monitoring is time-consuming, expensive, and ill-advised." (Poole *et al*. 1997, p. 894)

Other geomorphic metrics, in contrast, can provide a robust, albeit coarse, characterization of the channel boundaries. Some changes, particularly if consistently expressed by multiple adjacent cross-sections, can provide clear documentation of systematic channel changes over time that can be credibly associated with upstream changes (e.g., increased discharge from urbanization leading to channel enlargement). Other changes, however, may have a more indirect or uncertain association with upstream conditions (e.g., grain-size changes) because of the potential for rapid, ill-described changes over time without a corresponding human "cause." This emphasizes the importance of having a well-crafted purpose for the monitoring program into which the utility of any chosen parameter can be clearly described.

Biological Indicators. Biological indicators have been long-applied in society's evaluation of stream conditions, but historically that application has been rather informal. Observation of major fish kills, for example, is the application of a "biological indicator," but it provides little diagnostic or discriminatory information except in those streams where conditions are so poor that even casual awareness is inescapable. As a more refined assessment tool, however, their application to freshwater streams is only a few decades old. As such, the science is still under construction and some basic principles are still debated.

The rationale behind using biological indicators, however, is relatively undisputed. Karr (1999) has provided a useful summary of that rationale, of which the key elements are:

- Biological monitoring and biological endpoints provide the most integrative view of river condition, or river health.
- Biological monitoring is essential to identify *biological* responses (emphasis added) to human actions.
- Communicating results of biological monitoring to citizens and political leaders is critical if biological monitoring is to influence environmental policies.

Some of the earliest references to biological monitoring are associated with the development of RIVPACS, the River Invertebrate Prediction and Classification System, developed by the Centre for Ecology and Hydrology in the United Kingdom and now applied in a number of countries worldwide to predict instream biological conditions from a suite of watershed and channel variables. Since that beginning, other approaches have been advanced and practiced (e.g., the US Environmental Protection Agency's *Rapid Bioassessment Protocols*) that provide alternative, but likely near-equivalent results (e.g., Herbst and Silldorf 2004).

In this section we compare several biological indicators recently applied in various regions of California. This not intended as a comprehensive comparison of all available approaches potentially applicable to California; rather, it simply provides a few examples that illustrate the differences, and the similarities, of the various approaches. As the comparisons demonstrate, there is no "right" approach—but all share commonalities that are likely to be valuable elements of any biological monitoring program. We focus exclusively on benthic macroinvertebrates (BMI), because these have seen the longest and most widespread application (both in California and worldwide) given their species diversity and their relative geographic immobility. However, a variety of other biological metrics (particularly fish and periphyton) have relevance to biological monitoring and strong advocates in the scientific community. Their omission here is not a judgment on their value, merely a reflection of the broader applicability and richer scientific development of BMI-based indicators.

Multimetric indices are presently completed for four areas of the state (Eastern Sierra, North Coast, Central Valley, and Southern Coast). They are not standardized or calibrated state-wide (nor should they necessarily be), and they do not provide statewide coverage. In addition, the City of Santa Barbara (Ecology Consultants 2010) has sponsored development of its own BMI index (geographically embedded within the Southern Coast region), with both commonalities and differences between it and the others.

Eastern Sierra Nevada. Herbst and Silldorf (2009) developed an IBI based on streams from the upper Owens River north to the Truckee River. Their purpose was both to provide a region-specific IBI for future use and to evaluate the results of such an approach with others that also make use of BMIs to assess stream conditions. They evaluated the performance of 12-, 10-, and 8-metric indices, recommending the 10-metric index as providing the best overall performance included in the 12-metric index were these 10 and also predator richness and EPT% abundance:

- % tolerant percent richness (% of taxa with TV= 7,8,9,10).
- Richness (total number of taxa).
- Chironomidae Percent Richness (% of taxa that are midges).
- Ephemeroptera (E) Richness (number of mayfly taxa).
- Plecoptera (P) Richness (number of stonefly taxa).
- Trichoptera (T) Richness (number of caddisfly taxa).
- Dominance 3 (proportion of 3 most common taxa)
- Biotic Index (modified Hilsenhoff, composite tolerance).
- Acari richness (number of water mite taxa).
- Percent shredders (% of total number that are shredders).

A statistical analysis suggests that as many as 10 distinct classes can be discriminated using this IBI, although their recommended application uses only five categories of quality.

North Coast. Rehn *et al.* (2005) developed an IBI based on coastal-draining streams from Marin County north to the Oregon border. They evaluated 77 individual metrics, testing them for responsiveness to human disturbance and redundancy, and ultimately settled on eight:

- EPT richness.
- Coleoptera richness.
- Diptera Richness.
- Percent intolerant individuals.

- Percent non-gastropod scraper individuals.
- Percent predator individuals.
- Percent shredder taxa.
- Percent non-insect taxa.

Their statistical analysis indicated that five categories of quality could be discriminated; response was driven most strongly by watershed land cover (natural vs. unnatural) and percent of substrate that was sand-sized or finer. They also suggested a set of thresholds for rejecting potential "reference" sites (Rehn *et al.* 2005; Table 5-2), which was also used in the Southern Coast study (Ode *et al.* 2005; see below):

Table 5-2. Thresholds for rejecting potential "reference" sites.

Stressor	Threshold
Percentage of unnatural land use at the local scale	> 5%
Percentage of urban land use at the local scale	> 3%
Percentage of total agriculture at the local scale	> 5%
Road density at the local scale	> 1.5 km/km^2
Population density (2000 census) at the local scale	> 25 ind./ km^2
Percentage of unnatural land use at the watershed scale	> 5%
Percentage of urban land use at the watershed scale	> 3%
Percentage of total agriculture at the watershed scale	> 5 %
Road density at the watershed scale	> 2.0 km/km^2
Population density (2000 census) at the watershed scale	> 50 ind./ km^2

Central Valley. Rehn *et al.* (2008) also developed an IBI for Central Valley streams, evaluating 80 candidate metrics to yield a final list of five:

- Collector richness.
- Predator richness.
- Percent EPT taxa.
- Percent clinger taxa.
- Shannon diversity (a composite measure of taxonomic richness and evenness of abundance).

They found that reach-scale physical habitat variables were more critical in their data set than water chemistry or land use. They also presented their findings with greater caution than with other regions of the state, noting the difficulty of identifying truly "unimpaired" reference conditions and the geographic concentration of much of their source data.

Southern Coast. Ode *et al.* (2005) developed a BMI index of biological integrity based on 61 potential metrics from reference sites drawn from relatively undisturbed coastal-draining watersheds from Monterey Bay south to the Mexican border. They included seven final metrics:

- Percent tolerant taxa.
- Percent collector-gatherer + collector-filterer individuals.
- Predator richness.
- Percent intolerant individuals.
- EPT richness.
- Percent noninsect taxa.
- Coleoptera richness.

They note that the last two on the list are not common in other multimetric B-IBIs but were statistically appropriate for their data set. They judge that this "SoCal B-IBI" can discriminate 5 categories of condition, using 5 categories evenly divided along a 100-point scale. Particularly strong correlations amongst all seven metrics were displayed in comparison to road density and percent "watershed unnatural."

A portion of the Southern Coast region has also been the subject of independent IBI development over the past decade (Ecology Consultants 2010, 2011). The region of study spans the Santa Barbara coastal streams from the Ventura County line west about 45 miles to Gaviota Creek. Their work led to the development of an IBI using the following 7 metrics:

- # of insect families
- # of EPT families
- % EPT minus Baetidae
- % PT
- Tolerance value average
- % sensitive BMIs
- % predators + shredders

In the course of this work, tolerance values were adjusted for certain taxa based on local observations of presence/absence relative to the level of watershed disturbance. With these changes, they found strong statistical basis for discriminating five categories of biological quality. They also found that considering both watershed-level land use patterns and localized physical habitat conditions were necessary to achieve the best prediction of biological integrity.

Summary. A compilation of the various metrics (Table 5-3) demonstrates only broad commonalities between the various regional IBI's presently available for specific parts of California, suggesting that additional work needs to be done before comprehensive recommendations for biological monitoring can be made. At present, perhaps half(?) of the state's area is covered by existing multimetric indices as noted above, and for these areas they provide the best (indeed, the only) guidance for meaningful collection and interpretation of biological data. Elsewhere, however, only a few general points can be made:

- Biological monitoring in un-assessed regions of the state cannot be used to identify absolute conditions of biological health (i.e., "status" monitoring). However, they will likely be useful for "trends" monitoring, where only the change relative to a prior state is being sought.
- Despite the variability in metric choices amongst the various regions (Table 5-2), some broad commonalities are apparent. In particular, several types of metrics are likely to provide useful indicators of change in a known direction (i.e., an increase or decrease in the metric can be confidently assigned to a change in quality in a known direction):
    - One or more measures of tolerance or intolerance
    - One or more measures of predator prevalence
    - One or more measures of EPT taxa or taxa richness

This list does not purport to describe a true multimetric B-IBI, nor to provide a basis to evaluate instream biological health on an absolute scale (i.e., from "poor" to "excellent"). In the absence of any region-specific guidance, however, changes in one or more of these metrics are each likely to provide some initial, useful indication of temporal trends in biological health until such time as the types of studies referenced above can be conducted.

Table 5-3. Compilation of metrics used in the five regional B-IBI's described in the text.

METRIC	Eastern Sierra	North coast	Central Valley	Southern coast	Santa Barbara
Percent intolerant individuals		X		X	X
% tolerant (% of taxa with TV= 7,8,9,10)	X			X	
Tolerance value average					X
# of insect families					X
Percent non-insect taxa		X		X	
Percent shredders (% of total number that are shredders)	X	X			
Percent predator individuals		X			
% predators + shredders					X
Predator richness			X	X	
Collector richness			X		
Percent non-gastropod scraper individuals		X			
Percent clinger taxa			X		
Percent collector-gatherer + collector-filterer individuals				X	
EPT richness		X		X	X
Percent EPT taxa			X		
% EPT minus Baetidae					X
% PT					X
Ephemeroptera (E) Richness (number of mayfly taxa)	X				
Plecoptera (P) Richness (number of stonefly taxa)	X				
Trichoptera (T) Richness (number of caddisfly taxa)	X				
Coleoptera richness		X		X	
Diptera Richness		X			
Chironomidae Percent Richness (% of taxa that are midges)	X				
Richness (total number of taxa)	X				
Dominance 3 (proportion of 3 most common taxa)	X				
Biotic Index (modified Hilsenhoff, composite tolerance)	X				
Acari richness (number of water mite taxa)	X				
Shannon diversity index			X		

5.5 Recommendations

Based on this review of monitoring theory, current applications, and current needs, the following steps are recommended to advance a state-wide program of monitoring to support the management of hydromodification control plans.

5.5.1 Programmatic Monitoring

Over the next several years, the following actions should be implemented at the state and/or regional level:

- Executing broad-scale, GIS-based watershed characterization;
- Identifying a set of representative indicator watersheds, and a basic suite of regular measurements that are suitable for establishing trends in physical, chemical, and biological indicators;
- Identifying (and multi-metric monitoring within) a relatively small set of watersheds that have implemented recent hydromodification control plans to initiate the long-term evaluation of downstream trends.

Over the course of the next several NPDES permit cycles (i.e., one or more decades), the following actions should also be undertaken as a regional responsibility:

- Setting regionally appropriate endpoints for biological health of receiving waters;
- Identifying particularly promising (or particularly ineffective) combinations of control strategies across a range of different landscape conditions;
- Providing supplemental data collection at reference sites to support trends monitoring by local jurisdictions;
- Compiling local results to guide development and refinement of regionally appropriate hydromodification control strategies.

5.5.2 Local Monitoring

Over the next several years, the following actions should be implemented by local jurisdictions at a local scale:

- Implementing a program of source identification at one or more high-risk locations (e.g., high vehicular traffic, high imperviousness, toxic chemical storage/transport);
- Demonstrating the hydrologic performance of one or more representative hydromodification control facilities;
- Monitoring trends at one or more representative receiving waters, ideally at a regionally identified site (see the second bullet under “Programmatic monitoring,” above);

- Conducting a synoptic evaluation of waterbodies, stratified by watershed type (see the first bullet under "Programmatic monitoring," above), to identify highest priority systems for protection or rehabilitation, if not already known.

Over the course of the next several NPDES permit cycles, the following long-term actions should also be undertaken as a local responsibility:

- Monitoring representative conditions to evaluate whether management actions are improving overall receiving-water health;
- Evaluating cost-effectiveness of implemented hydromodification control measures;
- Identifying critical areas for resource protection by virtue of existing high-quality conditions.

6. References

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APPENDIX A: GUIDANCE FOR APPROPRIATE APPLICATION OF HYDROLOGIC AND HYDRAULIC ANALYSES

Information contained in this document is intended solely for guidance purposes only. It is not intended to be an instruction manual and use of any of the guidance provided herein is at the risk of the user. No other person or entity shall be entitled to rely on the services, opinions, recommendations, plans or specifications provided in the document.

1. INTRODUCTION AND PURPOSE

The purpose of this Appendix is to provide technical guidance on hydrologic and hydraulic analyses, including the use of Continuous Simulation (Hydrologic) Modeling (CSM), in support of hydromodification assessment and mitigation. CSM is the industry standard developed since the early 2000s for use in the assessment and mitigation of hydromodification. The fundamental difference between CSM and peak flow hydrologic modeling, is that CSM considers the full range of flow events over a long period of record, typically 30 years or more, to develop flow duration curves, whereas peak flow hydrologic modeling generally considers synthetically (usually calibrated to measured data) produced event-based hydrographs (2-, 10-, 50-, 100- and 200-year return frequency events). CSM allows flow duration curves and other derived hydraulic metrics to be compared between existing and proposed conditions in order to assess hydromodification impact potential and to develop mitigation strategies. The guidance provided in this appendix is the product of the experience gained in the application of hydromodification management strategies to multiple urban development projects. This appendix is not intended to be an instruction manual but to provide guidance to engineers, planners and regulatory staff on specific modeling elements involved with HMPs.

MODELING METOHDOLOGY REVIEW

Modeling Approaches

A common approach to mitigating hydromodification impacts from development projects is to construct best management practices (BMPs) which capture, infiltrate and retain runoff, where possible. In such cases, the water is detained and released over a period of time at rates which more closely mimic pre-project hydrology. Methods commonly used to size hydromodification BMPs include hydrograph matching (matching pre and post-project flow regimes), volume control and flow duration control. Hydrograph matching is most traditionally used to design flood detention facilities for a specific storm recurrence interval, such as the 100-year storm, whereby the outflow hydrograph for a project area matches the pre-project hydrograph for a design storm. Volume control matches pre- and post-project runoff volume for a project site; however, the frequency and duration of the flows are not controlled. This can result in higher erosive forces during storms. Flow duration control matches both the duration and magnitude of a range of storm events for pre- and post-project runoff. The complete hydrologic record is taken into account, and runoff magnitudes and volumes are matched as closely as possible.

It is generally accepted that flow duration control matching is the most appropriate method to be used in the design of hydromodification BMPs. The flow duration control approach has been used in at least half a dozen HMPs in California, all of which used a CSM to match flow durations. However, differences exist in how the continuous simulation modeling is used between programs.

OVERVIEW OF APPENDIX

This appendix covers the following specific topics, addressed in the order in which they would arise as part of a hydromodification analysis for a major development project:

Section 2 addresses calculation of a flow control range, including identification of an acceptable low flow value, based upon critical flow for incipient motion of the channel material. .

Section 3 addresses the development of evaluation criteria to assess the effectiveness of a proposed mitigation design, including a discussion of flow duration matching and the erosion potential metric.

Section 4 addresses CSM, including precipitation data requirements, hydrologic time steps, model calibration and validation, and other modeling considerations and tips.

2. METHOD FOR SELECTION OF A FLOW CONTROL RANGE

INTRODUCTION TO FLOW CONTROL

Most hydromodification plans (HMPs) in California have adopted a flow control approach, which establishes a range of flow magnitudes discharging from the proposed site that must be controlled. The magnitude of the flow range is commonly expressed in terms of a percentage of the return period flow to which it is equivalent; for example: from 10% of the Q2 to 100% of the Q10. Flow magnitudes within the prescribed range must not occur more frequently under the proposed condition than they do in the existing (or pre-project) condition. Another way of expressing this is that the long term (decadal) cumulative duration of these flows must not be longer in the post-project condition compared to the pre-project condition. Generally, a small exceedance tolerance is allowed. For example, the following is a typical criterion that has been used in HMPs:

> For flow rates ranging from 10% of the pre-project 2-year recurrence interval event (XQ2) to the pre-project 10-year runoff event (Q10), the post-project discharge rates and durations shall not deviate above the pre-project rates and durations by more than 10% over and more than 10% of the length of the flow duration curve. The specific lower flow threshold should be influenced by results from the channel susceptibility assessment.

The rationale behind setting an upper limit is the understanding that when less frequent, high intensity/volume precipitation events occur, the watershed reaches a saturation level and responds in a similar manner for undeveloped and developed conditions. Furthermore, while these less frequent, high magnitude events do induce significant geomorphic change, they occur so infrequently that over a long time period, they comprise only a small portion of the work done on a channel. For example GeoSyntec (2007) used a hydro-geomorphic model to assess cumulative sediment transport on Laguna Creek (near Sacramento) and determined that 95% of the total erosion and sediment transport in the creek is accomplished by flow rates less than Q_{10}.

The purpose of determining a low flow range is one of practical design consideration when meeting a requirement for flow duration matching. The requirement to match flow durations between a pre- and post-project condition requires that runoff be detained and infiltrated within a BMP (e.g. open basin or underground vault). If flow matching is required to be achieved for all flows down to zero, the BMP volume will be significantly larger (and therefore more costly) than if there were some low flow below which runoff could be discharged at durations longer than in the pre-project condition. A key assumption underlying the concept of a low-flow discharge is that the increase in discharge durations below this rate will not increase channel erosion because the flows are too small to initiate movement of channel materials to any significant extent. Another critical assumption in the flow duration matching approach is that a single discharge value is valid across the range of grain sizes and geometries in the streams to which that low flow value applies.

For a specific set of hydraulic conditions (e.g., cross sectional shape, channel slope, bed and bank roughness), the flow rate can be calculated where the critical shear strength value is reached. Thus with an estimate of the critical shear strength of the materials composing a channel's bed or banks, and the hydraulic conditions occurring at the same location, the critical flow rate can be determined at which transport (or erosion) begins. This critical flow rate (Q_c) can then be compared to the magnitude of a flood peak which occurs every two years (Q_2) to establish the estimate of percent Q_2 to be used as the lower flow threshold.

Thus in order to calculate the lower flow threshold as expressed by a percentage of Q_2, three values must be determined for each analysis location (described in further detail below):

- The critical shear strength (τ_c) of bed and bank materials;
- The critical flow rate (Q_c) at which this critical shear strength is reached and exceeded;
- The magnitude of a flood peak which occurs every two years (Q_2).

In contrast, when using an erosion potential (Ep) metric (rather than flow duration matching) for BMP sizing, the Ep analysis incorporates channel geometry to estimate shear stresses generated at various flow rates, and then compares these to estimated critical shear stresses (i.e., shear stress required to initiate transport) for the grain size distribution within the stream. However, for either flow duration matching or for erosion potential analysis, the first step is to determine the critical shear stress for incipient motion of channel materials.

DETERMINATION OF CRITICAL SHEAR STRESS

The composition and condition of the bed and banks of a stream channel are the best indicators of how a channel will react (i.e., its susceptibility) to hydrologic changes resulting from development projects (i.e., hydromodification). Channels composed of materials more resistant to erosion are less susceptible to excessive erosion due to hydromodification than channels composed of less resistant materials. Channel material type can vary widely between, as well as within, watersheds. Figure 2-1 **Error! Reference source not found.**a. and b. illustrate stream incision through (a) relatively loosely consolidated, non-cohesive sand and gravels, and (b) relatively cohesive silty-clays. The resistance of bed and bank materials is quantified by their critical shear strengths, (τ_c) that is, the value where entrainment or transport begins.

Typical stream erosion in a southern California stream (granular, non-cohesive
(Photo courtesy of Eric Stein, SCCWRP)

Typical stream erosion in a northern California stream (generally cohesive silty clays)
(Photo cbec, inc.)

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Guidance on the Use of Continuous Simulation Hydrologic Modeling

Examples of Stream Erosion in Southern and Northern California

Project: 11-1001 | Created By: CBB | **Figure 2-1**

Figure 2-1. a. Example of a loosely consolidated, non-cohesive sand and gravel stream bed. b. Example of a relatively cohesive silty-clay stream bed.

Several methods are available for the estimation of critical shear stress, including laboratory studies (e.g., flume studies) and field measurements, with different methods utilized for cohesive materials and non-cohesive materials.

Estimating Critical Shear Stress for Non-Cohesive Materials

The most common method for determining the critical shear stress of a non-cohesive material is through the application of the Shields relationship. This relationship is applicable to the calculation of critical shear stress for a uniform size mixture of sediment with a known particle size and specific gravity. Since it was originally proposed by Shields in 1936, the relationship has been tested and further investigated by several other researchers, resulting in a variety of modifications, primarily through variation of the Shields parameter. The original value of the Shields parameter proposed by Shields was 0.06, however, values from 0.03-0.06 have been suggested, with 0.045 acknowledged as a good approximation. Recent research has demonstrated that a value of 0.03 may be more appropriate for estimating incipient motion in streams with gravel beds (Neill 1968, Parker et al. 2008, Wilcock et al. 2009), where D50 estimates are based upon data collected via pebble count. The decision of what value of Shields parameter is used can have a large influence on the resulting τ_c estimate. For example, if a value of 0.06 is used, it results in twice as large of an estimate of τ_c than if a value of 0.03 is used.

While the Shields relationship was developed for a mixture of uniform sized sediment, it can be applied to a mixture of sediment with varying sizes as long as the distribution is uni-modal and does not have a high standard deviation of grain sizes (Wilcock 1993). In contrast, for sediment mixtures which are bimodal (e.g., if there is a large amount of sand in addition to gravel), a different approach (e.g., Wilcock and Crowe 2003) is recommended. For a more in depth discussion of sediment transport and incipient motion, the reader is referred to Wilcock et al. (2009).

In order to apply the Shields relationship to determine τ_c, the median grain size (d50) present on the channel surface must be determined. River channels are often armored; meaning that coarser material is present on the surface than is present underneath the armor layer. However to access and transport the finer material beneath, the surface layer must first be mobilized. The median grain size is determined by analysis of a particle size distribution.

A particle size distribution can take the form of: 1) a cumulative *frequency* distribution which is determined by way of a pebble count or photographic analysis, or 2) a cumulative *weight* distribution. For a cumulative frequency distribution a subset of particles present on the surface are measured, and the frequency of particles within different size class bins is used. **Error! Reference source not found.** shows a sample particle size distribution graph developed from a pebble count. For a cumulative weight distribution, a bulk sample of the surface material is collected, and then sorted using a set of sieves with different screen sizes. The amount of material retained by each sieve is weighed and then used to plot the cumulative weight distribution. Both approaches have advantages and disadvantages.

A pebble count is a relatively straightforward field technique that is easily applied in streams which are wadable. **Error! Reference source not found.** shows photographs of pebble counts being conducted in the field. They can be performed relatively quickly, which means more samples can be collected to better characterize the conditions present in a reach. However, there are a variety of ways a pebble count can be conducted, and there is tremendous opportunity to introduce bias to the measurement. Furthermore, while studies often cite Wolman (1954) as the method employed in data collection, strict adherence to this protocol is not always achieved. Rather than the method suggested by Wolman (1954), a refined, more regimented approach has been suggested by Bundte and Abt (2001a), and is recommended. In addition, it should be noted that pebble counts generally do a poor job of characterizing sand and smaller sized material. In addition to pebble counts, software can be used to process a digital image of an area of the bed. The software samples a subset of particles present in the image, and using assumptions regarding the amount of given particle that is visible, is able to provide a cumulative frequency distribution.

Collecting a bulk sample for sieve analysis is another method frequently employed to determine values for typical characteristic indices of a particle size distribution. In this method a sample is collected from the channel surface, and then the sample is segregated into various size classes with sieves. One advantage of this approach is that it utilizes all the data available from the sampled area (as opposed to a pebble count which uses a subset of the entire population, e.g., ~100 particles as opposed to thousands), however the sampled area is typically smaller than the area sampled within one pebble count. One disadvantage is the size of sample that is necessary. Because the resulting particle size distribution is based upon weight, the largest particles present can have a very large influence on the resulting particle size distribution. Research has suggested that the weight of the entire sample must exceed 100x the weight of the largest particle present to escape this possible bias. This means large (volume and weight) samples are often required. Some sieving can occur on site through the use of shaker sieves, but typically some portion of the sample is also taken back to the lab for further analysis. Thus, bulk samples typically require more effort and equipment to establish a particle size distribution, however they provide a much more accurate estimate, especially when a large fraction of the sample is sand sized (2mm) and smaller.

For a more in depth discussion of sampling methods to determine particle size distributions in wadable streams, the reader is referred to Bunte and Abt (2001).

Estimating Critical Shear Stress for Cohesive Materials

The methods described above are not appropriate for cohesive materials, which due to chemical cohesion between particles exhibit larger τ_c values than would be estimated by consideration of particle size/weight in isolation (i.e., cohesive properties not considered). One method that allows for the determination of τ_c *in situ* is the application of a jet test (ASTM 2007). The jet-testing apparatus and analytical methods were developed by researchers at the USDA Agricultural Research Station (Hanson and Cook 1999; Hanson et al. 2002; Hanson and Cook 2004; ASTM 2007). The method uses a submerged impinging jet of water directed perpendicularly at the material surface, in order to erode the material. As erosion occurs, a scour hole is created. The depth of this hole is measured periodically as time progresses through the test. As the scour hole increases in depth, the strength of the jet is reduced because it is travelling longer distance through water from the jet orifice to the soil surface. Eventually, the energy of the jet is dissipated enough that it no longer has energy in excess of the material's shear strength and erosion stops. **Error! Reference source not found.** shows a photograph of a jet testing rig deployed in a stream bank.

In addition to jet testing, *in situ* testing of shear strength can be obtained through the application of a field vane shear test (ASTM 2008). This method provides τ_c values based upon the assumption that the bed or bank will fail via large blocks (composed of thousands of particles), as opposed to erosion occurring particle by particle. As such, the values measured by a shear vane are often several orders of magnitude larger than those obtained via testing with the jet-device.

Estimating Critical Shear Stress Through the Use of Literature Values

An alternative to the measurement/calculation of τ_c, is the use of values found in the literature. Indeed, several HMPs have several HMPs have been developed through assumption of material resistance properties found in the literature based upon literature based upon a textural description of the material. An often-cited reference is Fischenich (2001), which provides a (2001), which provides a summary (compiled from the relevant literature) for critical shear strength values for various values for various materials. An extract from this reference is provided in

Figure 2-5.

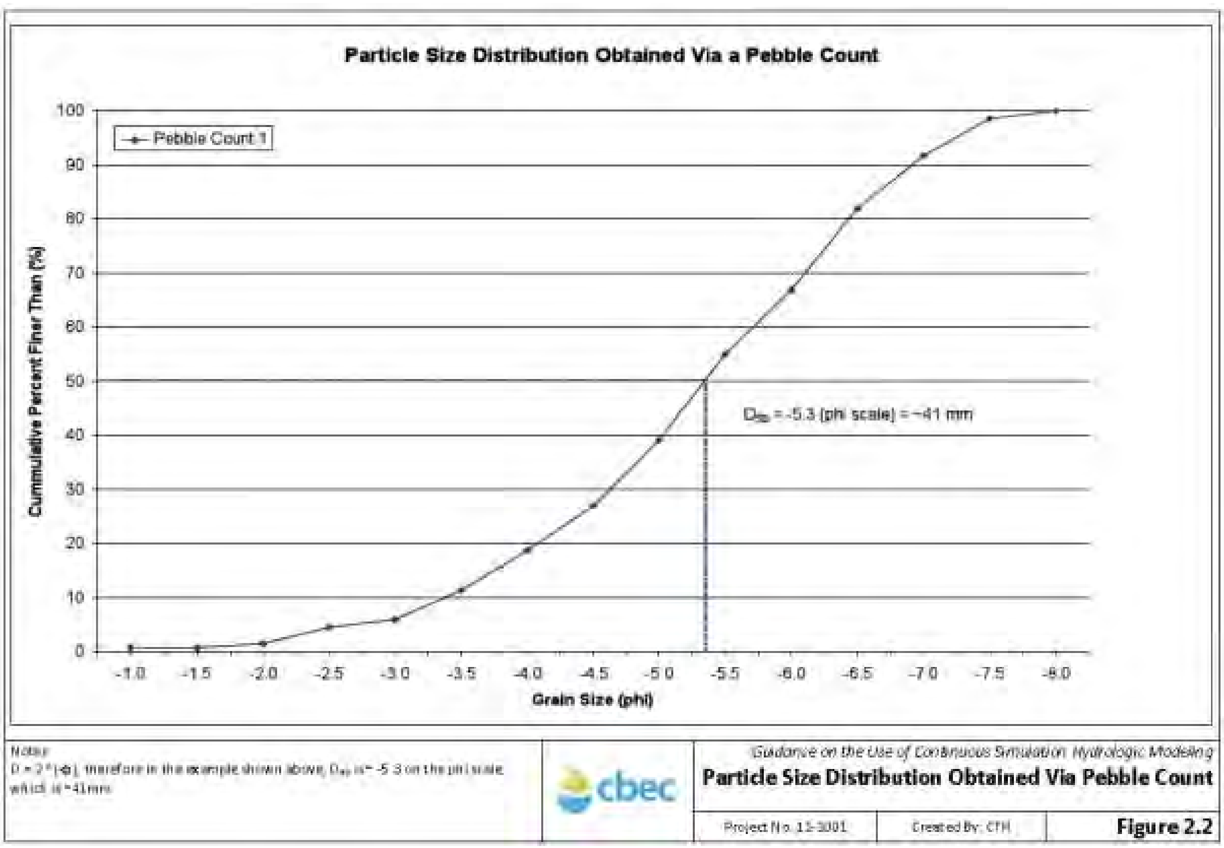

Figure 2-2. Particle Size Distribution Graph Developed from a Pebble Count

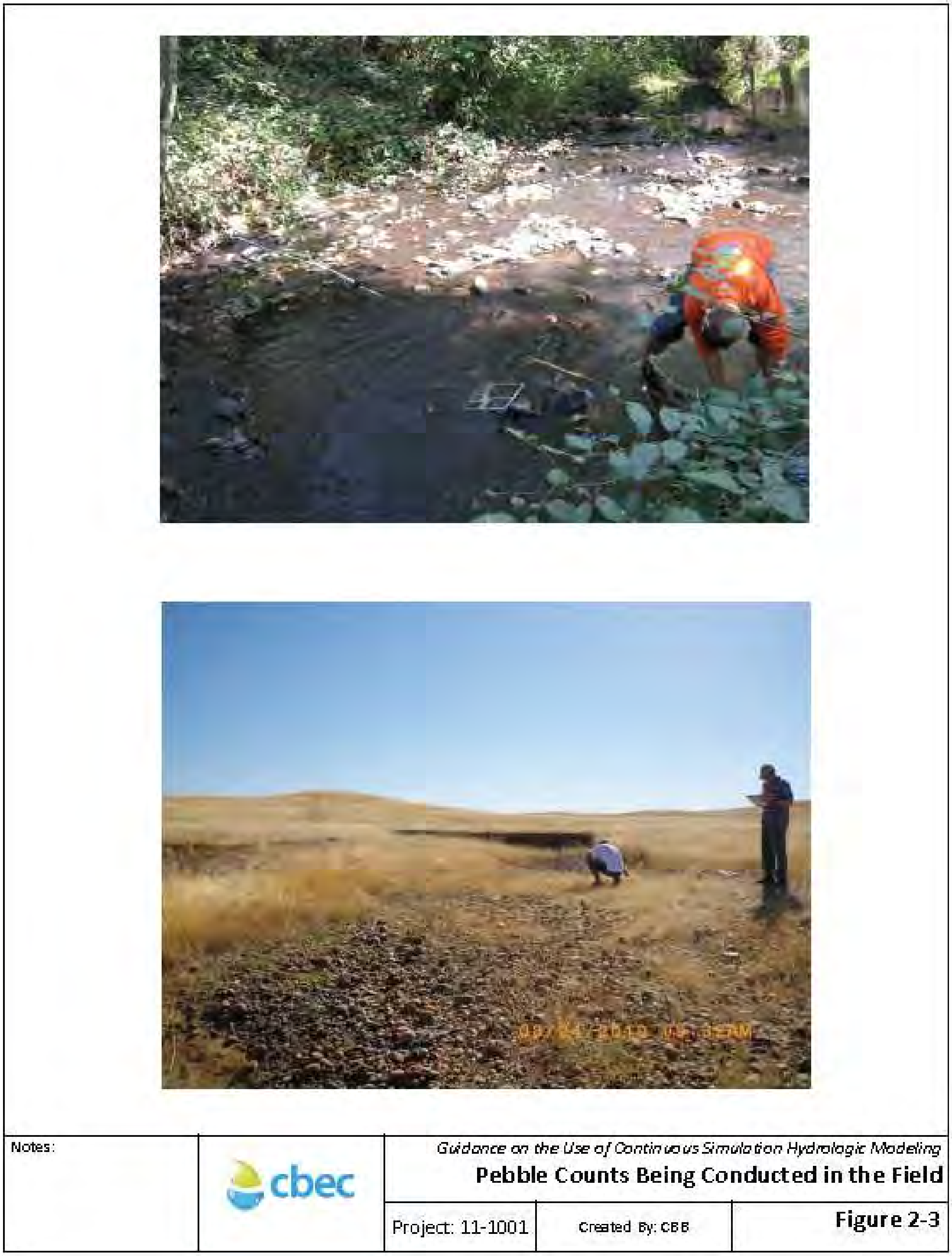

Figure 2-3. Pebble Counts Being Conducted in the Field

Typical installation of jet testing equipment in stream bank

Hole created in cohesive bank material by jet impinging on surface

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Figure 2-4. Jest Testing Equipment Deployed in a Stream

Table 2. Permissible Shear and Velocity for Selected Lining Materials[1]

Boundary Category	Boundary Type	Permissible Shear Stress (lb/sq ft)	Permissible Velocity (ft/sec)	Citation(s)
Soils	Fine colloidal sand	0.02 - 0.03	1.5	A
	Sandy loam (noncolloidal)	0.03 - 0.04	1.75	A
	Alluvial silt (noncolloidal)	0.045 - 0.05	2	A
	Silty loam (noncolloidal)	0.045 - 0.05	1.75 – 2.25	A
	Firm loam	0.075	2.5	A
	Fine gravels	0.075	2.5	A
	Stiff clay	0.26	3 – 4.5	A, F
	Alluvial silt (colloidal)	0.26	3.75	A
	Graded loam to cobbles	0.38	3.75	A
	Graded silts to cobbles	0.43	4	A
	Shales and hardpan	0.67	6	A
Gravel/Cobble	1-in.	0.33	2.5 – 5	A
	2-in.	0.67	3 – 6	A
	6-in.	2.0	4 – 7.5	A
	12-in.	4.0	5.5 – 12	A
Vegetation	Class A turf	3.7	6 – 8	E, N
	Class B turf	2.1	4 – 7	E, N
	Class C turf	1.0	3.5	E, N
	Long native grasses	1.2 – 1.7	4 – 6	G, H, L, N
	Short native and bunch grass	0.7 - 0.95	3 – 4	G, H, L, N
	Reed plantings	0.1-0.6	N/A	E, N
	Hardwood tree plantings	0.41-2.5	N/A	E, N
Temporary Degradable RECPs	Jute net	0.45	1 – 2.5	E, H, M
	Straw with net	1.5 – 1.65	1 – 3	E, H, M
	Coconut fiber with net	2.25	3 – 4	E, M
	Fiberglass roving	2.00	2.5 – 7	E, H, M
Non-Degradable RECPs	Unvegetated	3.00	5 – 7	E, G, M
	Partially established	4.0-6.0	7.5 – 15	E, G, M
	Fully vegetated	8.00	8 – 21	F, L, M
Riprap	6 – in. d_{50}	2.5	5 – 10	H
	9 – in. d_{50}	3.8	7 – 11	H
	12 – in. d_{50}	5.1	10 – 13	H
	18 – in. d_{50}	7.6	12 – 16	H
	24 – in. d_{50}	10.1	14 – 18	E
Soil Bioengineering	Wattles	0.2 – 1.0	3	C, I, J, N
	Reed fascine	0.6-1.25	5	E
	Coir roll	3 - 5	8	E, M, N
	Vegetated coir mat	4 - 8	9.5	E, M, N
	Live brush mattress (initial)	0.4 – 4.1	4	B, E, I
	Live brush mattress (grown)	3.90-8.2	12	B, C, E, I, N
	Brush layering (initial/grown)	0.4 – 6.25	12	E, I, N
	Live fascine	1.25-3.10	6 – 8	C, E, I, J
	Live willow stakes	2.10-3.10	3 – 10	E, N, O
Hard Surfacing	Gabions	10	14 – 19	D
	Concrete	12.5	>18	H

[1] Ranges of values generally reflect multiple sources of data or different testing conditions.

A. Chang, H.H. (1988).
B. Florineth. (1982)
C. Gerstgraser, C. (1998).
D. Goff, K. (1999).
E. Gray, D.H., and Sotir, R.B. (1996).
F. Julien, P.Y. (1995).
G. Kouwen, N., Li, R. M., and Simons, D.B., (1980).
H. Norman, J. N. (1975).
I. Schiechtl, H. M. and R. Stern. (1996).
J. Schoklitsch, A. (1937).
K. Sprague, C.J. (1999).
L. Temple, D.M. (1980).
M. TXDOT (1999)
N. Data from Author (2001)
O. USACE (1997)

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Fischenich, C. 2001. Stability thresholds for stream restoration materials. EMRRP Technical Notes Collection (ERDC TN-EMRRP-SR-29). U.S. Army Engineer Research and Development Center, Vicksburg, MS.

Notes:	cbec	*Guidance on the Use of Continuous Simulation Hydrologic Modeling* **Permissible Shear Strength and Velocity for Selected Lining Materials**		
		Project No: 11-1001	Created By: CBB	**Figure 2-5**

Figure 2-5. Permissible Shear and Velocity for Selected Lining Materials

DETERMINATION OF CRITICAL FLOW (Q_c)

For a specific set of hydraulic conditions at a location (i.e., cross sectional shape, channel slope, bed and bank roughness), the flow rate at which critical shear values are reached can be calculated. These calculations can be made with a programed spreadsheet analysis, or with a hydraulic model (e.g., HEC-RAS, Brunner 2010). Because of their ease of use and the ease at which multiple flow rates can be assessed (in order to determine when τ_c is reached), hydraulic models are typically employed for this part of the analysis. Average boundary shear stress is calculated with the following equation:

$$\tau = \rho g R s$$

where *p* represents the density of water, *g* represents the gravitational constant, R represents the hydraulic radius (defined as the wetted area dived by the wetted perimeter), and *s* represents the slope. For wide channels the value of the hydraulic radius is approximately equal to the average depth of the cross section. The hydraulic model calculates the value for R for a given discharge based on the channel dimensions.

Typically one-dimensional approximations are used for this analysis, which means that the value of Q_c determined is that where the cross sectional average of τ_c is reached, not the highest value which is occurring at the deepest point of the cross section. This is typically considered reasonable because the grain size is determined for the bed of the cross section, not just the shallow or deep area.

Analyses can be conducted at a station, or in other words just looking at one cross section in isolation using normal depth calculations, or within a larger hydraulic model constructed for the entire reach (i.e., multiple distributed cross sections upstream and downstream of the location of interest). The advantage of looking at the cross section of interest within the context of the entire reach is that conditions downstream (e.g. a constriction which causes a backwater condition) may affect the flow depth (or hydraulic radius), yielding different results than would be obtained if the cross-section was analyzed in isolation.

It is important that the determination of τ_c (via pebble count or other means) and the hydraulic calculations to determine Q_c, occur at the same location. Typically the analysis is undertaken at a riffle because these are the high points of a long profile and are what are controlling incision in the system. Bed material characterization in a pool is much more difficult (because of the depth of water), in addition the resulting calculated shear values are typically much higher, because of the added depth.

If HEC-RAS is used (which is typical), the way the bank markers are set can have a dramatic influence on the calculated shear results. The bank markers are used to delineate differences in roughness across the channel and flood plain (typically higher values are used on the lateral margins to include the influence of vegetation roughness in the resulting depth calculations). The shear values calculated by HEC-RAS are segregated by these bank markers, and thus may include values for each of the floodplains as well as the channel. If bank markers are set too wide, and the shear stress calculation may include a portion of the floodplain too, and subsequently the conditions in the actual channel will be greatly underestimated. Remember that the model is essentially using the average depth for the entire cross section (as limited by the bank markers), so including floodplain with shallow depths greatly influences the average depth and thus the resulting calculated shear value.

DETERMINATION OF Q_2

The determination of a value of Q_2 is the third and final piece of the equation used to determine what percent of Q_2 the lower threshold should be. As with the other two pieces, several options are available, and again the decision on what method is used can have a profound influence upon the final results. Q_2 can be determined through the results of a calibrated and validated hydrologic model (e.g., HEC-HMS, HSPF, SWMM, etc.) which uses precipitation, sub basin area, soil conditions, etc. to calculate a runoff hydrograh. This type of model can be used in one of two ways, to simulate a single precipitation event or to simulate a long term (e.g., 50 year) precipitation record. The first approach produces a single runoff hydrograph resulting from a "design" storm, from which the peak magnitude can be determined. As such the results are largely controlled by the precipitation hyetograph, so a good understanding of how that was developed is important. This method has been used considerably less than the approach detailed below. The advantage of this method is that, if any existing model has already been developed (e.g., SacCalc; DFCE 2001), it will be cheaper and easier for an agency to review. However, it can yield different values for Q_2, due to differing assumptions employed in the modeling.

The second method uses a long-term precipitation record for simulation which results in a flow record containing a large number of runoff events of varying magnitudes (i.e., which are subsequently analyzed to determine the magnitude of the 2 year recurrence interval event). This method is more typical for HMP assessments, but again methodical decisions can have a large influence on the results. The rigor of the model calibration and validation has a strong influence. If the model is not representing through simulation what is actually occurring, then the simulation results are questionable.

Assuming the model has been calibrated and satisfactorily validated or verified, the manner in which the simulated runoff record is analyzed is important. The first basic distinction is whether an annual maximum series (AMS) or a partial duration series (PDS) is used. In an AMS analysis, just the single largest flood peak of any given year is used in the analysis, and the second and third largest events of the year are ignored. This is the method typically utilized when analyzing the flood frequency of large, less frequently occurring flood events. In the second approach, PDS, multiple flood events are considered in any given year. This is important when the second or third largest flood events in one year are greater than the annual maximum of another year. Because more large events are included, the resulting estimate of the given return period event (e.g., Q_2) is larger. For example, Langbein (1960) showed that a 1.45 year event determined with PDS is the same magnitude as a 2 year event with an AMS, and a 2 year event determined with PDS is a 2.54 year event with an AMS. Thus the value of Q_2 determined by PDS is larger than the value of Q_2 determined by AMS. While significant differences are apparent for smaller magnitude, more frequently occurring events (e.g., Q_2), for return periods greater than 10 years, there is almost no difference between the results obtained from the AMS and PDS.

When compiling a PDS for a recurrence interval analysis, the manner in which events are identified as independent can also have an effect upon the results. One typical method is to include all flood peaks above a certain base magnitude. This base value is often selected as equal to the lowest annual maximum flood of record, however can also be chosen such that the PDS only contains as many peaks as there are years of record. Some analysts have established a base value (e.g., 0.002 cfs/acre), and then added a duration below this base value as well (i.e., flow must be below 0.002 cfs/acre for at least 24 hours for events to be considered independent). One additional method is to identify individual events by extracting the highest peak (not just the maximum value) within a moving time window (e.g., 3 days), and therefore determine independence through time, rather than the discharge rate receding to a non-storm condition. With all of these options available, and no prescribed standard, the use of a PDS can have different Q_2 results even if an identical flow time series is used.

SUMMARY

The determination of the lower flow threshold, defined as a percentage of Q_2, is heavily influenced by three primary inputs: τ_c, Q_c, and Q_2. The determination of each of these values is sensitive to a variety of factors determined by the particular methodology. To demonstrate the sensitivity of the lower flow threshold to methodological decisions, a few examples are provided below.

- If 0.06 is used rather than 0.03 for Shields parameter in Shields relationship, τ_c increases, subsequently Q_c increases and ultimately the lower limit increases
- If bank markers are set too wide (including the floodplain and not just the channel) in the hydraulic analysis, a larger value for Q_c is calculated (because of a reduction of the hydraulic radius due to the inclusion of extensive shallow floodplain areas), resulting in an increase of the lower limit.
- If an annual maximum series is used in place of a partial duration series, the calculated Q_2 will be less than that obtained by a PDS analysis, and the ratio of Q_c to Q_2 will be higher if the AMS is used.

3. DEVELOPMENT OF EVALUATION CRITERIA

FLOW DURATION CONTROL AND PEAK FLOW CURVE MATCHING

Flow Duration Control (FDC) and Peak Flow Curve (PFC) matching criteria in their current form for many counties in CA are similar in form to the curve matching criteria from WA (WADOE, 2001). The curve matching criteria typically include a goodness of fit or variance due to the difficulty in achieving a precise match across the range of flows. The criteria are typically applied at the subwatershed scale based on continuous simulation flow results for pre- and post-project conditions to size individual BMP or LID features. In this instance, flow matching at the subwatershed scale assumes that there are no routing or timing effects in the treated runoff when it rejoins the receiving waterbody; however, this may not be true in all cases. For example, if treated runoff is delayed and rejoins the upstream runoff such that there is an increase in flow rates and durations or an increase in the peak flows in the receiving waterbody, then there is the potential to impair the receiving waterbody. To address this potential concern, the FDC and PFC criteria could be applied to the routed flows in the receiving waterbody as a check.

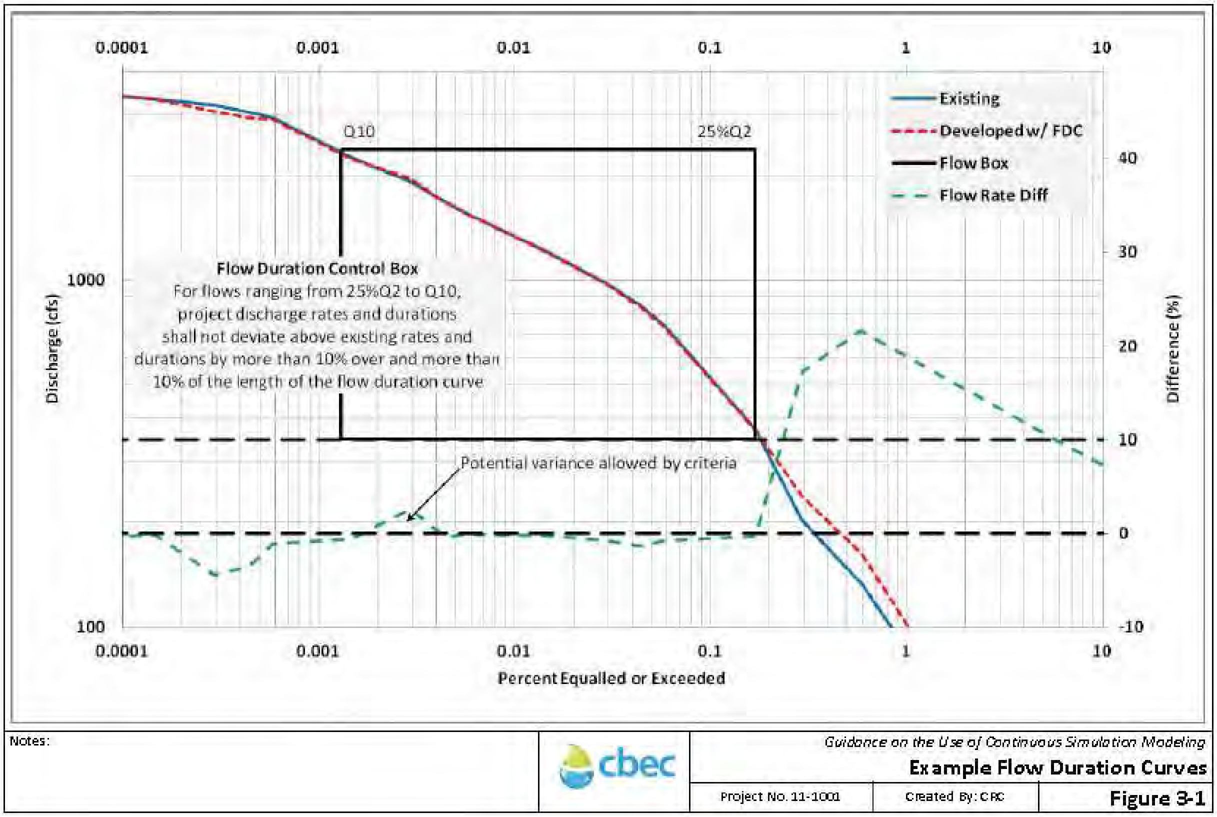


Figure 3-1 shows an example of FDC matching on the routed flows within a receiving waterbody with an example of the variance allowed by the criteria. However, it is cautioned that the FDC variance (e.g., "…by more than 10 percent over and more than 10 percent of the length…") may need to be reduced to something less than 10 percent (perhaps based on a ratio of watershed areas) to account for cumulative effects if there remain the potential for continued development in the watershed.

EROSION POTENTIAL

Erosion Potential (EP) is an index to indicate the impact of increased flows on stream stability and is based on bed mobility and an integration of work (as a function of velocity and excess shear stress in the channel only) over time, expressed as a ratio of post-project work divided by pre-project work in the receiving waterbody. Total work is based on integrating effective stream power as:

$$W = \sum_{i=1}^{n} (\tau_i - \tau_c)^e \cdot V_i \cdot \Delta t_i$$

where W is the total work done (ft-lbf/ft^2), τ is the average channel shear stress, τ_c is the critical shear stress to initiate erosion, e is an exponent varying from 1 to 2.5 to account for the exponential rise in stream power with flow, V is the velocity (ft/sec), and Δt is the numerical time step (sec). The EP index is then calculated as the ratio of W_{dev} / W_{ex} where W_{ex} and W_{dev} is the total work for existing and developed conditions, respectively. EP can be calculated at any location in the waterbody based on continuous simulation time series of flow, velocity, and excess shear stress in the channel as derived from hydraulic model outputs.

EP criteria are not widely integrated into HMPs. Notably Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) included EP criteria in their HMP, but in so much as it was used to inform their overall management objective (i.e., post-project runoff shall not exceed estimated pre-project rates and/or durations) and the development of their FDC / PFC criteria. In the SCVURPPP (2005) final HMP, an EP ratio <= 1.0 was recommended as the instream target value to be maintained for stream segments downstream of the point of discharge for HMP management. From a risk management perspective, the chance of a stream becoming unstable at an EP of 1.0 is 9%, meaning that 1 in 11 streams could become unstable even with controls (SCVURPPP, 2005). As such, instream EP must be evaluated considering the effects of the cumulative changes that have or may take place in the watershed.

Even though EP criteria are not widely promoted in county HMPs, that does not preclude analyses based on EP from being used, especially when instream measures permit more robust geomorphic analyses (e.g., SCVURPPP final HMP; SSQP draft HMP). While EP analyses are more time and data intensive, there is the potential outcome to discharge runoff at higher rates and durations than FDC / PFC criteria would allow, thus resulting in possibly smaller onsite measures. The time and data intensiveness of EP analyses stem from the need to evaluate the hydraulic and geomorphic conditions of the receiving waterbody to be protected at multiple locations based on continuous simulation hydraulic model outputs and geomorphic data. Potential hydraulic model considerations when performing EP calculations are addressed below.

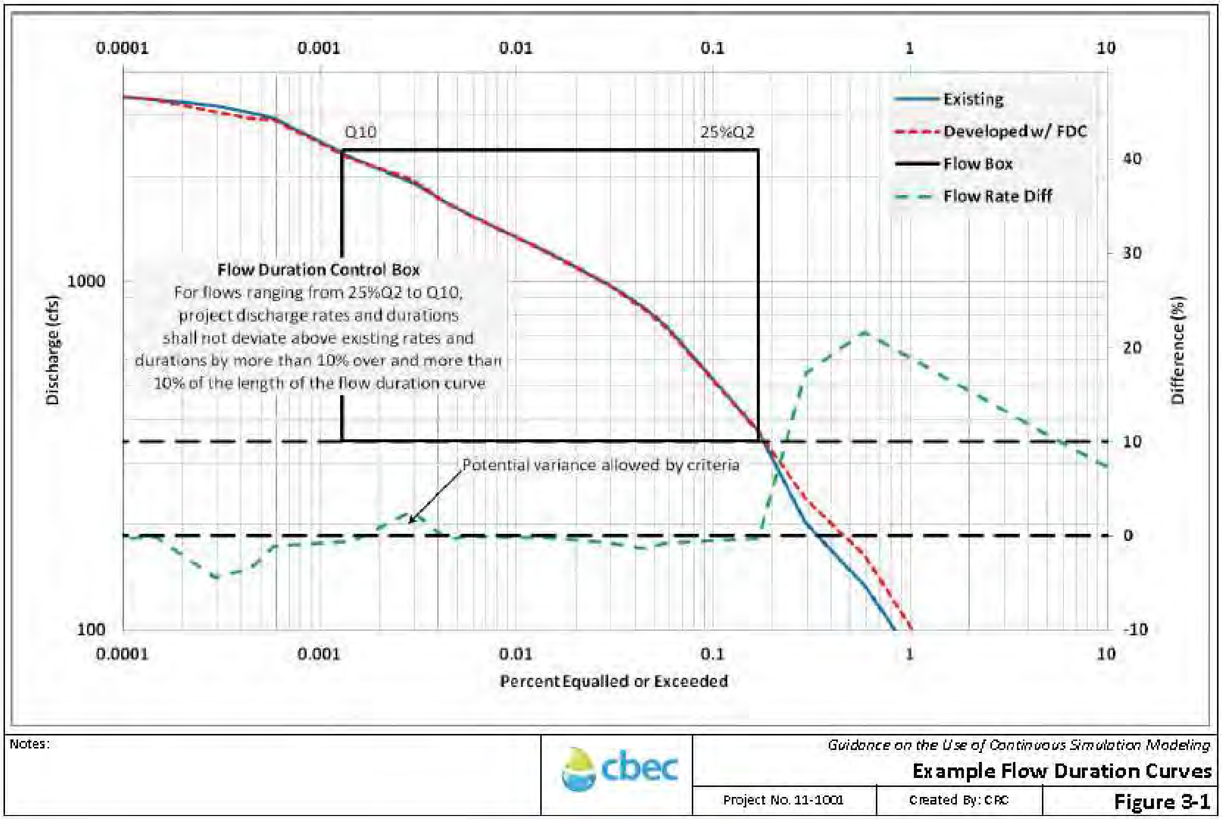


Figure 3-1. Example Flow Duration Curves

4. DATA REQUIREMENTS FOR CSM AND HYDRAULIC ANALYSIS

Hydrologic models capable of performing long-term continuous simulation to support HMPs include, but are not limited to, HSPF, HEC-HMS soil moisture accounting (SMA) method, and other hydrology models, such as the Bay Area Hydrology Model (BAHM). The first two are public domain software models and the third is a proprietary software model customized for specific counties that uses HSPF as its computational engine. A fourth modeling tool based on continuous simulation results, and also using HSPF as its computational engine, are the suite of BMP sizing calculators specifically designed for HMP management for select counties. These have been developed for Contra Costa and San Diego County and Sacramento County (in draft form). All four suites of models use site conditions (i.e., topography, soils, vegetation, and land use) and long-term precipitation data to calculate the various components of the hydrologic cycle (i.e., infiltration, surface runoff, soil moisture, evapotranspiration, percolation, interflow, and groundwater). Specific details about each model and model comparisons (e.g., TetraTech, 2011) are not discussed here, but can be reviewed in available literature.

Following model selection, hydrologic models are created for existing and project conditions based on various considerations, some of which are discussed in subsequent sections. For project conditions, county specific HMP measures need to be specified to manage project runoff to meet the evaluation criteria identified above. The BMP sizing calculators and BAHM-type hydrology models do have optimization routines to size BMP and LID measures. Automatic sizing allows for efficient and quick sizing of such features based on county specific, model specific (e.g., the sizing calculator for San Diego and Contra Costa County is based on pre-defined sizing factors such that site specific continuous simulations do not need to be performed, and is limited to drainage management units of less than 100 acres), and user-defined (e.g., the BAHM-type hydrology models require site specific continuous simulation with a wide selection of measure configurations) assumptions and limitations. As standalone models, HSPF and HEC-HMS offer flexibility as it relates to model configuration, model inputs, and user-defined parameters. However, these models do not have optimization routines to size various BMP and LID measures, thus requiring manual iteration to achieve a satisfactory solution.

PRECIPITATION DATA

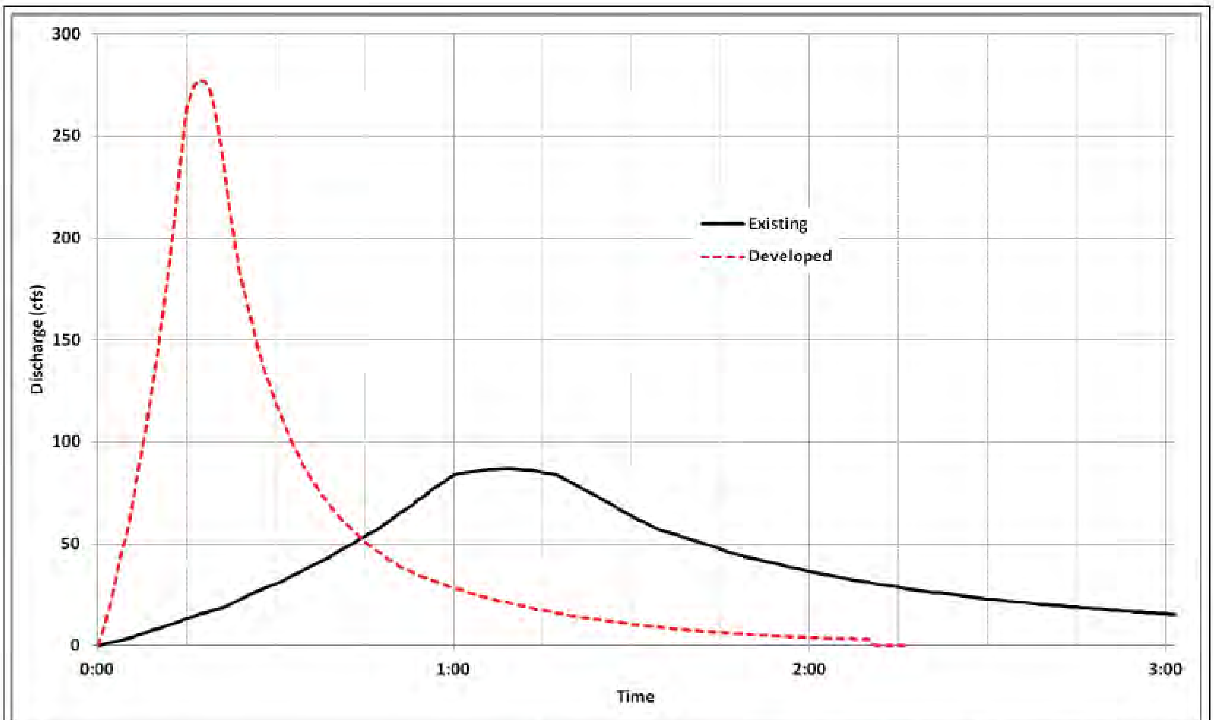
Long-term precipitation data in the range of 30 to 50 years is typically needed to generate a sufficiently long flow record from which FDC and PFC analyses and/or subsequent hydraulic analyses can be performed. The precipitation data observation interval should ideally be no coarser than hourly, and if available, can be sub-hourly (e.g., 15 minutes) to coincide with a finer continuous simulation time step.

The precipitation data should ideally be located near the project site, and if needed, scaled to the project site based on a ratio of mean annual precipitation as derived from county specific mapping or regional sources (e.g., PRISM [http://www.prism.oregonstate.edu/]) and reviewed to ensure that it captures key IDF characteristics from county specific mapping or regional sources (e.g., NOAA Atlas 14 [http://www.nws.noaa.gov/oh/hdsc/index.html]). A variety of precipitation data sources exist, and include, but are not limited to:

- ALERT system for individual counties (e.g., Sacramento [http://www.sacflood.org/])
- Western Region Climate Center (WRCC [http://www.wrcc.dri.edu/])
- NOAA National Climatic Data Center (NCDC [http://www.ncdc.noaa.gov/])
- California Irrigation Management Information System (CIMIS [http://wwwcimis.water.ca.gov/])

HYDROLOGIC SIMULATION TIME STEP

The continuous simulation time step and output reporting interval for the four models identified above has traditionally has traditionally been hourly. However, an hourly time step is often significantly larger than the time of concentration for concentration for developed subwatersheds relative to existing subwatersheds, especially those commonly configured commonly configured developed subwatersheds that are limited to less than 100 acres. The sizing calculator and BAHM-type calculator and BAHM-type models are hardwired at hourly, but the public domain software still affords the user to go to a the user to go to a finer time step. As such, a sub-hourly time step and output reporting interval is preferred in order to preferred in order to adequately resolve and sample flow from developed subwatershed elements where time of where time of concentrations are typically less than one hour. As shown by



Notes:

cbec

Guidance on the Use of Continuous Simulation Modeling

Example Unit Hydrographs

Project No. 11-1001 | Created By: CRC | **Figure 4-1**

Figure 4-1 for a typical developed subwatershed, the unit hydrograph for developed conditions is flashier, peaks quicker (well within one hour), and the recession limb becomes small quickly. While a sub-hourly time step and output reporting interval may not be desirable due to the volume of model output that will be generated, it is possible to bias the results in favor of the developed condition due to under sampling of the flashier and larger developed flows under an hourly time step.

HYDROLOGIC MODEL CALIBRATION AND VALIDATION

In developing continuous simulation models, the model parameters describing soil characteristics, land use descriptions, and evapotranspiration should be derived from published data (e.g., soil survey, local studies, county standards, etc.). These parameters should be calibrated and validated, where applicable, by comparing modeled flows to measured or observed flows with the receiving waterbody for specific overlapping periods when there is adequate precipitation, evapotranspiration, and flow data. In the absence of site-specific data for calibration and validation, calibrated model parameters from neighboring watersheds within the region could be used so long as proper justification is provided that said parameters are appropriate. However, it is not recommended that local studies rely upon calibrated parameters from other regions where soil characteristics and land use descriptions are markedly different. Rather, when calibration cannot be performed, general review and comparison of continuous simulation model outputs (e.g., hydrograph shape, AMS, etc.) to standardized event-based approaches could be performed to demonstrate that continuous simulation results are generally consistent with local standards and methodologies.

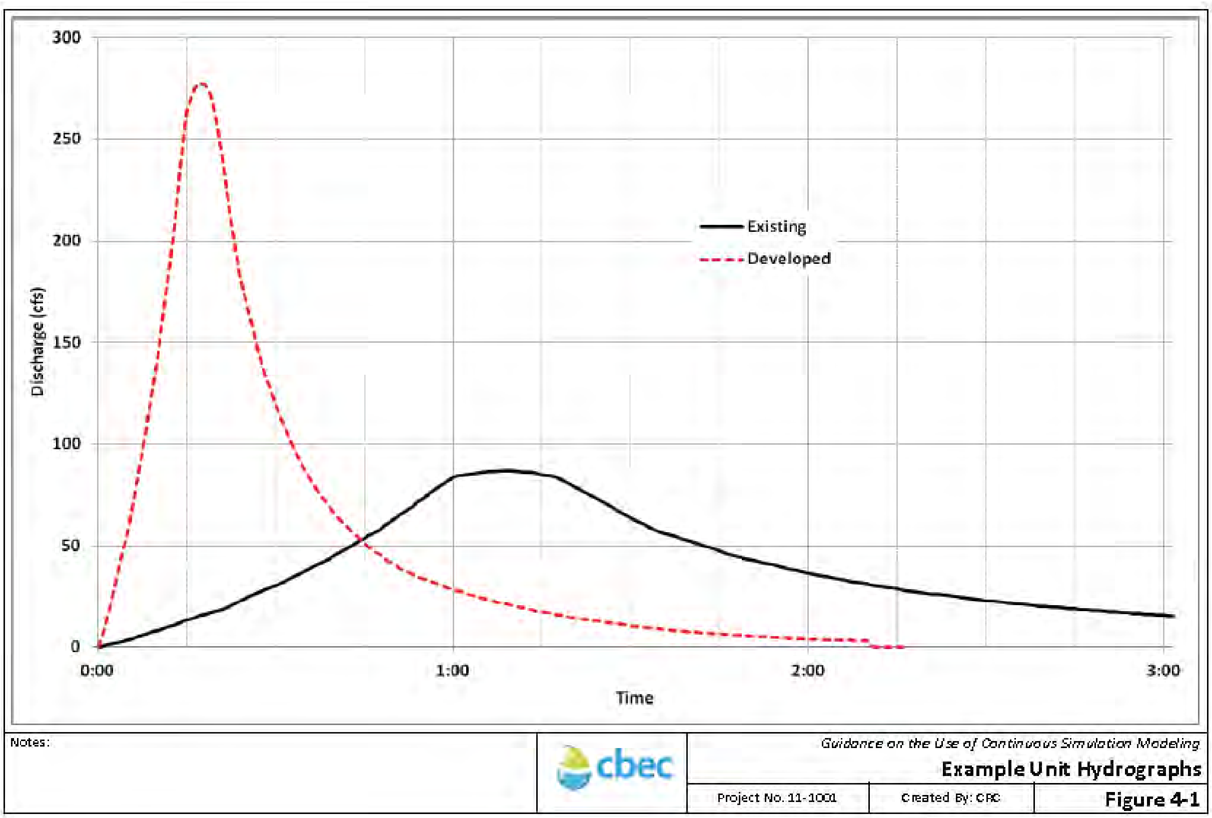


Figure 4-1. Unit Hydrograph Method

For example, continuous simulation modeling in Sacramento County for some developments has relied up conversion of SacCalc (HEC-1 pre- and post-processor) event-based models to the SMA method within HEC-HMS. This conversion often involves retaining the surface infiltration rate determined by SacCalc based on accepted land use descriptions, but parameterizing the subsurface based on soil survey information and local studies, using local potential evapotranspiration data, and reviewing model hydrographs for reasonableness.

HYDRAULIC MODEL CONSIDERATIONS

Sometimes hydraulic models are needed since the basic flow routing within the hydrologic models is not adequate to characterize the potential changes to the hydraulic and geomorphic character of the receiving waterbody, especially when instream measures are suggested or EP is used as the evaluation criteria. Potential considerations and issues encountered when developing and using hydraulic models for continuous simulation include:

1. Low flow instabilities can introduce anomalies into model output (which is commonly encountered in HEC-RAS), so careful hydraulic model selection is important for accuracy and efficiency
2. The sensitivity of the hydraulic model outputs (i.e., velocity and shear stress) to accurate hydraulic description of the receiving waterbody (i.e., cross section geometry (i.e., is it based on LiDAR influenced by vegetation or ground survey), proper definition of channel transitions, proper definition of channel bank markers, appropriate Manning's n-values, etc.)
3. Selection of appropriate compliance points that are representative of the reach and capture flow changes (e.g., downstream of points of discharge and not in backwater areas).

All of these issues have the potential to introduce error and subjectivity into long-term hydraulic analyses and care should be taken to systematically address each source of error.

GENERAL TIPS

A series of general tips are provided as follows. These can be used to increase efficiency and accuracy when performing CSM.

- To shorten the simulation time, the precipitation record can be truncated to only the rainy season (e.g., October through May) by removing the dry summer months from the simulation, especially in ephemeral systems where applicable.
- Hourly precipitation data does not prohibit the continuous simulation model from being run at a sub-hourly time step.
- Subwatershed delineation between existing conditions and developed conditions can often result in relatively large existing subwatersheds compared to relatively small developed subwatersheds. It is commonly known that smaller subwatersheds have flashier flows, so making existing and developed conditions subwatershed sizing consistent is recommended to provide a more meaningful comparison.

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APPENDIX B: APPLICATION OF SUITES OF MODELING AND ASSESSMENT TOOLS

Introduction. This appendix provides a discussion of four example "suites of tools" that can be used to perform predictive scientific assessments and address specific questions related to hydromodification assessment and management. The suites are changeable mixes of mechanistic models, statistical analyses, and expert scientific judgment that incorporate a number of the tools discussed in Chapter 4, combined in various ways. For example, some suites apply a series of cascading models, in which the output from one is used as input to the next; other suites apply a number of models in parallel to develop an assessment based on the weight of evidence. The suites of tools discussed below are used to perform a baseline stability assessment, a channel forming discharge analysis, an erosion potential analysis, and a sediment transport analysis. Most of these standard tools (with the exception of the erosion potential suite) have been widely employed in a variety of stream management activities for decades, and are considered essential components of the broader fluvial geomorphology toolbox. This is far from a comprehensive list of tools, as there are many other important tools (focused on both geomorphic and biologic endpoints) relevant to hydromodification management (Kondolf et al. 2003; Poff et al. 2010); however, the purpose of this appendix is to briefly illustrate how several standard tools can be integrated to answer key questions about stream responses and to provide a stronger technical basis for hydromodification management.

Application of these tools provides basic geomorphic data and knowledge that are typically needed to manage a stream for some desired future state in a watershed with changing land uses. This critical information comes at a cost—the tools require substantially more time and effort to apply than has been the norm in hydromodification management because they involve examining streams within their watershed context with a deeper level of geomorphic analysis. Stormwater management programs typically have made the "practical" assumptions that stream reaches can be managed in isolation from the larger systems of which they are a part, and that effective management prescriptions can be formulated with little or no substantive geomorphic analysis. ***These assumptions are in direct conflict with current understanding in fluvial geomorphology and stream ecology, which indicates that protection of stream integrity is often predicated upon careful assessments of geologic and historical context, performing detailed hydraulic and sedimentation analyses where appropriate, and developing basic understanding of streamflow-ecology linkages***. If hydromodification management policies are to have a reasonable chance of actually achieving their aims, then it will most likely be necessary to reject these simplifying assumptions and instead rely on approaches rooted in current scientific understanding of stream systems.

The suites of tools described below go beyond screening level assessments that are designed, in part, to identify which streams lend themselves to relatively straightforward management prescriptions versus which streams do not. For streams that do not lend themselves to generic management prescriptions, the level of analysis performed with these tools should increase with the level of risk and geomorphic / biologic susceptibility of the streams. This does not mean that every stream will require in-depth analysis by local permitting agencies. It is not possible to carry out sufficient geomorphic analyses with the tools illustrated below on a permit-by-permit basis, and local governments may lack the resources and/or technical capacity to effectively apply these tools. Instead, ***the vital information provided by these tools***

will need to be obtained through proactive regional studies that involve baseline assessments followed by progressively more in-depth analyses as necessary to provide local governments with a sound basis for effective project-by-project decision-making within a broader watershed management framework.

1. **Baseline Stability Assessment**. This suite of tools is designed to answer the following key questions:
   - What is the trajectory of the stream's form over time?
   - How has the channel form responded to changes in water and sediment supply over the years?
   - Is the channel close to a geomorphic threshold that could result in rapid, significant change in response to only minor flow alteration?
   - How can past channel responses provide insight into potential responses to future watershed change, and so aid in prediction of future hydromodification-induced changes?
   - What level of subsequent geomorphic analysis is appropriate given the complexity of the situation and the susceptibility of the streams of interest?

   The goals of a baseline stability assessment are to:
   - Document the historical trends of the system;
   - Establish the present stability status of the system and identify the dominant processes and features within the system;
   - Provide the foundation for projecting future trends with and without proposed project features;
   - Provide critical data for calibration and proper interpretation of models; and
   - Provide a rational basis for identification and design of effective alternatives to meet project goals.

   The key tools that comprise this suite include:
   - GIS mapping of topography, soils, geology, land use/land cover across the contributing watershed (e.g., Thorne 2002)
   - Analysis of hydro-climatic data, e.g. streamflow gauge records, changes in stage-discharge relationships over time (e.g., Thorne 2002)
   - Analysis of aerial photos and historical data (e.g., Thorne 2002)
   - Field reconnaissance (e.g., Thorne 1998)
   - Qualitative response (e.g., Lane 1955b, Schumm 1969, Henderson 1966 relations)
   - Classification systems - (e.g., Thorne 1997; Schumm et al. 1982; and channel evolution model developed for S CA by Hawley et al. in press)
   - Relationships between sediment transport and hydraulic variables
   - Regional hydraulic geometry (e.g., Hawley 2008; Haines in prep)
   - Regional planform and stability predictors (e.g., Hawley et al. in press, Bledsoe et al. in press, Dust and Wohl 2010)

- Bank stability analysis (e.g., BSTEM http://www.ars.usda.gov/Research/docs.htm?docid=5044, Hawley (2009), Bledsoe et al. in press, Osman and Thorne 1988; Thorne et al. 1998)
- Sediment budgets (Booth et al. 2010; Reid and Dunne 1996)
- Fluvial audit (Thorne 2002 – a comprehensive framework for performing baseline assessments)

A baseline assessment is completed by integrating information from all the available data sources and analytical tools. Analysis with each of the individual tools may yield a verdict of aggradation, degradation, or dynamic equilibrium with respect to the channel bed, and stable or unstable with respect to the banks. The individual assessments can produce contradictory results. In this case, one should assign a level of confidence to the various components based on the reliability and availability of the data, and the analyst's own experience level. As is often the case in the management of fluvial systems, there is no "cookbook" answer, and we must always incorporate sound judgment.

A process-based channel evolution model (CEM) is a particularly useful element of the baseline assessment process. A CEM aids in identifying the dominant processes and trends of channel change and provides a framework for subsequent, more detailed modeling (ASCE 2008). In some locations, CEMs have already been developed and calibrated with regional data. For example, the CSU / SCCWRP Screening Tool (Bledsoe et al. 2010) grew out of a regional CEM (Hawley et al. in press) and integrates several baseline assessment tools including regionally-calibrated braiding, incision, and bank stability thresholds, and sediment supply analysis with "Geomorphic Landscape Units" (Booth et al. 2010). In locations where a CEM has not been sufficiently defined, the baseline assessment suite of tools can provide the data and understanding needed to develop a regionally calibrated CEM.

The following are example outputs from a baseline stability assessment, including channel stability and bank stability diagrams associated with key geomorphic thresholds of management concern in the channel evolution sequence (i.e. braiding, incision, and bank failure):

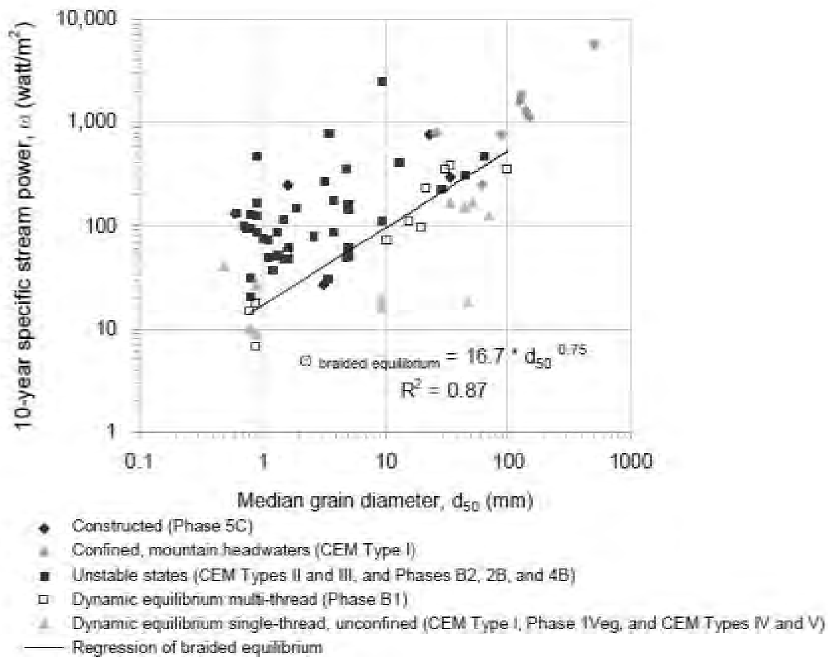

Figure B-1. Stability thresholds for channel types of southern CA, as identified through the development of a regional CEM (Hawley et al., in press).

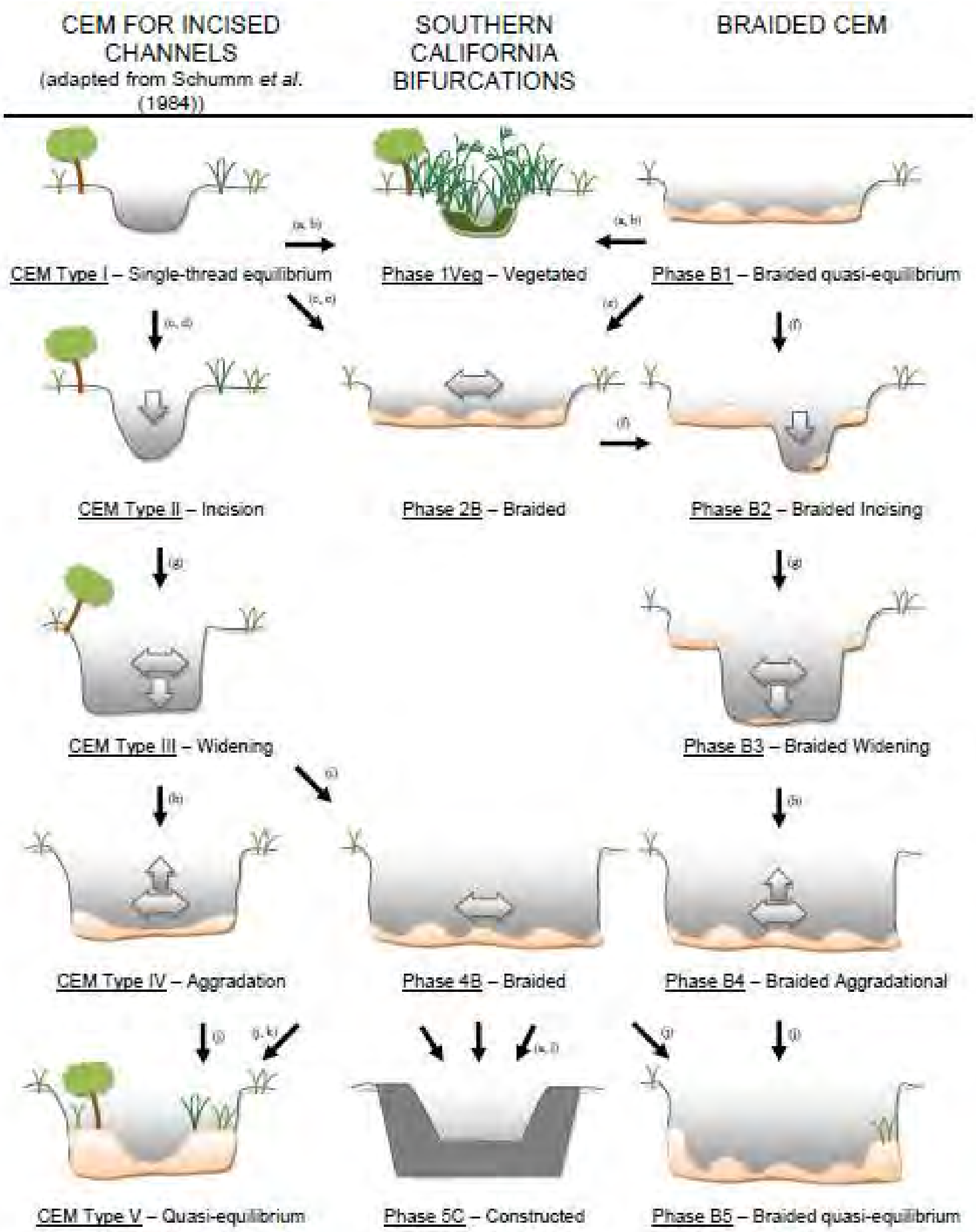

Figure B-2. Channel evolution model of response to hydromodification in southern California (Hawley et al. in press). Red and blue ovals highlight geomorphic thresholds that may be quantified using the baseline assessment suite of tools. By developing a general physical understanding of channel evolution sequences commonly observed in urbanizing watersheds of southern CA, two braiding thresholds and a bank stability threshold of management concern were identified. Channels may shift from single thread to braided planforms if widening is the dominant mode of initial adjustment. Alternatively, single thread channels may become braided after an initial period of incision that triggers geotechnical instability and failure of the banks. Quantitative predictors of these thresholds of braiding, incision, and bank failure can be developed in the baseline assessment process to evaluate the proximity of streams to these critical stages of channel evolution and instability.

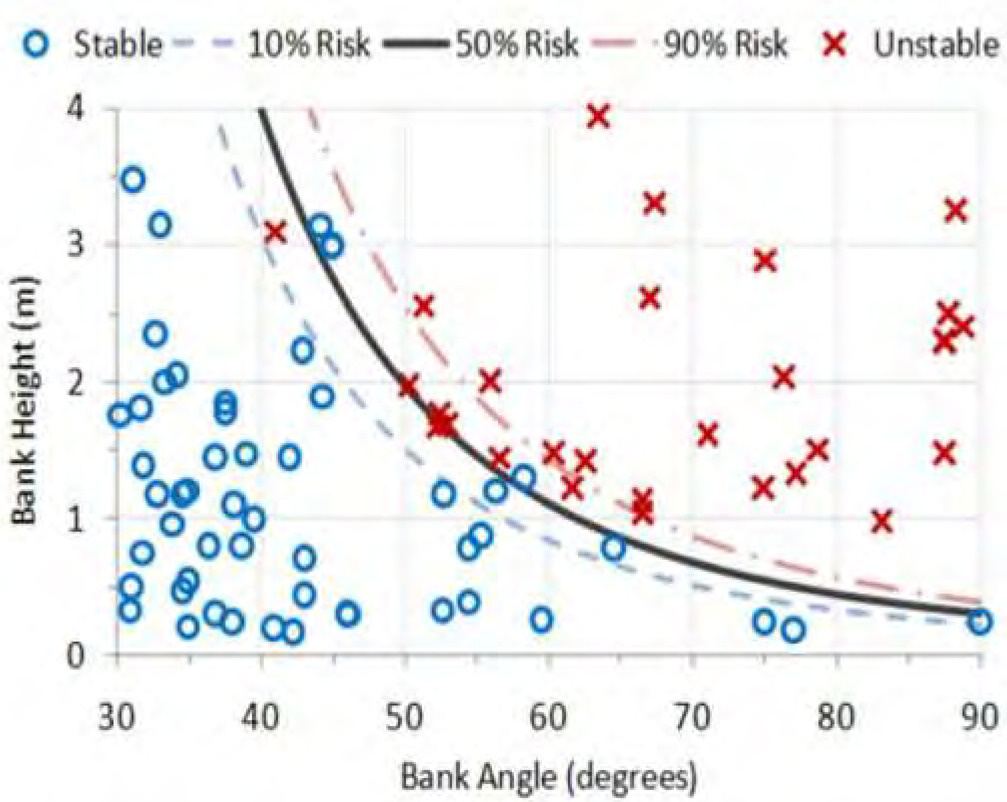

Figure B-3. Bank stability threshold for mass wasting identified through analysis of field data from southern California streams with stable and unstable banks (Bledsoe et al., in press).

2. **Channel-forming discharge suite of tools.** This suite of tools is designed to answer the following key questions:
   - What ranges of discharges are most influential in controlling channel form and processes over decadal time scales?
   - What channel-forming discharge should be used in sediment transport analyses to identify sediment transport capacity, equilibrium slope and geometry, etc.?

   The tools that comprise this suite include the following:
   - Effective discharge computations (e.g., Soar and Thorne 2001; Biedenharn et al. 2000; GeoTools – Bledsoe et al. 2007). An effective discharge analysis directly quantifies the range of discharges that transport the largest portion of the annual sediment yield over a period of many years.
   - Field identification of high water elevations, depositional surfaces, and "bankfull" features
   - Flood frequency analysis
   - Un-gauged site analysis (e.g. USGS StreamStats) http://water.usgs.gov/osw/streamstats/california.html; Hawley and Bledsoe (2011), regional flow duration curve extrapolation – Biedenharn et al. 2000)

This suite incorporates a number of parallel analyses that can be used to establish likely upper and lower bounds to the range of influential discharges, and that can be assessed through a weight-of-evidence evaluation. The following is an example output from the channel forming discharge suite of tools:

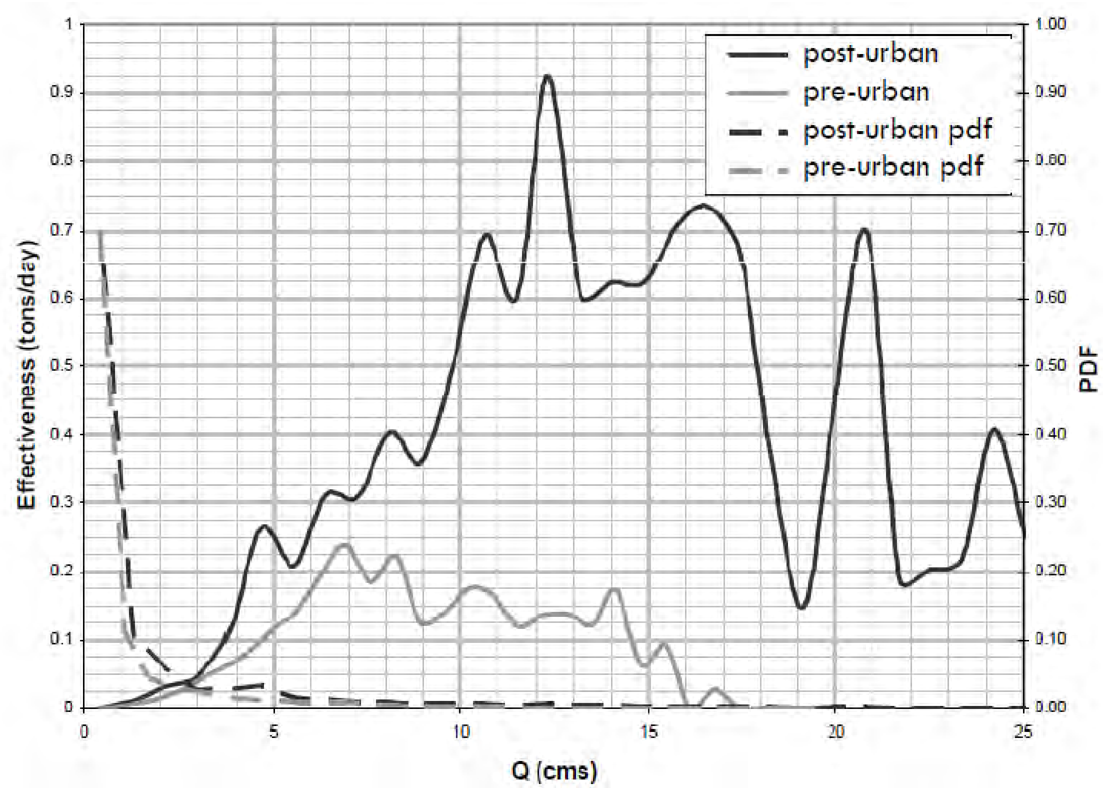

Figure B-4. Flow effectiveness curves for continuous series of pre-urban and post-urban discharges (Biedenharn et al. 2000; Bledsoe et al. 2007). Cumulative sediment yield is approximated by the area under the respective curves. If the stream bed is the most erodible channel boundary, the ratio of areas under these curves would be the erosion potential metric described below in the next suite of tools.

3. **Erosion potential suite of tools.** This suite of tools is designed to answer the following key questions:
   - How do proposed land-use changes or channel alteration affect the capacity of a channel to transport the *most erodible material in its boundary* over a period of many years (erosion potential – Ep)?
   - Do proposed mitigation approaches match the pre- vs. post- development erosion potential over the full spectrum of erosive flows?
   - Do past changes in erosion potential correspond to different states of channel stability and degradation in this region?
   - Does a proposed change in streamflow make it more likely that a channel will enter an alternative / degraded state?

The underlying premise of the erosion potential approach advances the concept of flow duration control (discussed in Chapters 2 and 3) by addressing in-stream processes related to sediment transport. An erosion potential calculation combines flow parameters with stream geometry to assess long term (decadal) changes in the sediment transport capacity. The cumulative distribution of shear stress, specific stream power and sediment transport capacity across the entire range of relevant flows can be calculated and expressed using an erosion potential metric, Ep (e.g., Bledsoe, 2002). This erosion potential metric is a simple ratio of post- vs. pre-development sediment transport capacity over a period of many years. The calculated capacity to transport sediment can be based on the channel bed material or the bank material, depending on which one is more erodible.

This Ep suite of tools has been applied in two primary ways:

a) At a project-level analysis, it has been applied to answer the first two questions above. A municipal stormwater permit may require a project design to achieve an erosion potential (Ep) value of 1.0. This means that a project must be designed so that the long-term erosion potential of the site's stormwater discharge is equal to the erosion potential of the pre-development condition. Section 3.1 below explains the process by which this analysis is conducted.
b) At a regional level, this suite of tools can be applied to answer the third and fourth questions above and to provide further guidance to project-level assessments. For example, practical engineering considerations generally require that a tolerance be permitted around a target design value. It is unlikely that a project design can match an Ep target of 1.0 across all conditions and through all stream reaches, due to variations in a multitude of contributing factors. The selection of an acceptable tolerance or variance from 1.0 is a management decision that should be informed by regional data presented in a risk-based format. Section 3.2 below explains how such a study has been conducted, using the Santa Clara Valley example from northern California.

3.1. *Project-Level Analysis.* As applied to the analysis of project impacts and mitigation design, the steps and associated tools that comprise this suite include the following (Figure B-5):

- Perform continuous simulation of hydrology (e.g. SWMM, HEC-HMS, HSPF) for the project site, for both pre-project condition and post-project condition with the proposed mitigation design.
- Convert discharges and field surveys to hydraulic parameters (shear stress and specific stream power) – e.g., for uniform flow analysis use Manning's equation, GeoTools; for varied flow analysis use HEC-RAS
- Convert hydraulic parameters into sediment transport capacity – e.g., at-a-station hydraulic geometry, HEC-RAS, GeoTools, sediment transport relationships (bedload and total load)
- Integrate Ep over time – e.g., GeoTools

- Compare Ep values for pre-development and post development to determine if the proposed mitigation design is adequate. Adjust stormwater controls as necessary to meet target Ep.

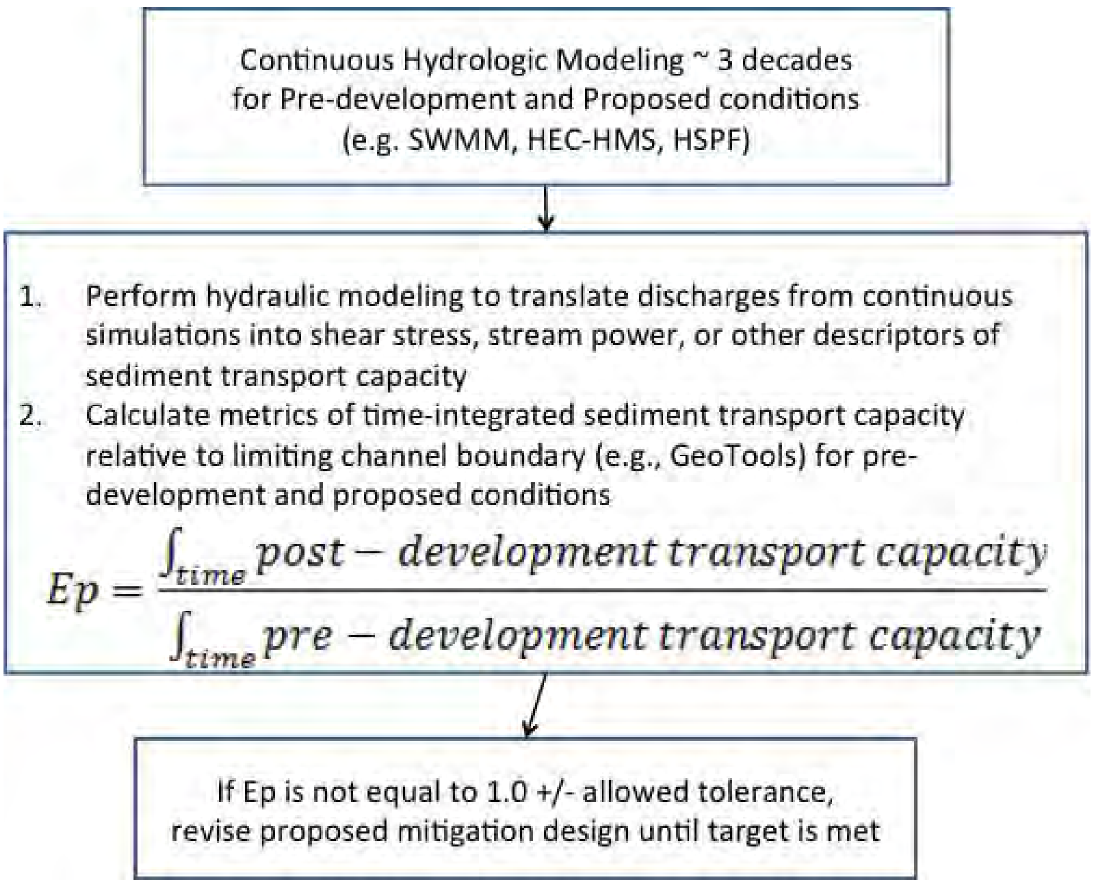

Figure B-5: Steps involved in a project-level Erosion Potential analysis

3.2. *Risk-Based Regional Analysis*. Risk-based modeling estimates the probability of stream geomorphic states. Decision-makers can then choose acceptable risk levels based on an explicit estimate of prediction error. The foundation of risk-based modeling in the context of hydromodification management is the integration of hydrologic and geomorphic data derived from the output of continuous hydrologic simulation models to generate metrics describing expected departures in the most important stream processes. These physical metrics are provided as inputs to probabilistic models that estimate the risk of streams shifting to some undesirable state. Because the decision endpoint is often categorical (e.g., stable, good habitat) the statistical tools of choice are often logistic regression, classification and regression trees (CART), and/or Bayesian probability networks.

The steps below are used to develop a risk-based framework (Fig. B-6) for assessing how hydromodification may impact streams within a region, and for understanding the relationships between deviation from an Ep of 1.0 and the likelihood of channel instability. Illustrating figures are taken from a risk-based approach was used in the development of the Santa Clara Valley Urban Runoff Program Hydromodification Management Plan (www.SCVURPPP.org). This study demonstrated that a time-integrated index of erosion potential based on continuous hydrologic simulation and an assessment of stream power relative to the erodibility of channel boundary materials could be used to distinguish between channels of a particular regional type that are stable vs. degraded by hydromodification in urban watersheds.

- Perform project-level analysis as described in section 3.1 above for existing developments throughout the study watersheds.
- Perform stream surveys throughout the study watersheds to characterize condition (i.e., stable, unstable)
- Create statistical relationships between Ep and different channel states – e.g., logistic regression in R, SAS, Statistica, Minitab, etc. Note that standard regression techniques are applied when the dependent variable and the explanatory variables are quantitative and continuous. To analyze a binary qualitative variable (e.g., 0 or 1, stable or unstable, healthy or degraded) as a function of a number of explanatory variables, alternative techniques must be used. The regression problem may be revised so that, rather than predicting a binary variable, the regression model predicts a continuous probability of the binary variable that stays within 0–1 bounds. One of the most common regression models that accomplishes this is the logit or logistic regression model (Menard, 1995; Christensen, 1997).

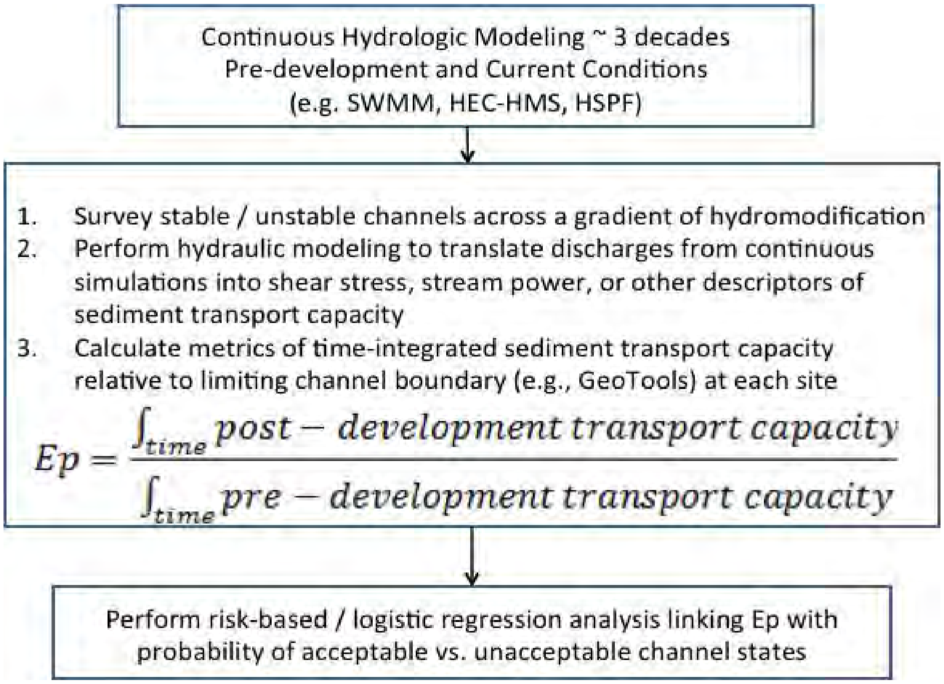

Figure B-6: Steps involved in a Risk-Based Erosion Potential analysis

The variables included in risk-based models of stream response are not limited to erosion potential. Additional multi-scale controls could be included. For example, simple categories of physical habitat condition and ecological integrity could be predicted by augmenting erosion potential metrics with descriptors of the condition of channel banks and riparian zones, geologic influences, floodplain connectedness, hydrologic metrics describing flashiness, proximity to known thresholds of planform change, and BMP types. Furthermore, although most of the emphasis to date has been on predicting geomorphic endpoints, the risk-based approach can be extended to the prediction of biological states in urban streams if the necessary data are available.

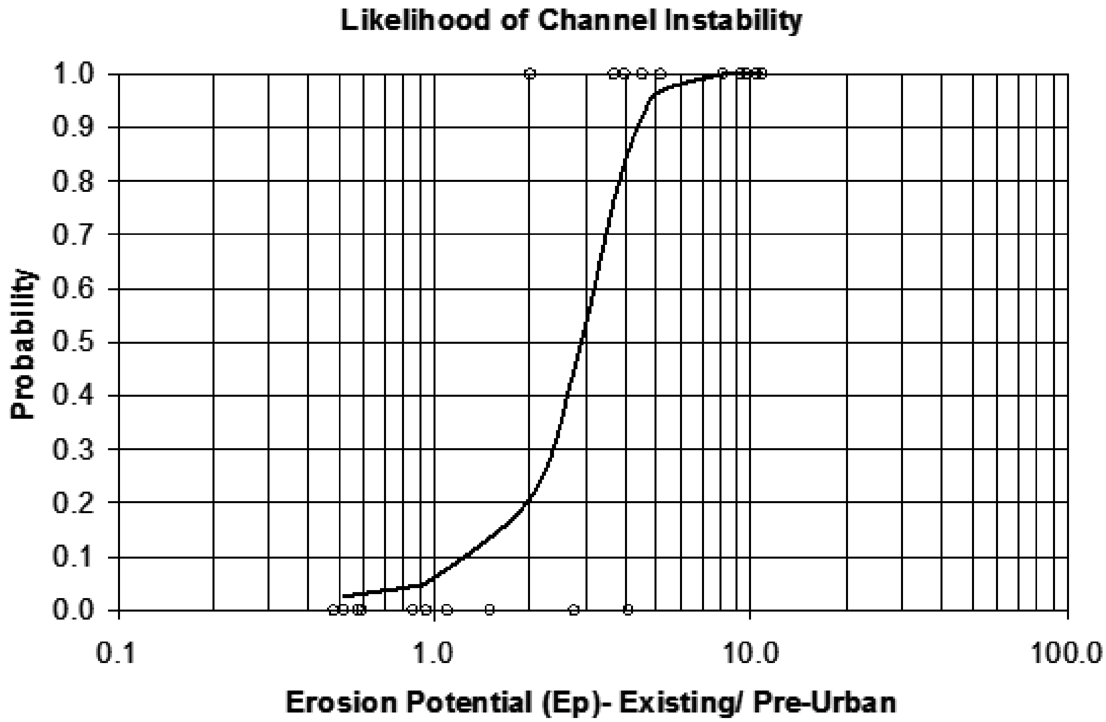

Figure B-7: Example of a logistic regression analysis of stable vs. unstable channels (Bledsoe and Watson, 2001; Bledsoe et al., 2007). The vertical axis represents the probability of stream instability which increases rapidly for channels with sediment transport capacity increased by urban hydromodification (Ep > 1).

3.3. *Strengths and Limitations.* The Erosion Potential approach combines a sound physical basis with probabilistic outputs and requires a substantial modeling effort. Such an effort is necessary to adequately characterize the effects of hydromodification on the stability of streams that are not armored with very coarse material such as large cobbles and boulders. Although policies based on this approach should reduce impacts to channel morphology, they may still fail to protect stream functions and biota. Key simplifying assumptions and prediction uncertainty in the inputs (hydrologic modeling, assumptions of static channel geometry in developing long term series of shear stresses or stream powers, assumptions of stationarity in sediment supply, etc.) have not been rigorously addressed. Its effectiveness also depends on careful stratification of streams in a region such that fundamentally different stream types are not lumped together (e.g. labile sand channels vs. armored threshold channels with grade control) in developing general relationships for instability risk. Endpoints to date have been rather coarse, e.g. stable vs. unstable; as such, they do not provide sufficient resolution for envisioning future stream states. However, the Erosion Potential approach provides promise as an important tool for hydromodification management; it is recommended that it be refined to address sediment supply changes and to provide more finely resolved endpoints for improved predictive capabilities.

4. **Sediment transport analysis suite of tools.** This suite of tools is designed to answer the following questions:
   - Do I need to incorporate sediment transport analysis in predicting channel response to hydromodification, i.e. what is the sensitivity of channel slope and geometry to inflowing sediment load?
   - At what discharges are different fractions of bed material mobilized in a particular stream segment?
   - What is inflowing sediment load to a stream segment, i.e. what is the water discharge Q(t) and sediment supply rate Qs(t) and grain size D(t) delivered to the upstream end of the channel segment of interest?
   - How will the available flow move the supplied sediment through the segment of interest?
   - What is the new equilibrium slope given some change in streamflow, and how much incision would be necessary to achieve this new slope?
   - What is the sediment transport capacity of the segment of interest *relative to* the inflowing sediment load from *upstream* supply reaches?
   - What is the sediment transport capacity of the segment of interest *relative to* the capacity of *downstream* reaches?
   - At the network scale, where are zones of low vs. high energy, aggradation vs. degradation potential, and coarse sediment constriction located?

   The primary tools that comprise this suite include the following:
   - Tools for estimating watershed sediment supply (Reid and Dunne 1996), including the RUSLE (Renard et al. 1997; http://www.ars.usda.gov/Research/docs.htm?docid=5971) and WEPP (Laflin et al. 1991; http://www.ars.usda.gov/Research/docs.htm?docid=10621) models.
   - Effective discharge analysis (see above)
   - Incipient motion analysis (tractive force, e.g. ASCE 2008; Brown and Caldwell 2011; Buffington and Montgomery 1998; Lane 1955a)
   - Sediment continuity analysis at single dominant discharge with an appropriate sediment transport relation – e.g., HEC-RAS, Bedload Assessment for Gravel-bed Streams (BAGS -Pitlick et al. 2009; GeoTools)
   - Equilibrium slope / geometry analysis e.g., HEC-RAS – Copeland et al. 2001, iSURF-NCED 2011)
   - Sensitivity to inflowing sediment load analysis e.g., Copeland's method in HEC-RAS, iSURF-NCED 2011)
   - Sediment continuity analysis over the entire flow frequency distribution e.g., Capacity-Supply Ratio of Soar and Thorne (2001), BAGS, GeoTools

- Network scale sediment balance – Sediment Impact Analysis Methods (SIAM) module in HEC-RAS

Movable bed / mobile boundary models also provide a mechanistic tool for estimating the trend and magnitude of changes in channel geometry due to hydromodification. However, a recent study evaluated the potential applicability of various movable bed and/or boundary models to streams in southern CA (Dust 2009), including HEC-RAS, CONCEPTS (Langendoen, 2000), and FLUVIAL 12 (Chang, 2006). The results of tests performed on urban streams in southern CA indicate that these models are difficult to apply and have high prediction uncertainty due to flows near critical, split flow conditions, and lack of fidelity to complex widening, bank failure, and armoring processes.

The following figures depict example outputs from an application of the sediment-transport suite of tools:

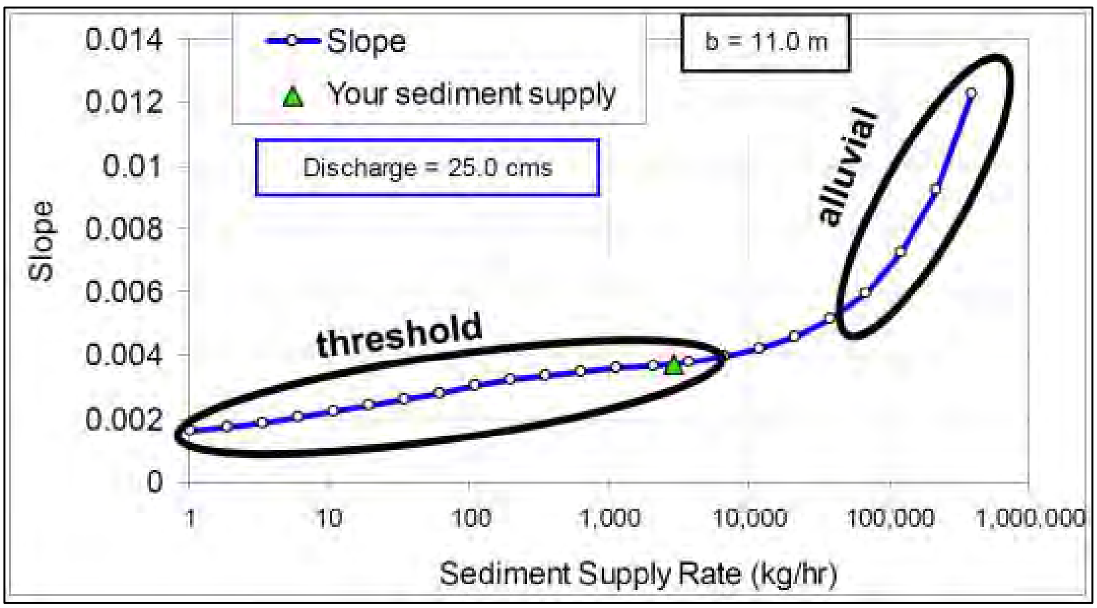

Figure B-8. Sensitivity analysis of equilibrium channel slope to inflowing sediment load (from iSURF, NCED 2011). Slopes of alluvial channels with high sediment supply are much more sensitive than threshold channels with relatively low sediment supply. Channels with beds composed of sand and fine gravels are generally much more geomorphically sensitive to hydromodification than threshold channels in which coarse bed sediments are primarily transported at relatively high flows.

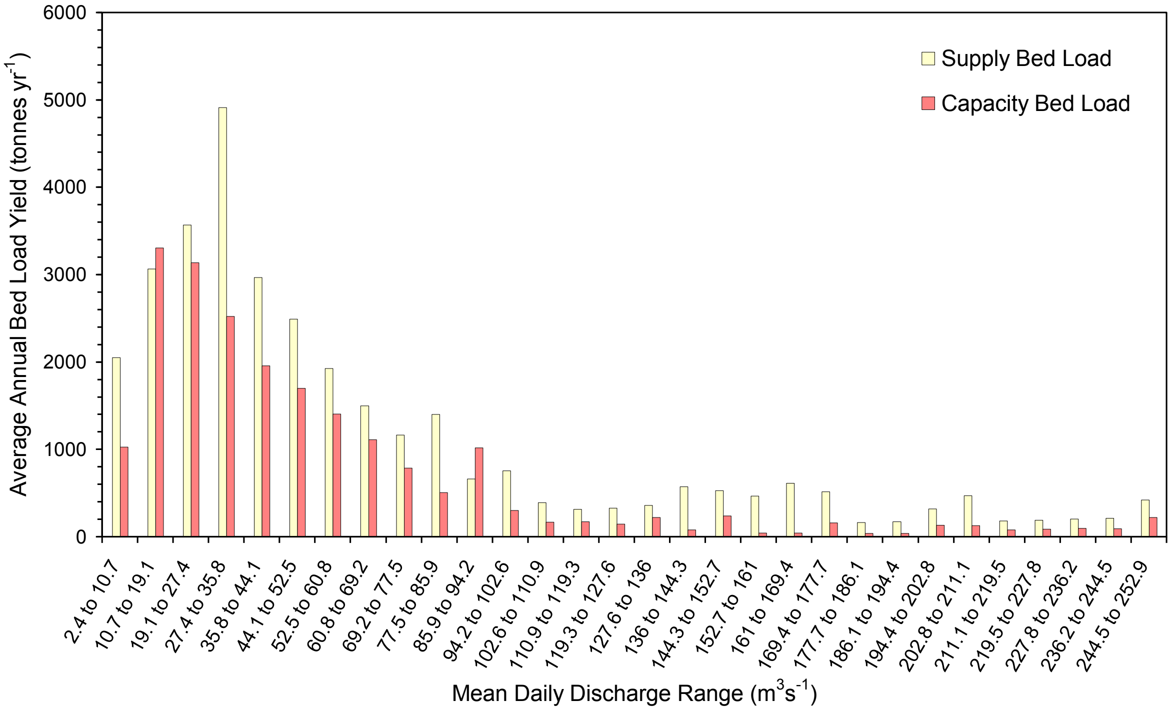

Figure B-9. Analysis of sediment transport capacity vs. inflowing sediment load over the full spectrum of stream discharges (capacity-supply ratio; Soar and Thorne 2001). In this case, the time-integrated capacity to transport bedload is 64% of the supplied bedload and significant aggradation is expected.

5. **Relationship to Management Framework**. These suites of tools could be applied to establish project-specific requirements for hydromodification assessment and mitigation, as recommended in the Management Framework presented in Chapter 3. In the example shown in the diagram below, results of the Baseline Assessment are used as a screening tool to assign high, moderate or low risk levels for stream reaches, in conjunction with the proposed land-use changes. Thus, the Baseline Assessment suite of tools is crucial in determining whether a detailed survey-level assessment and additional suites of tools are necessary for an adequate analysis. The need to apply additional suites of tools in formulating a management approach is commensurate with the level of risk and susceptibility of the stream. More complex and rigorous analysis with multiple suites of tools is necessary in predictive assessments for relatively susceptible stream types such as alluvial channels with sand beds.

   Although a stream may have relatively low susceptibility for overall geomorphic change, it may nevertheless have ecological attributes that are highly susceptible to hydromodification. Thus, suites of tools focused on both geomorphic and biological endpoints must be used to fully assess stream susceptibility to hydromodification. More work will be required to develop tools for prediction of biological response to flow alterations throughout California, as noted in Chapter 3 (see Poff et al., 2010 and http://conserveonline.org/workspaces/eloha).

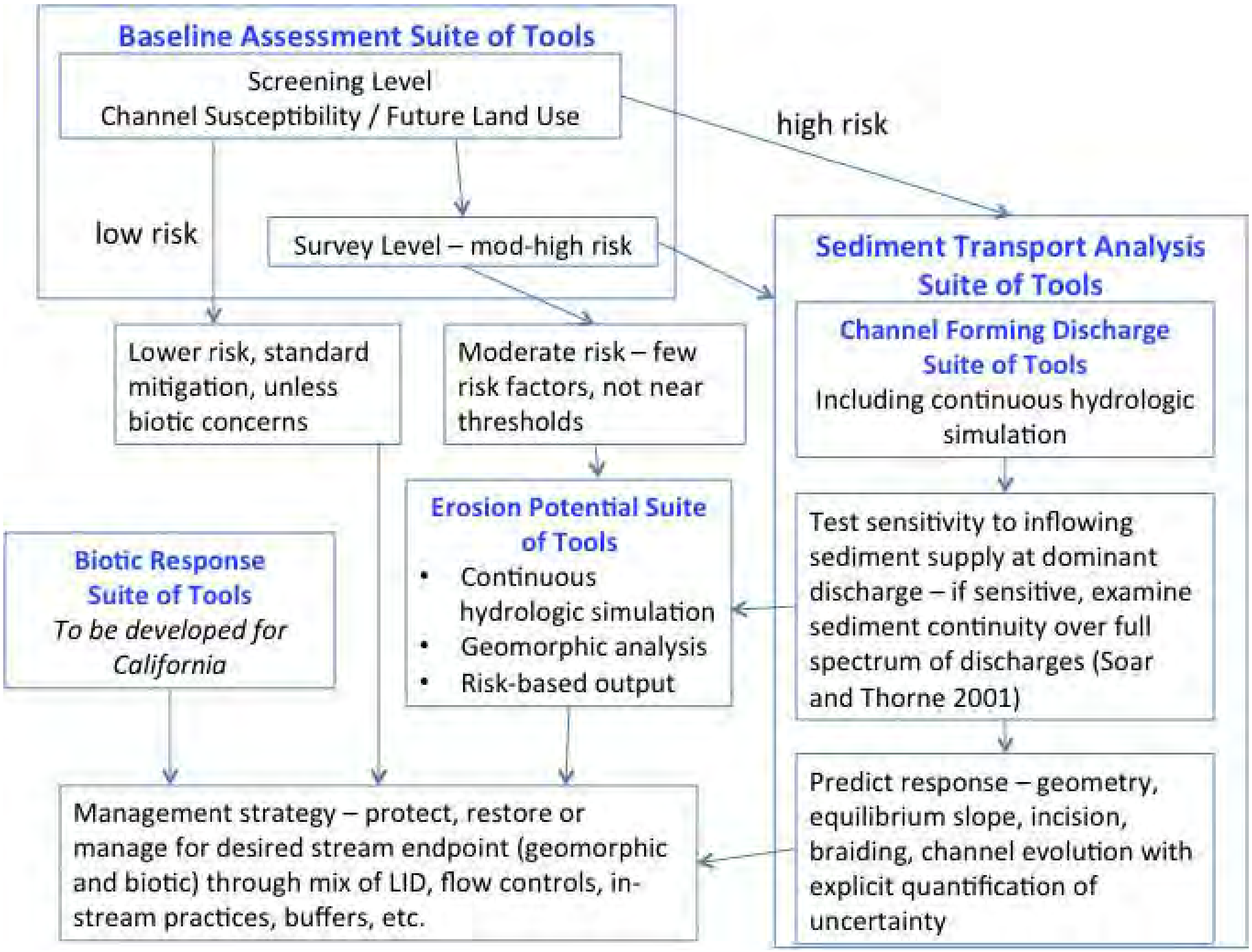

Figure B-10. Conceptual diagram showing relationships among the four suites of existing tools and biotic response tools to be developed in the future. Additional analyses will be required for engineering design.

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APPENDIX C: ADAPTIVE MANAGEMENT

WHAT IS ADAPTIVE MANAGEMENT

Adaptive management is a formalized approach for overcoming the inescapable difficulty in predicting ecological outcomes resulting from natural-resource management actions. It accomplishes this by treating all "management actions" (whether intentional or not) as experimental components within the larger structure of a monitoring program (Holling 1978, Walters 1986, Lee 1999, Ralph and Poole 2003). In other words, specific management actions that may affect ecological processes and functions are systematically evaluated, via "monitoring," to provide the data to affirm or refute the expected outcomes. To the extent that the monitoring results indicate a need to revise the scientific understanding or the management actions built on that understanding, establishing the mechanism to change management actions is a precursor, not an afterthought, of the monitoring program.

Adaptive Management was first articulated over 30 years ago (Holling, 1978) and more recently embraced through various conservation efforts worldwide. Fundamental to this approach is the integration of management and monitoring, recognizing that any management action in the context of a complex ecological system is ultimately experimental, requiring feedback to make progress.

The process of adaptive implementation is iterative and continuous; new knowledge is actively incorporated into revised experiments, a practice best described as "learning while doing" (Lee 1999). The key difference between this approach and other commonly implemented environmental management strategies is the application of scientific principles, such as hypotheses-testing,[is used] to explicitly define the relationships between policy decisions, management actions, and their measured ecological outcomes. Furthermore, this approach provides a means to understand and document these cause-and-effect relationships; it can also point to alternative actions that may produce more desirable outcomes. Uncertainty is embraced and serves as a focal point for defining ever-more specific evaluations.

Scientifically credible and relevant information can only be generated when the management "experiments" are designed with clear hypotheses about the effects of proposed actions or prescriptions. These hypotheses must be testable at multiple scales using available technology and methods (Conquest and Ralph 1998; Currens *et al*. 2000). Hypotheses that cannot be tested, are trivial (e.g., "water flows downhill"), are not credible ("water flows uphill"), or only account for site-specific conditions are not useful in considerations of the singular or cumulative effects of management actions.

In order to retain clear linkages between key questions, hypotheses, and monitoring protocols, the experimental approach must be designed before determining which goals and endpoints are appropriate (Ralph and Poole 2003) since appropriate goals should be *outcomes* of the effort, not a precondition; and the approach must explicitly tie stated hypotheses to the key ecological questions.

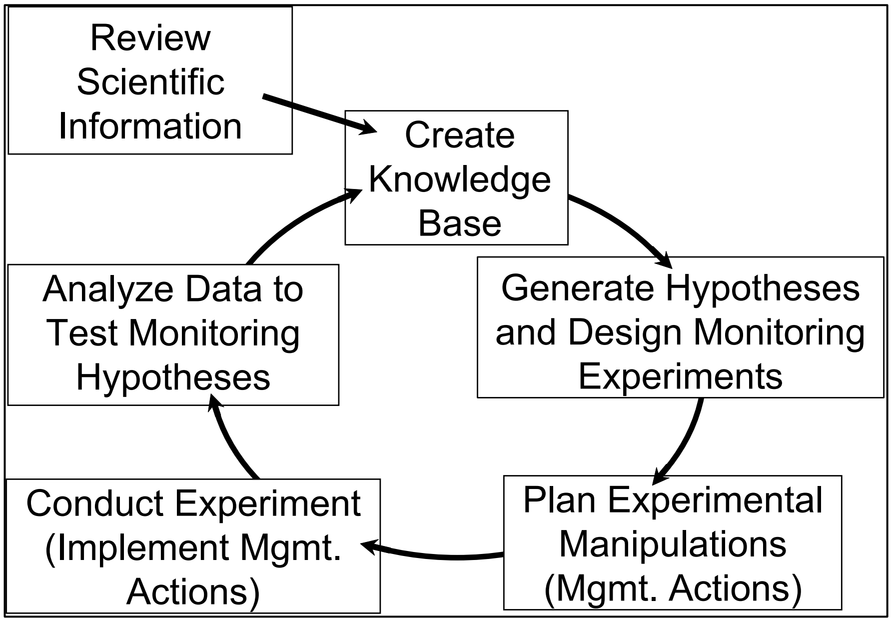

Figure A-1. Framework for an adaptive management program. The key feature of this cycle is the foundation of scientific principles and hypothesis generation; design of the management actions and the monitoring to evaluate their effects are integrated and designed to test assumptions, improve understanding, and reduce uncertainty (modified from Ralph and Poole 2003, Figure 3).

Wagner (2006) asserts that [stormwater] regulatory programs in the past often failed because they were designed in ways that ignored technological and scientific limitations. "Science-based" does not simply mean the monitoring of status and trends followed by responding to imposed benchmarks and goals, but rather that scientific principles must be the foundation of regulatory program design, and that these programs must rely on scientific methods to demonstrate results. Wagner suggests that regulations can still be designed despite incomplete or developing knowledge, but that gaps and limitations must be acknowledged and used to inform ongoing investigations. His argument clearly echoes those of scientists who insist that monitoring experiments and testable hypotheses must frame management decisions and land-use objectives.

WHAT IS *NOT* ADAPTIVE MANAGEMENT, AND WHY IS IT SO PROBLEMATIC?

Unlike the experimental approach embodied by adaptive management, an alternative process traditionally dominates in natural resource management: (1) a problem is identified, but a cause is simultaneously presumed (e.g., "increased sediment inputs into a stream are negatively impacting salmonid survival"); (2) a solution or set of solutions is proposed (e.g., timber harvest is restricted and riparian buffer width is increased), but the prescription is not translated into a testable hypothesis associated with the problem or question; and (3) if the problem is not solved within an arbitrarily reasonable period of time (e.g., a few years) then a different solution is proposed (e.g., "augmented upland and riparian restoration must be implemented"). Although simplified, this outline displays its divergence from adaptive management and from the basic principles of the scientific process—the resulting process is perpetually reactive.

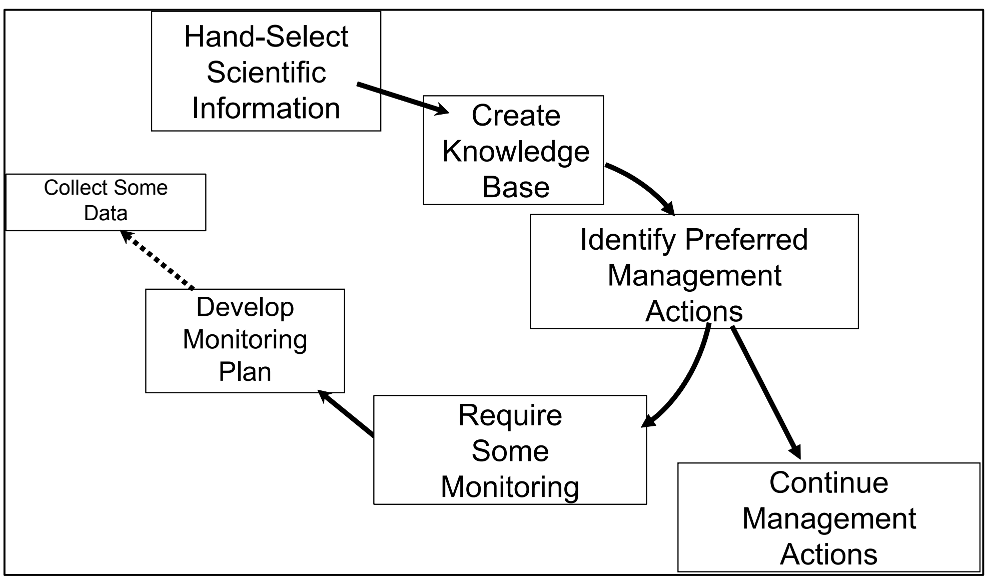

Figure A-2. Common framework for monitoring outside of an adaptive management structure. Management actions are chosen with a presumptive effect on ecological systems, and monitoring is conducted without any feedback to future actions. Even where monitoring is intended to "inform" future management actions, the absence of an explicit experimental design normally limits the utility of any monitoring data to provide meaningful insights.

In its best form, this paradigm has been termed passive adaptive management:

> Restoration planners' current management approach has been described as a "passive" adaptive management approach: science is used to

> develop best-guess predictive models, make policies according to these models, and revise them as data become available. The National Academies advise that every effort be made to take a more "active" adaptive management approach by developing alternative hypotheses for the expected consequences of a particular project and then design the project so the hypotheses can be experimentally tested" (from the summary to *Adaptive Monitoring and Assessment for the Comprehensive Everglades Restoration Plan*, 2003, National Academies Press, 122 pp.).

Ralph and Poole (2003) have aptly named this approach "socio-political adaptive management" (i.e., SPAM).

BARRIERS TO IMPLEMENTING "ACTIVE" ADAPTIVE MANAGEMENT

Although the virtues of active adaptive management are readily articulated, the framework is surprisingly rare in practice. Some of these barriers are practical or logistical, and they include such issues as:

- Longevity and long-term institutionalization of monitoring;
- Effective data management systems that allow managers to readily access data;
- Ability to differentiate effects from natural variability and events, such as flood and fire;
- Cost and technical limitations of necessary data collection.

The most severe impediments, however, are not scientific but social: "We suggest that watershed-scale adaptive management must be recognized as a radical departure from established ways of managing natural resources if it is to achieve its promise... Adaptive management encourages scrutiny of prevailing social and organizational norms and this is unlikely to occur without a change in the culture of natural resource management and research" (Allan et al. 2008).

While science can provide defensible and replicable insights regarding the ecological outcomes of management prescriptions, it cannot offer absolute certainty. Policy can be and should be informed by science but is ultimately based on a variety of considerations that are not always amenable to the spatial, temporal, and technological limitations of the scientific process (Van Cleave et al. 2004). This is an uncomfortable truth for agency managers and elected officials to acknowledge, and it commonly results in funding decisions and public pronouncements using the "language" of science but not its substance.

Although efforts to build large, collaborative programs are commonly characterized by increasing stakeholder involvement and outreach, greater participation does not necessarily mean that true adaptive management is occurring, or that scientific principals are being applied to either the choice of management actions or their evaluation. These efforts, however, do reflect a movement to extend natural resource management decision-making processes beyond just technical experts in order to reflect evolving social values (Pahl-Wostl *et al*. 2007). If they are successful, this approach can open a path to achieving the best of both realms, namely scientific rigor with a broad base of community support.

ATTRIBUTES OF USEFUL HYPOTHESES FOR AN ADAPTIVE MANAGEMENT PROGRAM

A key element of any adaptive management approach is the set of hypotheses that guide both the management actions and their associated monitoring. Because these management actions are recognized as "experimental" (because in a complex system most outcome(s) cannot be predicted with absolute certainty), their selection must be guided by assumptions about what *might happen,* or what is *expected* to happen. This defines the first attribute of a useful hypothesis: it is **credible**, typically because it is based on prior knowledge or scientific understanding of the system. Indeed, some hypotheses may already be so well evaluated and understood (e.g., "Stormwater runoff from freeways carries measurably elevated concentrations of toxic pollutants") that there is little point in framing them in this structure at all—as new monitoring programs to address such hypotheses are highly unlikely to result in new information or knowledge and might be perceived as an unwise expenditure of scarce monitoring resources.

The second attribute of a useful hypothesis stems from the scientific reality that any experiment, whether conducted in the laboratory or across the landscape, provides value only insofar as its outcomes are measured and the effects are distinguishable from the influence of other, unrelated factors. Thus, the hypothesis that guides the experiment should not only be credible but also **testable**. Otherwise, why bother making measurements at all?

Lastly, these actions and measurements and analyses do not occur in a vacuum. Thus, the final guiding principle for any hypothesis in an adaptive management approach is that it be **actionable**, or that different outcomes, as revealed by monitoring, can (and will) result in different management responses. If no difference occurs, then clearly there is no reason to have made the effort in the first place.

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ATTACHMENT A

**ORANGE COUNTY LEGAL &TECHNICAL COMMENTS ON
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION
TENTATIVE ORDER No. R9-2013-0001
NPDES NO. CAS0109266**

Appendix A-3

2009 Presentation to Santa Ana Regional Board

April 10 and 11, 2013
Item No. 8
Supporting Document No. 5

Storage and Reuse Systems for Stormwater Mangement

Preliminary Cost and Performance Estimates for Residential Land Use in Irvine, CA

Eric Strecker, P.E.
Geosyntec consultants

Summary of Study

- Compared hypothetical scenarios for rainwater harvesting and reuse systems (cisterns)
  - single lot scenario
  - 100 ac neighborhood scenario
- Compared resulting costs and for both scenarios
- Performed modeling (long term simulation) analysis for neighborhood scenario
- Evaluated water quality loading differences between rainwater harvesting and reuse systems and typical bioretention installation for single family residential
- Performed preliminary review of applicable codes

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Rainwater harvesting and Reuse Systems

Impervious Area

- Roof tops
- Driveways
- Streets

Stormwater Conveyance and Pretreatment

- Pipes
- Filters

Storage

- Cistern
- Storage Basin
- Underground Vault

Treatment

- UV treatment
- Filtration

Pumping and Piping

- Pipes back to house (purple)

Indoor Use and Irrigation

- Toilet flushing
- Yard and Garden irrigation

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Single Lot Scenario

- Two reuse demands were examined: 1) indoor use only (toilet flushing), and 2) indoor and outdoor use (toilets and irrigation)

- Lot Characteristics:
  - 0.1 acres
  - 69% impervious area
    - Roof area - 2400 ft^2
    - Other (patio) - 600 ft^2
  - 3.5 people/house
  - Toilet use/capita = 18.5

- Method assumptions:
  - Rational Method
    - Impervious Runoff Coeff. (0.9)
    - Precipitation Depth – 0.8 in (85th percentile for large parts of Orange County)
    - Toilet use / house = 65 gal/day
    - Irrigation /house = 77 gal/day (Avg. from Irvine Water District data)

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Single Lot Scenario Results

Water Collected From:	Roof	Roof + Other Impervious area
Demand Scenario	**Average Drawdown Time (days)**	
Toilets only	17	21
Both Toilets & Outdoor uses	7.6	9.5

Note: Outdoor demand assumes that irrigation demand is immediate; more sophisticated modeling would allow more accurate characterize of irrigation demand, but for purposes of this analyses, it was assumed to be immediate. This likely significantly overstates the demand for irrigation.

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Neighborhood Scenario

- Two reuse demands were examined: 1) indoor use only (toilet flushing), and 2) indoor and outdoor use (toilets and irrigation)

- Neighborhood Properties:
  - 100 acres – 60 % impervious
  - 0.1 acre lots at 4.5 du/ac = 450 houses
  - 3.5 people/house
  - Toilet use/capita = 18.5
  - Basin used to store runoff

- Method assumptions:
  - Rational Method
    - Impervious Runoff Coeff. (0.9)
    - Precipitation Depth – 0.8 in (85^{th} percentile for large parts of Orange County)
    - Toilet use / house = 65 gal/day
    - Irrigation /house = 77 gal/day (Avg. from Irvine Water District data)

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Neighborhood Scenario Results

Demand Scenario	Average Drawdown Time (days)
Toilets only	45
Both Toilets & Outdoor uses	10

Note: Outdoor demand assumes that irrigation demand is immediate; more sophisticated modeling would allow more accurate characterize of irrigation demand, but for purposes of this analyses, it was assumed to be immediate. This likely significantly overstates the demand for irrigation.

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General Cost List

Item	Description	Cost	Reference/Source
TANKS			
Galvanized steel	200 gal	$225	Fairfax County, 2005
Polyethylene	165 gal	$160	Fairfax County, 2005
Fiberglass	350 gal	$660	Fairfax County, 2005
Plastic	800 gal	$400	Plastic-mart.com
Plastic	1100 gal	$550	Plastic-mart.com
Plastic	1350	$600	Plastic-mart.com
Plastic cone	1500 gal w/metal stand	$1500	Plastic-mart.com
Plastic	2500 gal	$900	Plastic-mart.com
Plastic	5000 gal	$3000	Plastic-mart.com
Plastic	10000 gal	$6000	Plastic-mart.com
[1] Dry Det. Basin(1997)	$C = 12.4V^{0.760}$: for 1 ac-ft	$41,600	stormwatercenter.net
[2] Below Ground Vault	$C = 38.1 (V / 0.02832)^{0.6816}$	$55,300	fhwa.dot.gov
Concrete	1,000,000 gal above g. (O&P)	$548,000	RSMeans
Steel	1,000,000 gal above g. (O&P)	$467,000	RSMeans
TREATMENT			
UV (house-scale)	Whole system - 12 gpm	$700-$900	rainwatercollection.com
UV bulb	Life: 10,000 hrs or 14 months	$80-$110	rainwatercollection.com
UV (neighborhood-scale)	Whole system - 200 gpm	$10,000	Bigbrandwater.com
Downspout filter	Placed in Gutter	$20 - $500	many online
1st Flush Diverter	Vertical pipe w/ ball float	$50-$100	raintankdepot.com
PUMP	1 hp (all in one package)	$575 - varies	rainwatercollection.com
PIPING (Purple)			
to Tank (lot)	PVC: 2”-6” (O&P)	$2-$12 / LF	RSMeans
to House (lot)	PVC: 2”-6” (O&P)	$2-$12 / LF	RSMeans
to Tank (neighbor.)	Concrete: 6” – 18” (O&P)	$15-$30 /LF	RSMeans
to House (neighbor.)	HDPE- 4” – 10” (O&P)	$11-$27 / LF	RSMeans
to Irrigation	PVC: 2”-6” (O&P)	$2-$12 / LF	RSMeans
Backflow prev. valve	Each	$100-$200	web
STENCILS	Non-potable water	----	
INSTALLATION	Percentage of material cost	40 % – 50%	

[1] This dry detention cost equation - Brown and Schueler, 1997: C is the construction, design and permitting cost and V is the volume (cu-ft) need to control the 10-year design storm. In this case, the 0.8” storm runoff volume was used in place of the 10-yr design storm volume.
[2] This below ground storage vault equation - Weigand et al., 1986:C is the construction cost estimate (1995 dollars), and V is the runoff volume (cubic meters)

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Single Lot Costs

Item	Description	Cost
TANKS		
Plastic	1100 gal and 1350 gal	$550
TREATMENT		
UV	Whole system - 12 gpm	$800
UV bulb	Life: 10,000 hrs or 14 months	$80-$110
Downspout filter	Placed in Gutter	$250
1st FLUSH DIVERTER	Vertical pipe w/ ball float	$100
PUMP	1 hp (all in one package)	$575
PIPING (Purple)		
to Tank (lot)	PVC: 2”-6” (O&P) 20ft	$8 / LF
to House (lot)	PVC: 2”-6” (O&P) 50ft	$8/ LF
to Irrigation	PVC: 2”-6” (O&P) 50ft	$8 / LF
Backflow prev. valve	each	$200
STENCILS	Non-potable water	----
INSTALLATION	40% of material cost	$1400
TOTAL		**$4,900**

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Neighborhood Costs

Item	**Description**	**Cost**	**Units Assumed**
TANKS			
Dry Det. Basin(1997)	$C = 12.4V^{0.760}$	$119,000	174,000ft^3
Below Ground Vault	$C = 38.1\ (V / 0.02832)^{0.6816}$	$142,000	174,000ft^3
TREATMENT			
UV - neighborhood	Whole system - 200 gpm	$10000	
Catch basin filters	1 every 2 acres	$2000	50 catch basins
PUMP		$50,000	
PIPING (Purple)			
to Tank (neighbor.)	Concrete: 6" – 18" (O&P)	$15-$30 /LF	$23 - 14000 ft
to House (neighbor.)	HDPE- 4" – 10" (O&P)	$11-$27 / LF	$19 - 14000 ft
to Irrigation	PVC: 2"-6" (O&P)	$2-$12 / LF	$8 - 60 ft /house
Backflow prev. valve	each	$100-$200	$200 per house
STENCILS	Non-potable water	----	
INSTALLATION	40% of material cost	$470,000	
TOTAL		**$1,650,000**	

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SWMM Modeling Analysis

- Long term (40 yr) analysis of the neighborhood scenario was performed using SWMM. Two scenarios analyzed:
  - 0.8 inch design storm
  - 1.6 inch design storm
- Modeling assumptions:
  1. Toilet flushing – same as scenarios and applied as constant rate
  2. Irrigation – monthly values (from the IRWD) applied as constant rates by month (i.e. demand occurs continuously during and after storm event)
  3. Overflow from tanks considered to be untreated bypass
  4. Same total area and impervious areas in both studies

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SWMM Modeling Results

		Scenario			
		A	B	C	D
	Units	Toilet Flushing Only, 0.8" design storm	Toilet Flushing + Irrigation, 0.8" design storm	Toilet Flushing Only, 1.6" design storm	Toilet Flushing + Irrigation, 1.6" design storm
Average Annual Drawdown Time	**days**	**47**	**8.5**	**94**	**17**
Average Stormwater % Capture and Reuse	**%**	**32%**	**55%**	**41%**	**68%**
Avg Annual Volume of Stormwater Reused	MG | CCF	5.2 | 6,950	8.8 | 11,800	6.5 | 8,700	10.9 | 14,620
Avg % of Total Residential Demand Satisfied	**%**	**6.2%**	**11%**	**7.8%**	**13%**

Note: Outdoor demand assumes that irrigation demand is immediate; more sophisticated modeling would allow more accurate characterize of irrigation demand, but for purposes of this analyses, it was assumed to be immediate. This likely significantly overstates the demand for irrigation.

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Pollutant Loading Example

Assumptions

- Median Runoff EMC for TSS for HSFD: **70 mg/L**
- Median Effluent Concentration for TSS for Media Filters from International BMP Database: **15 mg/L**
- % Captured by cistern per SWMM (Scenario B – 0.8" design storm with toilet and irrigation re-use): **55%**
- % Captured by Bioretention with Underdrains per DAMP requirement: **80%** (requires approx 0.4" design storm)
- Bypass from both BMPs assumed to be untreated

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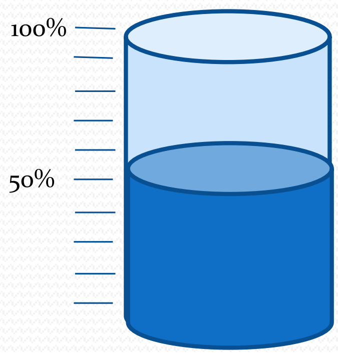
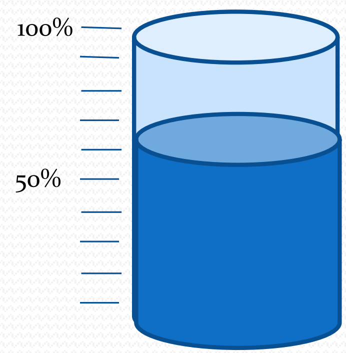
Pollutant Loading Example

Results – Average Annual TSS Load Removed

Cisterns and Re-Use: **55%**



Bioretention with Underdrains: **63%**



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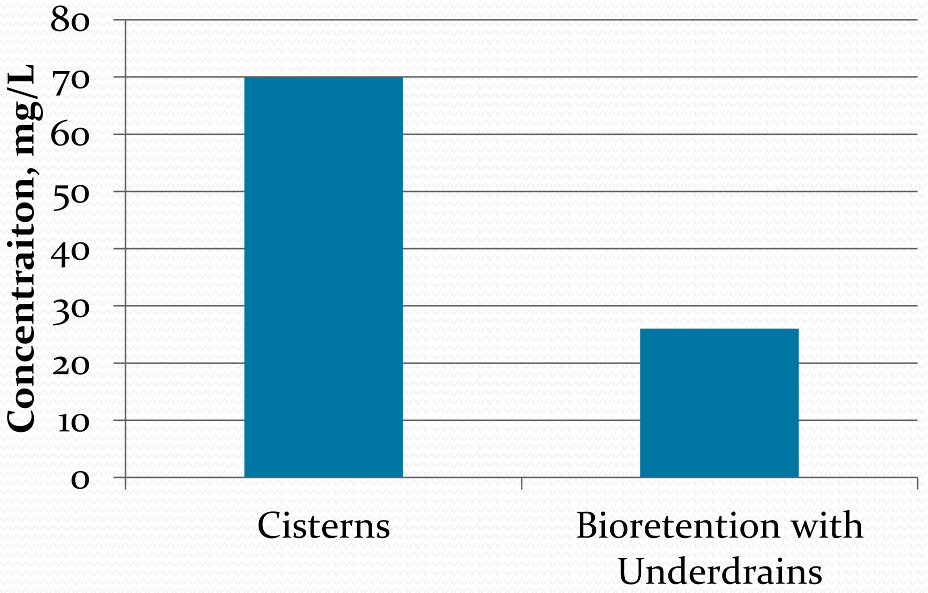
Pollutant Loading Example

Results – Average Annual TSS Concentration with BMPs



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Rainwater Harvesting - Code and Regulations

Applicable Codes

- Title 24—Building Standards Code (plumbing code)
  - Mechanical design and installation procedures
- Title 22—Social Security (recycled water quality standards)
  - Current technologies can meet this requirement (filtration, UV, and others)
- Title 17—Public Health (public water system cross-connection and backflow prevention)

Preliminary Conclusions

Since state codes do not currently recognize rainwater harvesting and reuse, discretion in approval will likely reside at the county and/or City levels through local codes and ordinances.

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Appendix A-4

The Water Report Issue #65:
Stormwater Retention on Site, An Analysis Of Feasibility and Desirability, Strecker and Poresky (2009)

The Water Report™
Water Rights, Water Quality & Water Solutions in the West

In This Issue:

Upcoming Stories:

Water Trusts

Obama Water Policy

Groundwater Decline

Tribal Water Needs

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STORMWATER RETENTION ON SITE

AN ANALYSIS OF FEASIBILITY AND DESIRABILITY

by Eric W. Strecker, PE, and Aaron Poresky, EIT, Geosyntec Consultants (Portland, OR)

INTRODUCTION

Both nationally and in various localities, there is increasing regulatory pressure to maximize or require the retention of stormwater on site with compliance often linked to matching post-development runoff with predevelopment hydrology.

For example, in California the recently adopted Ventura Municipal Separate Storm Sewer System (MS4) NPDES permit requires retention on site — via infiltration, evapotranspiration and/or harvest and "re-use" — of precipitation from storms ranging up in size to the permit-defined "design storm" (Standard Urban Stormwater Mitigation Plan (SUSMP) depth of 3/4 of a inch — "design storms" are events defined in regulation and reflected in stormwater system design). There is an exception allowed where it is not feasible to retain the entire volume: the project may then retain "only" 70 percent of the SUSMP storm on site and mitigate the remaining volume off site. Another example is the North Orange County permit, which requires that infiltration, evapotranspiration, and/or harvest and re-use be employed to manage the water quality design storm, unless infeasible.

Nationally, the recent Energy Independence and Security Act (EISA) Section 438 requires that any Federal project with over 5,000 square feet of impervious area "maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow." Guidance for compliance with this provision allows either retention of the 90th percentile, 24-hour storm event or a model-based evaluation of discharge rates and volumes, matching predevelopment with post-development runoff hydrology. In effect , both of these conditions mandate substantial on site retention.

These permits/regulations have "narrowed" the traditional definition of Low Impact Development (LID) down to only a few elements — i.e., infiltration, evapotranspiration and/or harvest and use. This narrowing precludes management options present in the broader LID definition, such as detention and bio-filtration in vegetation-based facilities that provide incidental infiltration and evapotranspiration, but have a surface discharge point (e.g. bioretention with underdrains).

Nationally, the US Environmental Protection Agency (EPA) has also limited the definition of LID in some of their various guidance documents. For example, *Reducing Stormwater Costs through Low Impact Development (LID) Strategies and Practices*, December 2007 (EPA 841-F-07-006) includes the definition: "LID comprises a set of approaches and practices that are designed to reduce runoff of water and pollutants from the site at which they are generated. By means of **infiltration, evapotranspiration, and reuse of rainwater**, LID techniques manage water and water pollutants at the source and thereby prevent or reduce the impact of development on rivers, streams, lakes, coastal waters, and ground water." (Emphasis added) It should be noted that other EPA documents include

Stormwater On Site

LID Definitions

definitions with the broader definition of filtration and surface release (see **Table 1**). It also should be noted that even in the guidance that includes the narrowed definition, in most cases the examples and guidance details include filtration and surface release of runoff.

Table 1. Summary of Filtration and Surface Release Inclusion in LID Definitions and associated guidance

Document/Reference	Filtration and Surface Release	
	In Definition	In Guidance/Examples
Reducing Stormwater Costs through Low Impact Development (LID) Strategies and Practices, December 2007 (EPA 841-F-07-006)	No	Yes
Low Impact Development (LID) Literature Review, October 2000 (EPA-841-B-00-005	Yes	Yes
Low-Impact Development: An Integrated Environmental Design Approach (Prepared by the Prince George's County Maryland Department of Environmental Resources Programs and Planning Division, with assistance from EPA), June 1999	Yes	Yes
Polluted Runoff (Nonpoint Source Pollution) Low Impact Development (LID), Last updated on Thursday, January 15th, 2009 Additional information from linked factsheet: *Design Principles for Stormwater Management on Compacted, Contaminated Soils in Dense Urban Areas*, April 2008 (EPA-560-F-07-231)	Not Clear	Yes
Low Impact Development (LID) and Other Green Design Strategies, Last updated on October 09, 2008	No	Not Clear

Harvested Water

To date, the retention of stormwater on site has been primarily been accomplished via infiltration and, to a much more limited extent, evapotranspiration. Only in a few cases has harvest and use (the authors believe that stormwater that is captured and used is not "re-used") been employed on a site scale (typically as a part of a Leadership in Energy and Environmental Design (LEED) rating process). Uses for harvested water typically include non-potable uses such as irrigation and toilet flushing and in some cases process water for industrial uses.

Natural Balance

The feasibility and desirability of retaining stormwater on site up to some design storm level has not been vetted technically on a national or regional scale. For example, in the EPA *Reducing Stormwater Costs* Guidance referenced above there is virtually no assessment via monitoring or modeling information of the potential results of the case studies presented. It is primarily a compendium of antidotal information. There has been almost no consideration of the natural water balance (i.e., predevelopment conditions) in technical guidance or whether infiltrating more volume than occurs under natural conditions (as would tend to result from matching runoff hydrology without matching evapotranspiration) could, in many cases, cause problems. This paper attempts to present some of the considerations for retaining on site to determine whether it is feasible and/or desirable. It focuses on Southern California examples, but the factors discussed are applicable to much of the West and beyond.

It should be noted that "retaining stormwater on site" in its contemporary usage typically only refers to not having surface discharges result from specific "design storm" events. This usage ignores the fact that infiltrated or evapotranspirated stormwater is not actually "retained" on site — it either enters a deeper aquifer, flows as shallow interflow which may emerge elsewhere or, in the case of evapotranspiration, escapes to rain another day.

The authors believe that, while one should try to maximize the retention of stormwater on site, such retention should not be mandated, as site specific circumstances often indictate wiser alternatives.

PERFORMANCE OF STORMWATER BEST MANAGEMENT PRACTICES (BMPs)

General Considerations

In order to assess the performance of stormwater treatment Best Management Practices (BMPs), it is important to understand the range of factors which may impact BMP performance. BMP performance is effected by: runoff patterns; pollutant types and forms; the storage volume and/or treatment rate; the ability to recover storage capacity (for BMPs that rely on storage); the treatment processes for released flows (to surface waters or groundwaters); and operations and maintenance issues that affect the ability of the BMP to continue operations (Strecker, et. al., 2006). For storage-based BMPs, methods for recovering storage capacity include: surface discharge; evapotranspiration; deeper infiltration; and putting the stored water to use. For systems which include cisterns (harvest and use), one of the most critical factors is the ability to quickly recover storage capacity before the next storm event arrives. Typically, if storage capacity cannot be recovered within two-to-four days, then the amount of runoff bypassing storage becomes significant due to the cistern being partially to nearly full.

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Stormwater On Site

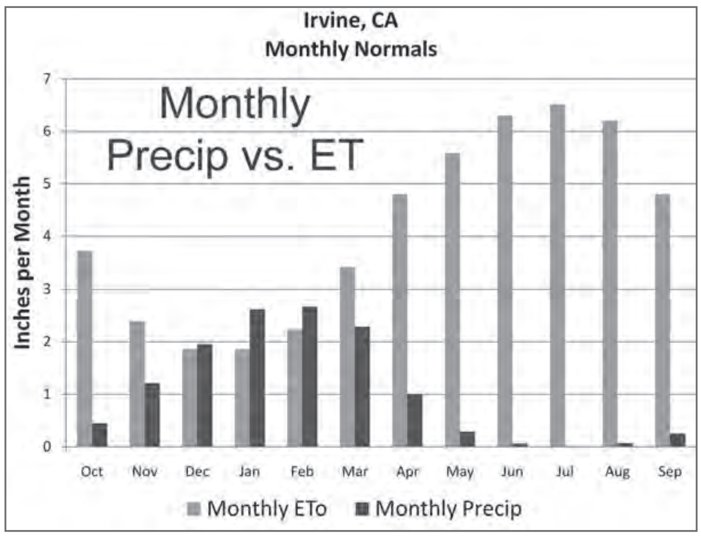
Storage Capacity Recovery

Weather and Resulting Runoff Patterns

In Southern California and the West Coast in general, precipitation patterns in most urban areas are affected by the presence or absence of a high pressure ridge that in essence blocks-out low pressure storm systems. Typically, once the high pressure ridge is absent a series of storms arrives, delivering "back-to-back" storms until a high pressure ridge re-establishes. Storms arrive about every two to three days during this period. If the storage capacity is not quickly recovered, these back-to-back storms can result in storage-based BMPs that are full or partially full when the next storm arrives, which then causes significant bypass or overflow to occur. In Southern California, most precipitation arrives from December to March. **Figure 1** shows the monthly normal rainfall in Irvine California (and monthly **e**vapo**t**ranspiration (ET)). Monthly normals tend to mask the patterns that occur within specific months in the period of record. **Figure 2** shows a typical precipitation pattern for the same gage, which includes the effect of 'back-to-back" storm events on a weekly timescale in an actual year. These weather patterns indicate that the recovery of storage on a sub-weekly time scale is critical to ensure that sequential storms do not result in excessive bypass or overflow of BMPs. Study of typical storm patterns indicates that storage capacity should be regenerated within two-to-three days to maximize the stormwater management performance when harvesting stormwater.

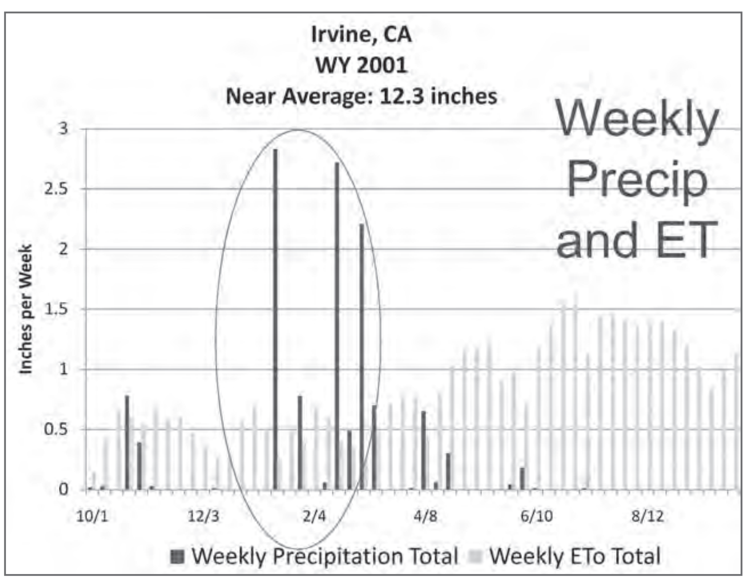
Precipitation v. "ET"

Figure 1. Monthly Precipitation vs. Monthly Evapotranspiration for Irvine, California.



Precipitation Pattern

Figure 2. Typical Precipitation Pattern Showing Back-to-Back Storms at Irvine California for a Near Average Water Year.



Stormwater On Site

Infiltration Issues

Infiltration is the primary method that is employed to retain stormwater on site. This is because, when it can be accomplished, infiltration is the method most likely to be successful. However, the authors believe that three key questions/issues need to be addressed when considering infiltration strategies if unintended, problematic consequences are to be avoided.

Key infiltration considerations include:

- Can you do it?
- Should you do it and, if so, to what extent?
- If you do employ infiltration, what factors need to be addressed to insure a desirable outcome?

Infiltration: Can You Do It?

Soil Factors

Underlying soils greatly affect the ability to infiltrate. In much of Southern California (and the West) urban areas are situated atop soils that are difficult for infiltration. Some practitioners have suggested soil amendments as a strategy for increasing infiltration. However, amending soils typically only addresses surface soils, so if underlying soils are still difficult for infiltration, soil amendments may only be increasing the storage available (vs. significantly increasing underlying infiltration rates). **Figure 3** presents a map that shows underling soils for the North Orange County, California permit area. It is expected that, in general, infiltration will only be successful in areas with A and B soil types. Of course, in mapping broader soils groups, there may be pockets where infiltration is more feasible. However, the converse is also true.

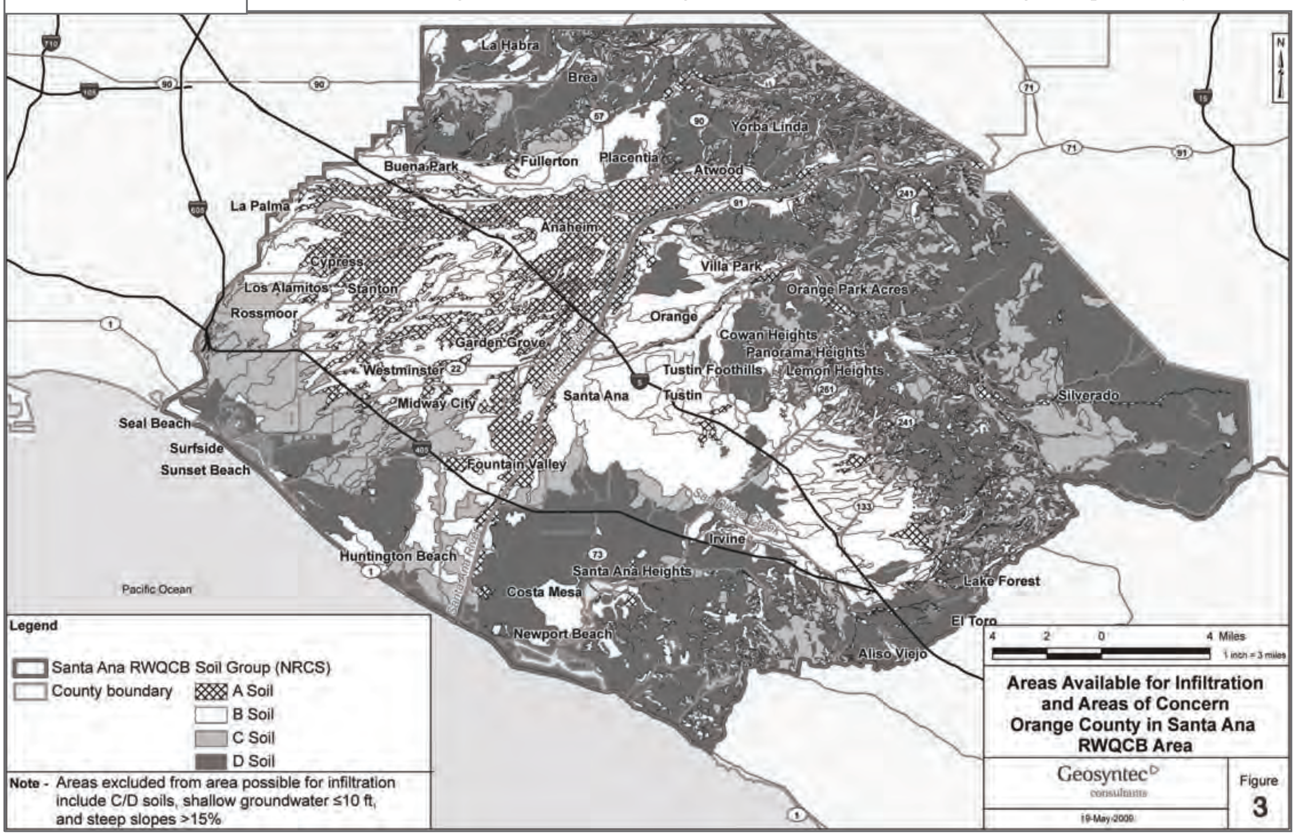
Infiltration Rates & Design

In this Orange County example, a little over 58% of the permit area has C and D soil types that would be unlikely to promote infiltration at an acceptable rate. Infiltration facilities that ignore low underlying infiltration rates in their design would tend to be full for much of the wet season, resulting in substantial bypass/overflow, thereby greatly reducing retention on site. Infiltration facilities designed with lower infiltration rates in mind would have shallower allowable ponding depths and thus require a greater amount of site area, possibly promoting sprawl. To ascertain feasibility, maps like this should be developed prior to requiring infiltration or on site stormwater retention.

Infiltration: Should You Do It?

The next question is "should you (or how much should you) infiltrate?" In many areas there are unnatural (e.g., solvent) or natural (e.g., selenium) plumes or soil contamination that infiltration could negatively impact by either moving or spreading the contaminants. Infiltration in industrial areas is often not desirable due to general concerns about groundwater contamination resulting from potentially elevated

Figure 3.
Soil types for North Orange County MS4 NPDES Permit Area



Stormwater On Site

pollutant concentrations in industrial stormwater runoff. Geotechnical issues associated with steep slopes or expansive soils may also be an issue for infiltration. Depth to groundwater typically limits infiltration to areas with 10 or more feet of separation from the bottom of infiltration facilities to groundwater. Finally, in some locations upgradient of an ephemeral stream, increased infiltration may cause undesirable habitat type changes downstream of the site due to increased periods of base flows that result in vegetation changes (e.g. conversion of dry wash to a thickly vegetated system). There has been a lack of consideration of the overall water balance consequences that a "retention on site" requirement may have in terms of habitat.

Water Balance Consequences

As an example, **Figure 4** presents a map of the North Orange County permit area that shows the areas remaining with good potential for infiltration after consideration of some of the issues covered above. The area remaining within the permit area for consideration of infiltration is less than 23 percent of the permit area, even without considering habitat issues or regulated facilities (small contamination areas shown as dots). There are large urbanized areas where infiltration would not be either feasible or desirable.

Infiltration: Do It Carefully

Groundwater Quality

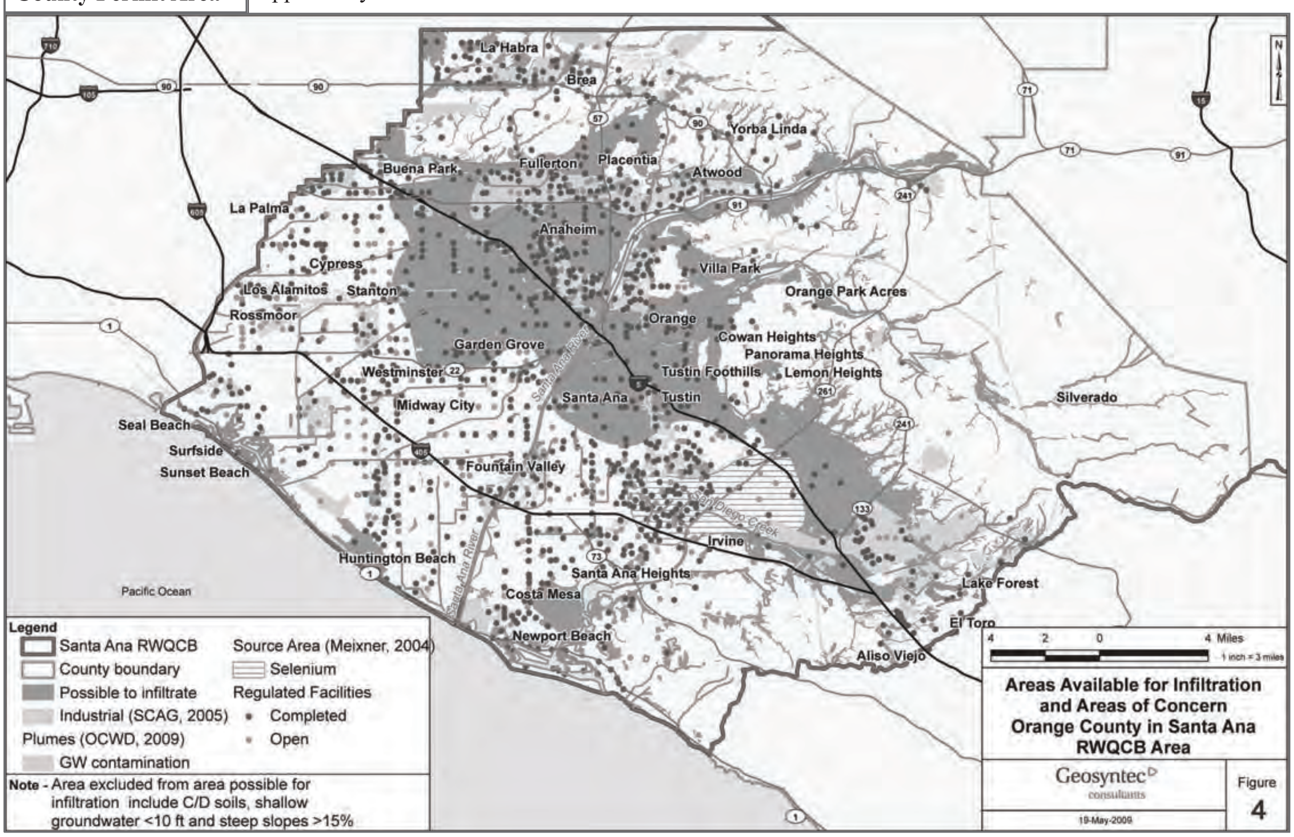
Finally, infiltration should be done carefully to ensure that groundwater quality is protected and widespread stormwater management facility failure does not occur. Proper treatment of infiltrating water should occur before this water reaches groundwater either via treatment with BMPs or ensuring that soils are adequate to provide treatment while passing infiltrating water. Infiltration facilities have often failed due to poor maintenance and operation of the facilities. One needs to think through how to design infiltration facilities to minimize maintenance issues, including whether widely-distributed infiltration facilities can be maintained as adequately as one centralized facility. Water districts that utilize groundwater should obviously be involved in decisions about where and how to infiltrate stormwater so that groundwater supplies are protected.

Maintenance Issues

Infiltration: Summary

Infiltration must be done carefully to ensure that it can be successful on a long-term basis as well as be protective of water supplies. The best opportunities for successful infiltration are in areas where groundwater is actively managed for water supply. Such areas are unlikely to face as many water balance hindrances or other issues. For example, areas along the Santa Ana River are actively managed for recharge and withdrawals by the Orange County Water District. These localities provide the best opportunity for successful infiltration.

Figure 4.
Areas available for infiltration for the North Orange County Permit Area



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Stormwater On Site

Development Factors

Precipitation v. ET

In Soil Storage Recovery

Water Balance

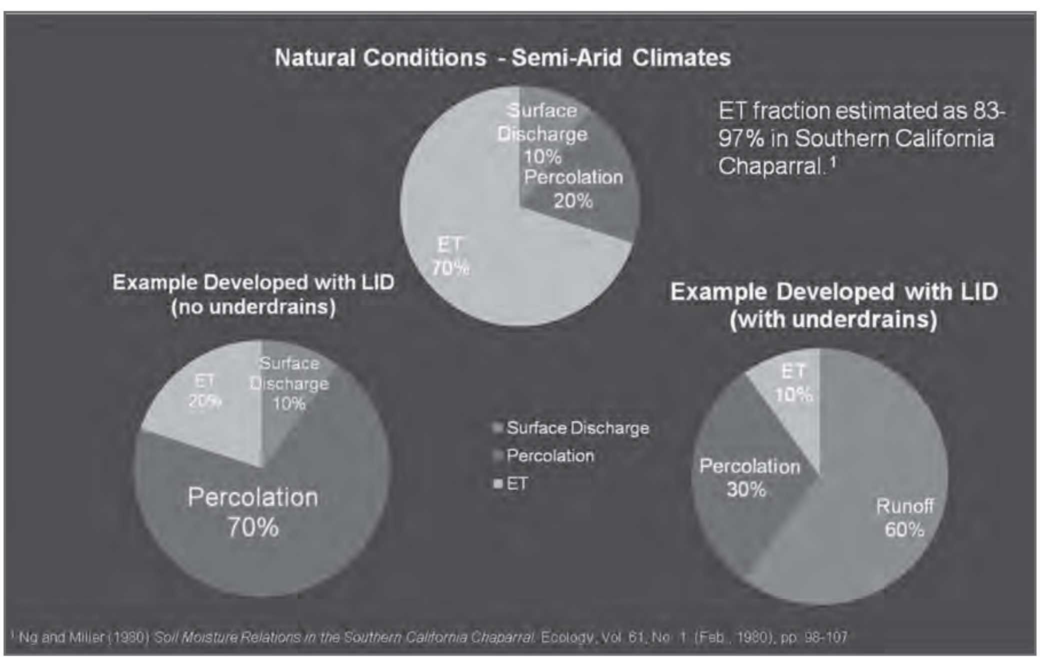
EVAPOTRANSPIRATION (ET)

After an area undergoes development there will be less available area for **e**vapo**t**ranspiration (ET)to occur. This holds true even when vegetated roofs, pervious pavements, and other "green" development practices are employed and is especially true for high density projects. Some analysts have compared monthly or seasonal ET to precipitation levels to assess the potential for ET losses as a significant retain-runoff on site measure. This is particularly inappropriate on the West Coast in light of the region's tendency for back-to-back storm events.

Refer again to **Figures 1 and 2** appearing above. **Figure 1** shows monthly normal comparisons of precipitation versus ET, while **Figure 2** shows precipitation and ET as weekly totals for an example year. While the former suggests that ET matches or exceeds precipitation on a monthly normal bases, it does not account for back-to-back storms or the fact that months with higher than normal rainfall would be the same months that correspond to lower than normal ET. **Figure 2** clearly demonstrates that ET cannot keep up with precipitation on a weekly basis in critical periods of the typical back-to-back storms of an average year. During these critical periods, the storage provided in soils would not have recovered in time for subsequent rainfall. While ET of stormwater should be maximized, it almost certainly will not be able to match pre-development levels and is likely a minor component of retaining stormwater on site (without storage and use for irrigation).

ET is a very important consideration when assessing the ability to mimic predevelopment runoff volume. **Figure 5** presents typical arid southwest water balances for: undisturbed areas; areas developed with infiltration facilities (Example Developed with LID – no underdrains); and for areas developed using LID with underdrains. Predevelopment ET can range upwards of 80 to 97 percent of the precipitation on an average annual basis. It is very unlikely that predevelopment ET will be matched by post-development ET due to reduction in vegetated open soils areas. So, the choice for development, particularly high density development, is to either have more runoff than predevelopment or more infiltration, or a combination of the two. This fact and its ramifications have not been considered during the development of on site retention requirements that are focused on surface hydrology versus overall hydrology (including sub-surface).

Figure 5. Typical Water Balance from Precipitation in Arid Southwest Climate



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CAPTURE & USE ("RE-USE")

Stormwater On Site

Harvest Demand

In most all cases where infiltration is not feasible or possible, the only option remaining to meet the retain on site requirements is to capture (harvest) and use the stormwater. In North Orange County, for example, this would be the option in about 77 percent of the permit area or more.

The key factor for success of capture and use of stormwater as a means to retaining water on site is the rate at which storage can be made available for subsequent events. This means having a demand for the captured water that is high enough, especially during the rainy season. The two most obvious uses for captured stormwater are for irrigation and toilet flushing. There are significant code issues with capture and use for internal non-potable demand in many jurisdictions. In addition, there are water rights issues associated with capture of stormwater in some areas (e.g., Colorado and Utah). These limitations are not the focus of this article. Other potential uses include process water for commercial or industrial purposes. A scenario for a residential development was conducted to illustrate the potential for capture and use of stormwater. This scenario is discussed next.

Capture and Use: Residential Scenario

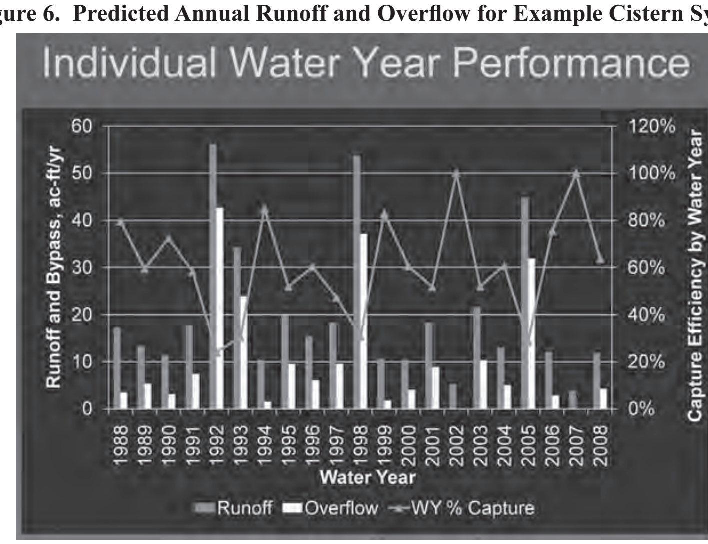
Model Assumptions

Your authors modeled and evaluated a100-acre residential catchment with 60 percent overall impervious area using a continuous simulation model (SWMM) as an example of a capture-and-use scenario. It was assumed that infiltration losses would be minimal (due to shallow groundwater depth, poor soils for infiltration and/or other issues). A tank (above ground storage) of 1.3 million gallons (equivalent to the runoff from the catchment resulting from a 0.8 inch storm event — the water quality design storm) was evaluated with toilet flushing and irrigation uses combined. Toilet flushing assumed 65 gallons per day per dwelling unit at 4.5 units per acre. For simplicity, irrigation demands were assumed to equal the monthly average ET levels for the 30 acres of landscaped areas. It was also assumed that irrigation was always on, even during rainfall (note that irrigation demands during and after rainfall are significantly over-estimated in this analysis). A 21-year hourly long-term simulation model was run to ascertain the potential effectiveness of such a system for retaining runoff on-site. We also evaluated potential pollutant removal results as compared to biofiltration with an underdrain (surface water release).

Capture & Use Levels

Overall the system resulted in an estimated capture and use of stormwater of about 48% of the total runoff volume (52% bypassing with no treatment — though one could treat the bypass as well). The capture and use levels varied annually from less than 30 percent to 100 percent for the 21 water years evaluated (**Figure 6**).

Figure 6. Predicted Annual Runoff and Overflow for Example Cistern System



Biofiltration Comparison

Using data from International BMP Database (see: www.bmpdatabase.org), a comparison of total loadings performance to a biofiltration system with underdrains was made. This comparison showed that the biofiltration system reduced **t**otal **s**uspended **s**olids (TSS) loads by about 63% compared to 48% for the cistern scenario for the 21-year simulation. So, in this case the assumption that retain on site is the most effective at reducing pollutant loadings is not valid, unless one also required treatment of the bypassed flows (in essence an additional BMP treatment requirement). Finally, the average annual potable water saved was on the order of about 10 percent of the average annual demand.

Stormwater On Site

Another scenario was run doubling the size of the cistern tank to 2.6 million gallons (equivalent to a 1.6 inch design storm). Under this scenario, the capture and use level went up to about 57 percent (so doubling the tank size resulted in another nine percent of the runoff being captured and used). Again, this emphasizes the point that being able to drain the cistern relatively rapidly is the key to success for capture and use.

Capture and Use: Limiting Factors

Evaluation Factors

As illustrated in these examples, one should evaluate carefully potential scenarios to help ensure that choices made regarding retention on site requirements actually result in the desired results. Evaluation should consider land use and density assumptions as well as assessment of local precipitation and runoff patterns, irrigation needs, and ability to use water for toilet flushing or other non-potable uses.

Rapid Storage Recovery

For capture and use to work, the storage must be quickly recovered. Irrigation typically is not an effective use for recovering storage quickly as irrigation needs during wet periods are minimal and in some cases (i.e., colder climates) there is no irrigation demand for long periods. In addition, much of the arid southwest is encouraging "xeri-scaping" (drought tolerant plants), which is likely much more effective at reducing potable demand than capture and use for irrigation. Xeriscape plant pallets typically do not like to be saturated for long periods, as would occur via over-irrigation if irrigation use was maximized. Further, use of a water-loving plant palate to maximize the use of captured runoff during normal and wet years could exert an additional demand for potable water during dry years.

Toilet Use Ratio

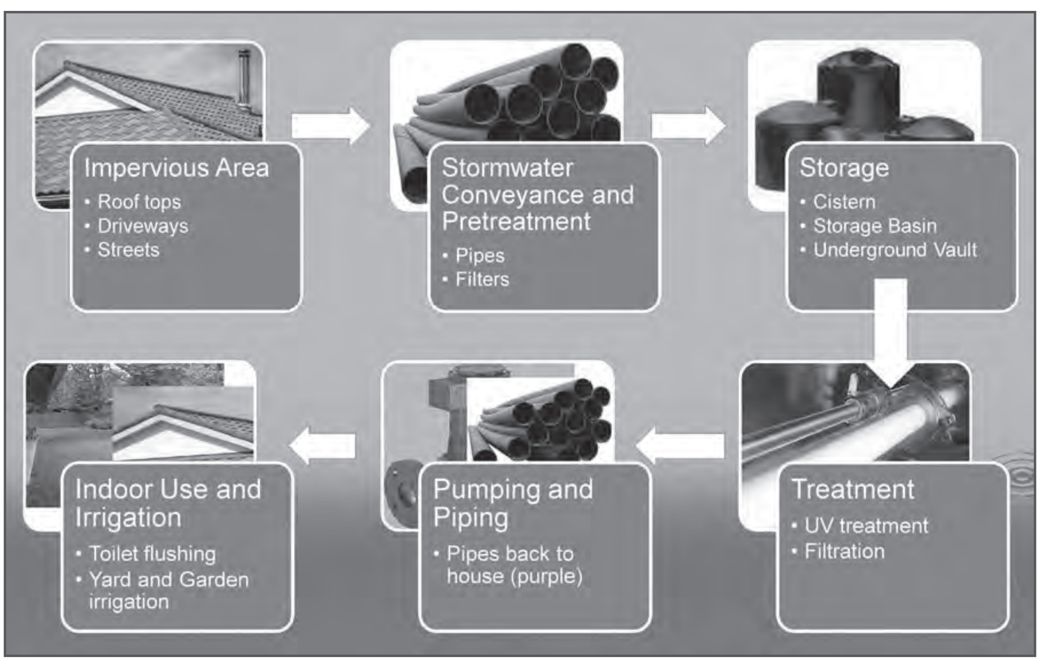
For toilet flushing to be effective, there needs to be a high enough ratio of Toilet Users To Impervious Area (TUTIA). Perhaps in high-rise condominiums, office buildings, institutional buildings, etc. this ratio would be high enough to drain the tank sufficiently fast and in these cases capture and use should be considered.

However, there would be a "competition" for reclaimed water in much of the arid west. Reclaimed water systems tend to be limited in their ability to distribute water in the wetter and colder periods of the year due to low irrigation demands. In addition, in some locations use of reclaimed water for toilet flushing is required in high density projects. One has to question if the capture and use of stormwater that may result in reclaimed water being discharged is an effective strategy. Under this scenario, the captured stormwater would not be reducing potable water demand.

Infrastructure Needs

Finally, there is significant infrastructure (**Figure 7**) that would be required to employ cistern and use on a site basis, including piping, storage, treatment, pumping, and separate piping (purple pipes). Questions about sustainability for these systems need to be explored and assessed.

Figure 7. Typical Components of a Stormwater Harvest and Use system.



Stormwater On Site

CONCLUSIONS

Key Considerations

In Summary:

- Infiltration is often not broadly feasible, effective and/or desirable. While it should be maximized where appropriate, studies are needed to identify suitable areas and also identify areas where infiltration may be feasible but not appropriate.
- Precipitation/runoff patterns in California and much of the West limit the ability of evapotranspiration-based BMPs to achieve retention on site requirements. Evapotranspiration of stormwater should be maximized, but will not be a significant component of retaining stormwater on site in densely developed areas.
- Precipitation/runoff patterns coupled with landscaping and reclaimed water considerations limit the applications where capture and use of runoff can be effective. Generally, only scenarios with high indoor demand and no competing requirements to use reclaimed water can be expected to provide a complete and reliable stormwater solution. Capture and use should be maximized in these cases, but in other cases it should be carefully considered against other options such as biofiltration and discharge to determine which option is most effective in meeting stormwater management goals.
- The overall water balance should be considered when making choices on proper levels of infiltration versus surface runoff.
- There needs to be more technical vetting of "retain on site" and stormwater harvest and use before these approaches are made mandatory.

Unique Factors

Each watershed and site has unique soils, topography, groundwater, water quality, land uses, receiving water sensitivities, wastewater strategies, etc. which should be considered when evaluating retention on site as a requirement or strategy. The authors believe that management approaches that are "one size fit all" are not appropriate and in many cases would likely lead to undesirable results.

Proper Stormwater Management Includes:

- Source controls
- Infiltration where feasible and appropriate
- Maximizing ET losses
- Harvest and use where it makes sense
- Capture and treat with effective (i.e. vegetated) BMPs where it makes sense

We believe that significant progress could be made by improving BMP selection and design guidance for all BMPs to better target unit processes (i.e. physical, biological, chemical treatment processes) to the pollutants and parameters of concern for each watershed.

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Eric Strecker, P.E. is a Principal and Water Resources Practice Leader with Geosyntec Consultants in Portland, Oregon. He has over 25 years of stormwater management experience, including national level applied research efforts for EPA, FHWA, WERF, and NCHRP as well as state and local stormwater management, design and research projects throughout the United States. He is a Principal Investigator for the International BMP Database.

Aaron Poresky, E.I.T. has more than four years of experience in water resources and urban stormwater management. At Geosyntec, he has been involved in a variety of projects including structural BMP design and evaluation, water quality planning and impact analysis, hydromodification planning and impact analysis, stormwater policy support, and modeling methodology development. Key project areas have included stormwater retrofit planning and design for a variety of municipal and private clients, modeling methodology development and implementation, new development stormwater planning, and regulatory analysis. Mr. Poresky has been an invited speaker on the topics of modeling, BMP design, and stormwater policy.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

TENTATIVE
ORDER NO. R9-2013-0001
NPDES NO. CAS0109266

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT AND WASTE DISCHARGE REQUIREMENTS FOR DISCHARGES FROM THE MUNICIPAL SEPARATE STORM SEWER SYSTEMS (MS4s) DRAINING THE WATERSHEDS WITHIN THE SAN DIEGO REGION

The San Diego County Copermittees in Table 1a are subject to waste discharge requirements set forth in this Order.

Table 1a. San Diego County Copermittees

City of Carlsbad	City of Oceanside
City of Chula Vista	City of Poway
City of Coronado	City of San Diego
City of Del Mar	City of San Marcos
City of El Cajon	City of Santee
City of Encinitas	City of Solana Beach
City of Escondido	City of Vista
City of Imperial Beach	County of San Diego
City of La Mesa	San Diego County Regional Airport Authority
City of Lemon Grove	San Diego Unified Port District
City of National City	

After the San Diego Water Board receives and considers the Orange County Copermittees' Report of Waste Discharge and makes any necessary changes to the Order, the Orange County Copermittees in Table 1b will become subject to waste discharge requirements set forth in this Order after expiration of Order No. R9-2009-0002, NPDES No. CAS0108740 on or after December 16, 2014.

Table 1b. Orange County Copermittees

City of Aliso Viejo	City of Rancho Santa Margarita
City of Dana Point	City of San Clemente
City of Laguna Beach	City of San Juan Capistrano
City of Laguna Hills	City of Laguna Woods
City of Laguna Niguel	County of Orange
City of Lake Forest	Orange County Flood Control District
City of Mission Viejo	

After the San Diego Water Board receives and considers the Riverside County Copermittees' Report of Waste Discharge and makes any necessary changes to this Order, the Riverside County Copermittees in Table 1c will become subject to waste discharge requirements set forth in this Order after expiration of Order No. R9-2010-0016, NPDES No. CAS0108766 on or after November 10, 2015.

Table 1c. Riverside County Copermittees

City of Murrieta	County of Riverside
City of Temecula	Riverside County Flood Control and Water Conservation District
City of Wildomar	

The Orange County Copermittees and Riverside County Copermittees may become subject to the requirements of this Order at a date earlier than the expiration date of their current Orders subject to the conditions described in Provision F.6 of this Order if the Copermittees in the respective county receive a notification of coverage from the San Diego Water Board.

The term Copermittee in this Order refers to any San Diego County, Orange County, or Riverside County Copermittee covered under this Order, unless specified otherwise.

This Order provides permit coverage for the Copermittee discharges described in Table 2.

Table 2. Discharge Locations and Receiving Waters

Discharge Points	Locations throughout San Diego Region
Discharge Description	Municipal Separate Storm Sewer System (MS4) Discharges
Receiving Waters	Inland Surface Waters, Enclosed Bays and Estuaries, and Coastal Ocean Waters of the San Diego Region

Table 3. Administrative Information

This Order was adopted by the San Diego Water Board on:	**Month Day, 2013**
This Order will become effective on:	**Month Day, 2013**
This Order will expire on:	**Month Day, 2018**
The Copermittees must file a Report of Waste Discharge in accordance with Title 23, California Code of Regulations, as application for issuance of new waste discharge requirements no later than 180 days in advance of the Order expiration date.	

I, David W. Gibson, Executive Officer, do hereby certify that this Order with all attachments is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Diego Region, on Month Day, 2013.

TENTATIVE

David W. Gibson
Executive Officer

TABLE OF CONTENTS

II. PROVISIONS (Cont'd)

ATTACHMENTS

I. FINDINGS

The California Regional Water Quality Control Board, San Diego Region (San Diego Water Board), finds that:

JURISDICTION

1. **MS4 Ownership or Operation.** Each of the Copermittees owns or operates an MS4, through which it discharges storm water and non-storm water into waters of the U.S. within the San Diego Region. These MS4s fall into one or more of the following categories: (1) a medium or large MS4 that services a population of greater than 100,000 or 250,000 respectively; or (2) a small MS4 that is "interrelated" to a medium or large MS4; or (3) an MS4 which contributes to a violation of a water quality standard; or (4) an MS4 which is a significant contributor of pollutants to waters of the U.S.

2. **Legal and Regulatory Authority.** This Order is issued pursuant to section 402 of the federal Clean Water Act (CWA) and implementing regulations (Code of Federal Regulations [CFR] Title 40, Part 122 [40 CFR 122]) adopted by the United States Environmental Protection Agency (USEPA), and chapter 5.5, division 7 of the California Water Code (CWC) (commencing with section 13370). This Order serves as an NPDES permit for discharges from MS4s to surface waters. This Order also serves as waste discharge requirements (WDRs) pursuant to article 4, chapter 4, division 7 of the CWC (commencing with section 13260).

   The federal regulations make it clear that the Copermittees need only comply with permit conditions relating to discharges from the MS4s for which they are operators (40 CFR 122.26(a)(3)(vi)). This Order does not require the Copermittees to manage storm water outside of their jurisdictional boundaries, but rather to work collectively to improve storm water management within watersheds.

Deleted: The San Diego Water Board has the legal authority to issue a regional MS4 permit pursuant to its authority under CWA section 402(p)(3)(B) and 40 CFR 122.26(a)(1)(v). The USEPA also made it clear that the permitting authority, in this case the San Diego Water Board, has the flexibility to establish system- or region-wide permits (55 Federal Register [FR] 47990, 48039-48042). The regional nature of this Order will ensure consistency of regulation within watersheds and is expected to result in overall cost savings for the Copermittees and San Diego Water Board.¶

3. **CWA NPDES Permit Conditions.** Pursuant to CWA section 402(p)(3)(B), NPDES permits for storm water discharges from MS4s must include requirements to effectively prohibit non-storm water discharges into MS4s, and require controls to reduce the discharge of pollutants in storm water to the maximum extent practicable (MEP), and to require other provisions as the San Diego Water Board determines are appropriate to control such pollutants. This Order prescribes conditions to assure compliance with the CWA requirements for owners and operators of MS4s to effectively prohibit non-storm water discharges into the MS4s, and require controls to reduce the discharge of pollutants in storm water from the MS4s to the MEP.

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4. **CWA and CWC Monitoring Requirements.** CWA section 308(a) and 40 CFR 122.41(h),(j)-(l) and 122.48 require that NPDES permits must specify monitoring and reporting requirements. Federal regulations applicable to large and medium MS4s

also specify additional monitoring and reporting requirements in 40 CFR 122.26(d)(1)(iv)(D), 122.26(d)(1)(v)(B), 122.26(d)(2)(i)(F), 122.26(d)(2)(iii)(D), 122.26(d)(2)(iv)(B)(2) and 122.42(c). CWC section 13383 authorizes the San Diego Water Board to establish monitoring, inspection, entry, reporting and recordkeeping requirements. This Order establishes monitoring and reporting requirements to implement federal and State requirements.

5. **Total Maximum Daily Loads.** CWA section 303(d)(1)(A) requires that "[e]ach state shall identify those waters within its boundaries for which the effluent limitations…are not stringent enough to implement any water quality standard applicable to such waters." The CWA also requires states to establish a priority ranking of impaired water bodies known as Water Quality Limited Segments and to establish Total Maximum Daily Loads (TMDLs) for such waters. This priority list of impaired water bodies is called the Clean Water Act Section 303(d) List of Water Quality Limited Segments, commonly referred to as the 303(d) List. The CWA requires the 303(d) List to be updated every two years.

   TMDLs are numerical calculations of the maximum amount of a pollutant that a water body can assimilate and still meet water quality standards. A TMDL is the sum of the allowable loads of a single pollutant from all contributing point sources (waste load allocations or WLAs) and non-point sources (load allocations or LAs), background contribution, plus a margin of safety. Discharges from MS4s are point source discharges. The federal regulations (40 CFR 122.44(d)(1)(vii)(B)) require that NPDES permits to incorporate water quality based effluent limitations (WQBELs) developed to protect a narrative water quality criterion, a numeric water quality criterion, or both, consistent with the assumptions and requirements of any available WLA for the discharge. Requirements of this Order implement the TMDLs adopted by the San Diego Water Board and approved by USEPA.

6. **Non-Storm Water Discharges.** Pursuant to CWA section 402(p)(3)(B)(ii), this Order requires each Copermittee to effectively prohibit discharges of non-storm water into its MS4. Nevertheless, non-storm water discharges into and from the MS4s continue to be reported to the San Diego Water Board by the Copermittees and other persons. Monitoring conducted by the Copermittees, as well as the 303(d) List, have identified dry weather, non-storm water discharges from the MS4s as a source of pollutants causing or contributing to receiving water quality impairments in the San Diego Region. The federal regulations (40 CFR 122.26(d)(2)(iv)(B)(1)) require the Copermittees to have a program to prevent illicit discharges to the MS4. The federal regulations, however, allow for specific categories of non-storm water discharges to be addressed as illicit discharges only where such discharges are identified as sources of pollutants to waters of the U.S.

7. **In-Stream Treatment Systems.** Pursuant to federal regulations (40 CFR 131.10(a)), in no case shall a state adopt waste transport or waste assimilation as a designated use for any waters of the U.S. Authorizing the construction of a runoff treatment facility within a water of the U.S., or using the water body itself as a treatment system or for conveyance to a treatment system, would be tantamount to

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accepting waste assimilation as an appropriate use for that water body. Runoff treatment must occur prior to the discharge of runoff into receiving waters. Treatment control best management practices (BMPs) must not be constructed in waters of the U.S. Construction, operation, and maintenance of a pollution control facility in a water body can negatively impact the physical, chemical, and biological integrity, as well as the beneficial uses, of the water body.

DISCHARGE CHARACTERISTICS AND RUNOFF MANAGEMENT

8. **Point Source Discharges of Pollutants.** Discharges from the MS4s may contain waste, as defined in the CWC, and pollutants that adversely affect the quality of the waters of the state. A discharge from an MS4 is a "discharge of pollutants from a point source" into waters of the U.S. as defined in the CWA. Storm water and non-storm water discharges from the MS4s may contain pollutants that cause or threaten to cause a violation of surface water quality standards, as outlined in the Water Quality Control Plan for the San Diego Basin (Basin Plan). Storm water and non-storm water discharges from the MS4s are subject to the conditions and requirements established in the Basin Plan for point source discharges.

9. **Potential Beneficial Use Impairment.** The discharge of pollutants and/or increased flows from MS4s may cause or threaten to cause the concentration of pollutants to exceed applicable receiving water quality objectives and impair or threaten to impair designated beneficial uses resulting in a condition of pollution, contamination, or nuisance.

10. **Pollutants Generated by Land Development.** Land development has created and continues to create new sources of non-storm water discharges and pollutants in storm water discharges as human population density increases. This brings higher levels of car emissions, car maintenance wastes, municipal sewage, pesticides, household hazardous wastes, pet wastes, and trash. Pollutants from these sources are dumped or washed off the surface by non-storm water or storm water flows into and from the MS4s. When development converts natural vegetated pervious ground cover to impervious surfaces such as paved highways, streets, rooftops, and parking lots, the natural absorption and infiltration abilities of the land are lost. Therefore, runoff leaving a developed area without BMPs will contain greater pollutant loads and have significantly greater runoff volume, velocity, and peak flow rate than pre-development runoff from the same area.

11. **Runoff Discharges to Receiving Waters.** The MS4s discharge runoff into lakes, drinking water reservoirs, rivers, streams, creeks, bays, estuaries, coastal lagoons, the Pacific Ocean, and tributaries thereto within the eleven hydrologic units comprising the San Diego Region. Historic and current development makes use of natural drainage patterns and features as conveyances for runoff. Numerous receiving water bodies and water body segments have been designated as impaired by the San Diego Water Board pursuant to CWA section 303(d).

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Deleted: Rivers, streams and creeks in developed areas used in this manner are part of the Copermittees' MS4s regardless of whether they are natural, anthropogenic, or partially modified features. In these cases, the rivers, streams and creeks in the developed areas of the Copermittees' jurisdictions are both an MS4 and receiving water.

12. **Pollutants in Runoff.** The most common pollutants in runoff discharged from the MS4s include total suspended solids, sediment, pathogens (e.g., bacteria, viruses, protozoa), heavy metals (e.g., cadmium, copper, lead, and zinc), petroleum products and polynuclear aromatic hydrocarbons, synthetic organics (e.g., pesticides, herbicides, and PCBs), nutrients (e.g., nitrogen and phosphorus), oxygen-demanding substances (e.g., decaying vegetation, animal waste), detergents, and trash. As operators of the MS4s, the Copermittees cannot passively receive and discharge pollutants from third parties. These discharges may cause or contribute to a condition of pollution or a violation of water quality standards.

13. **Human Health and Aquatic Life Impairment.** Pollutants in runoff discharged from the MS4s can threaten and adversely affect human health and aquatic organisms. Adverse responses of organisms to chemicals or physical agents in runoff range from physiological responses such as impaired reproduction or growth anomalies to mortality. Increased volume, velocity, rate, and duration of storm water runoff greatly accelerate the erosion of downstream natural channels. This alters stream channels and habitats and can adversely affect aquatic and terrestrial organisms.

14. **Water Quality Effects.** The Copermittees' water quality monitoring data submitted to date documents persistent exceedances of Basin Plan water quality objectives for runoff-related pollutants at various watershed monitoring stations. Persistent toxicity has also been observed at several watershed monitoring stations. In addition, bioassessment data indicate that the majority of the monitored receiving waters have Poor to Very Poor Index of Biological Integrity (IBI) ratings. These findings indicate that runoff discharges are causing or contributing to water quality impairments, and are a leading cause of such impairments in the San Diego Region. Non-storm water discharges from the MS4s have been shown to contribute significant levels of pollutants and flow in arid, developed Southern California watersheds, and contribute significantly to exceedances of applicable receiving water quality objectives.

15. **Non-Storm Water and Storm Water Discharges.** The discharge of pollutants from the MS4 is subject to the MEP standard notwithstanding whether the pollutants are transported by stormwater or non-stormwater. Pursuant to CWA 402(p)(3)(B)(ii), non-storm water discharges into the MS4s, namely identified illicit discharges and pollutants from unlawful dumping, must be effectively prohibited.

16. **Best Management Practices.** Waste and pollutants which are deposited and accumulate in MS4 drainage structures may be discharged from these structures to waters of the U.S. unless they are removed. These discharges may cause or contribute to, or threaten to cause or contribute to, a condition of pollution in receiving waters. For this reason, pollutants in storm water discharges from the MS4s can be and must be effectively reduced in runoff by the application of a combination of pollution prevention, source control, and treatment control BMPs. Pollution prevention is the reduction or elimination of pollutant generation at its source and is the best "first line of defense". Source control BMPs (both structural and non-structural) minimize the contact between pollutants and runoff, therefore

Deleted: By providing free and open access to an MS4 that conveys discharges to waters of the U.S., the operator essentially accepts responsibility for discharges into the MS4 that it does not prohibit or otherwise control.

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Deleted: Non-storm water discharges from the MS4s are not considered storm water discharges and therefore are not subject to the MEP standard of CWA section 402(p)(3)(B)(iii), which is explicitly for "Municipal … *Stormwater Discharges* (emphasis added)" from the MS4s.

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keeping pollutants onsite and out of receiving waters. Treatment control BMPs remove pollutants that have been mobilized by storm water or non-storm water flows.

17. **BMP Implementation.** Runoff needs to be addressed during the three major phases of development (planning, construction, and use) in order to reduce the discharge of storm water pollutants to the MEP, effectively prohibit non-storm water discharges, and protect receiving waters. Development which is not guided by water quality planning policies and principles can result in increased pollutant load discharges, flow rates, and flow durations which can negatively affect receiving water beneficial uses. Construction sites without adequate BMP implementation result in sediment runoff rates which greatly exceed natural erosion rates of undisturbed lands, causing siltation and impairment of receiving waters. Existing development can generate substantial pollutant loads which are discharged in runoff to receiving waters. Retrofitting areas of existing development with storm water pollutant control and hydromodification management BMPs may, in many cases be necessary to address storm water discharges from existing development that may cause or contribute to a condition of pollution or a violation of water quality standards.

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18. **Long Term Planning and Implementation.** Federal regulations require municipal storm water permits to expire 5 years from adoption, after which the permit must be renewed and reissued. The San Diego Water Board recognizes that the degradation of water quality and impacts to beneficial uses of the waters in the San Diego Region occurred over several decades. The San Diego Water Board further recognizes that a decade or more may be necessary to realize demonstrable improvement to the quality of waters in the Region. This Order includes a long term planning and implementation approach that will require more than a single permit term to complete.

WATER QUALITY STANDARDS

19. **Basin Plan.** The San Diego Water Board adopted the Water Quality Control Plan for the San Diego Basin (Basin Plan) on September 8, 1994 that designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for receiving waters addressed through the plan. The Basin Plan was subsequently approved by the State Water Resources Control Board (State Water Board) on December 13, 1994. Subsequent revisions to the Basin Plan have also been adopted by the San Diego Water Board and approved by the State Water Board. Requirements of this Order implement the Basin Plan.

    The Basin Plan identifies the following existing and potential beneficial uses for inland surface waters in the San Diego Region: Municipal and Domestic Supply (MUN), Agricultural Supply (AGR), Industrial Process Supply (PROC), Industrial

Service Supply (IND), Ground Water Recharge (GWR), Contact Water Recreation (REC1), Non-contact Water Recreation (REC2), Warm Freshwater Habitat (WARM), Cold Freshwater Habitat (COLD), Wildlife Habitat (WILD), Rare, Threatened, or Endangered Species (RARE), Freshwater Replenishment (FRSH), Hydropower Generation (POW), and Preservation of Biological Habitats of Special Significance (BIOL). The following additional existing and potential beneficial uses are identified for coastal waters of the San Diego Region: Navigation (NAV), Commercial and Sport Fishing (COMM), Estuarine Habitat (EST), Marine Habitat (MAR), Aquaculture (AQUA), Migration of Aquatic Organisms (MIGR), Spawning, Reproduction, and/or Early Development (SPWN), and Shellfish Harvesting (SHELL).

20. **Ocean Plan.** The State Water Board adopted the Water Quality Control Plan for Ocean Waters of California, California Ocean Plan (Ocean Plan) in 1972 and amended it in 1978, 1983, 1988, 1990, 1997, 2000, and 2005. The State Water Board adopted the latest amendment on April 21, 2005 and it became effective on February 14, 2006. The Ocean Plan is applicable, in its entirety, to point source discharges to the ocean. Requirements of this Order implement the Ocean Plan.

    The Ocean Plan identifies the following beneficial uses of ocean waters of the state to be protected: Industrial water supply; water contact and non-contact recreation, including aesthetic enjoyment; navigation; commercial and sport fishing; mariculture; preservation and enhancement of designated Areas of Special Biological Significance; rare and endangered species; marine habitat; fish spawning and shellfish harvesting

21. **Sediment Quality Control Plan**. On September 16, 2008, the State Water Board adopted the Water Quality Control Plan for Enclosed Bays and Estuaries – Part 1 Sediment Quality (Sediment Quality Control Plan). The Sediment Quality Control Plan became effective on August 25, 2009. The Sediment Quality Control Plan establishes: 1) narrative sediment quality objectives for benthic community protection from exposure to contaminants in sediment and to protect human health, and 2) a program of implementation using a multiple lines of evidence approach to interpret the narrative sediment quality objectives. Requirements of this Order implement the Sediment Quality Control Plan.

22. **National Toxics Rule and California Toxics Rule.** USEPA adopted the National Toxics Rule (NTR) on December 22, 1992, and later amended it on May 4, 1995 and November 9, 1999. About forty criteria in the NTR applied in California. On May 18, 2000, USEPA adopted the California Toxics Rule (CTR). The CTR promulgated new toxics criteria for California and, in addition, incorporated the previously adopted NTR criteria that were applicable in the state. The CTR was amended on February 13, 2001. These rules contain water quality criteria for priority pollutants.

23. **Antidegradation Policy.** This Order is in conformance with the federal Antidegradation Policy described in 40 CFR 131.12, and State Water Board Resolution No. 68-16, *Statement of Policy with Respect to Maintaining High Quality*

Waters in California. Federal regulations at 40 CFR 131.12 require that the State water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy in State Water Board Resolution No. 68-16. State Water Board Resolution No. 68-16 incorporates the federal antidegradation policy where the federal policy applies under federal law. State Water Board Resolution No. 68-16 requires that existing quality of waters be maintained unless degradation is justified based on specific findings. The Basin Plan implements, and incorporates by reference, both the State and federal antidegradation policies.

CONSIDERATIONS UNDER FEDERAL AND STATE LAW

24. **Coastal Zone Act Reauthorization Amendments.** Section 6217(g) of the Coastal Zone Act Reauthorization Amendments of 1990 (CZARA) requires coastal states with approved coastal zone management programs to address non-point source pollution impacting or threatening coastal water quality. CZARA addresses five sources of non-point source pollution: agriculture, silviculture, urban, marinas, and hydromodification. This Order addresses the management measures required for the urban category, with the exception of septic systems. The runoff management programs developed pursuant to this Order fulfills the need for coastal cities to develop a runoff non-point source plan identified in the Non-Point Source Program Strategy and Implementation Plan. The San Diego Water Board addresses septic systems through the administration of other programs.

25. **Endangered Species Act.** This Order does not authorize any act that results in the taking of a threatened or endangered species or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code sections 2050 to 2097) or the Federal Endangered Species Act (16 USC sections 1531 to 1544). This Order requires compliance with receiving water limits, and other requirements to protect the beneficial uses of waters of the State. The Copermittees are responsible for meeting all requirements of the applicable Endangered Species Act.

26. **Report of Waste Discharge Process.** The waste discharge requirements set forth in this Order are based upon the Report of Waste Discharge submitted by the San Diego County Copermittees prior to the expiration of Order No. R9-2007-0001 (NPDES No. CAS0109266). The Orange County and Riverside County Copermittees are not immediately covered by the waste discharge requirements in this Order. The San Diego Water Board understands that each municipality is unique. The Order will continue to use the Report of Waste Discharge process prior to initially making Orange County or Riverside County Copermittees subject to the requirements of this Order.

Deleted: although the Counties share watersheds and geographical boundaries

The federal regulations (40 CFR 122.21(d)(2)) and CWC section 13376 impose a duty on the Copermittees to reapply for continued coverage through submittal of a Report of Waste Discharge no later than 180 days prior to expiration of a currently effective permit. This requirement is set forth in the Orange County Copermittees' and Riverside County Copermittees' currently effective permits at Provisions K.2.b and K.2.c, respectively. The Orange County Permit, Order No. R9-2009-0002 (NPDES No. CAS0108740) expires on December 16, 2014 and the Riverside County MS4 Permit, Order No. R9-2010-0016 (NPDES No. CAS0108766) expires on November 10, 2015.

Unless the Orange County or Riverside County Copermittees apply for and receive early coverage under this Order, the Orange County Copermittees' and the Riverside County Copermittees' respective permits will be superseded by this Order upon expiration of their respective permits, subject to any necessary revisions to the requirements of this Order made after the San Diego Water Board considers their respective Reports of Waste Discharge through the public process provided in 40 CFR 124.

27. **Integrated Report and Clean Water Act Section 303(d) List.** The San Diego Water Board and State Water Board submit an Integrated Report to USEPA to comply with the reporting requirements of CWA sections 303(d), 305(b) and 314, which lists the attainment status of water quality standards for water bodies in the San Diego Region. USEPA issued its *Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act* on July 29, 2005, which advocates the use of a five category approach for classifying the attainment status of water quality standards for water bodies in the Integrated Report. Water bodies included in Category 5 in the Integrated Report indicate at least one beneficial use is not being supported or is threatened, and a TMDL is required. Water bodies included in Category 5 in the Integrated Report are placed on the 303(d) List.

    Water bodies with available data and/or information that indicate at least one beneficial use is not being supported or is threatened, but a TMDL is not required, are included in Category 4 in the Integrated Report. Impaired surface water bodies may be included in Category 4 if a TMDL has been adopted and approved (Category 4a); if other pollution control requirements required by a local, state or federal authority are stringent enough to implement applicable water quality standards within a reasonable period of time (Category 4b); or, if the failure to meet an applicable water quality standard is not caused by a pollutant, but caused by other types of pollution (Category 4c).

    Implementation of the requirements of this Order may allow the San Diego Water Board to include surface waters impaired by discharges from the Copermittees' MS4s in Category 4 in the Integrated Report for consideration during the next 303(d) List submittal by the State to USEPA.

28. **Economic Considerations.** The California Supreme Court has ruled that although CWC section 13263 requires the State and Regional Water Boards (collectively Water Boards) to consider factors set forth in CWC section 13241 when issuing an NPDES permit, the Water Board may not consider the factors to justify imposing pollutant restrictions that are less stringent than the applicable federal regulations require. (*City of Burbank v. State Water Resources Control Bd.* (2005) 35 Cal.4th

613, 618, 626-627.) However, when pollutant restrictions in an NPDES permit are more stringent than federal law requires, CWC section 13263 requires that the Water Boards consider the factors described in CWC section 13241 as they apply to those specific restrictions.

As noted in the following finding, the San Diego Water Board finds that the requirements in this permit are more stringent than the minimum federal requirements. Therefore, a CWC section 13241 analysis is required for permit requirements that implement the effective prohibition on the discharge of non-storm water into the MS4 or for controls to reduce the discharge of pollutants in storm water to the MEP, or other provisions that the San Diego Water Board has determined appropriate to control such pollutants, as those requirements are mandated by federal law. The economic analysis is provided in the Fact Sheet.

29. California Environmental Quality Act. The issuance of waste discharge requirements and an NPDES permit for the discharge of runoff from MS4s to waters of the U.S. is exempt from the requirement for preparation of environmental documents under the California Environmental Quality Act (CEQA) (Public Resources Code, Division 13, Chapter 3, section 21000 et seq.) in accordance with CWC section 13389.

STATE WATER BOARD DECISIONS

30. Compliance with Prohibitions and Limitations. The receiving water limitation language specified in this Order is consistent with language recommended by the USEPA and established in State Water Board Order WQ 99-05, *Own Motion Review of the Petition of Environmental Health Coalition to Review Waste Discharge Requirements Order No. 96-03, NPDES Permit No. CAS0108740*, adopted by the State Water Board on June 17, 1999. The receiving water limitation language in this Order requires storm water discharges from MS4s to not cause or contribute to a violation of water quality standards, which is to be achieved through an iterative approach requiring the implementation of improved and better-tailored BMPs over time. Implementation of the iterative approach to comply with receiving water limitations based on applicable water quality standards is necessary to ensure that storm water discharges from the MS4 will not ultimately cause or contribute to violations of water quality standards and will not create conditions of pollution, contamination, or nuisance.

31. Special Conditions for Areas of Special Biological Significance. On March 20, 2012, the State Water Board approved Resolution No. 2012-0012 approving an exception to the Ocean Plan prohibition against discharges to Areas of Special Biological Significance (ASBS) for certain nonpoint source discharges and NPDES permitted municipal storm water discharges. State Water Board Resolution No. 2012-0012 requires monitoring and testing of marine aquatic life and water quality in several ASBS to protect California's coastline during storms when rain water overflows into coastal waters. Specific terms, prohibitions, and special conditions

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Deleted: Notwithstanding the above, the San Diego Water Board has developed an economic analysis of the requirements in this Order.

Deleted: <#>**Unfunded Mandates.** This Order does not constitute an unfunded local government mandate subject to subvention under Article XIIIB, Section (6) of the California Constitution for several reasons, including, but not limited to, the following: ¶
¶
<#>This Order implements federally mandated requirements under CWA section 402 (33 USC section 1342(p)(3)(B)). ¶
¶
<#>The local agency Copermittees' obligations under this Order are similar to, and in many respects less stringent than, the obligations of non-governmental and new dischargers who are issued NPDES permits for storm water and non-storm water discharges. ¶
¶
<#>The local agency Copermittees have the authority to levy service charges, fees, or assessments sufficient to pay for compliance with this Order. ¶
¶
<#>The Copermittees have requested permit coverage in lieu of compliance with the complete prohibition against the discharge of pollutants contained in CWA section 301(a) (33 USC section 1311(a)) and in lieu of numeric restrictions on their MS4 discharges (i.e. effluent limitations). ¶
¶
<#>The local agencies' responsibility for preventing discharges of waste that can create conditions of pollution or nuisance from conveyances that are within their ownership or control under State law predates the enactment of Article XIIIB, Section (6) of the California Constitution. ¶
¶
<#>The provisions of this Order to implement TMDLs are federal mandates. The CWA requires TMDLs to be developed for water bodies that do not meet federal water quality standards (33 USC section 1313(d)). Once the USEPA or a state develops a TMDL, federal law requires that permits must contain water quality based effluent limitations consistent with the assumptions and requirements of any applicable wasteload allocation (40 CFR 122.44(d)(1)(vii)(B)). ¶
¶
See the Fact Sheet for further discussion of unfunded mandates.¶

were adopted to provide special protections for marine aquatic life and natural water quality in ASBS. The City of San Diego's municipal storm water discharges to the San Diego Marine Life Refuge in La Jolla, and the City of Laguna Beach's municipal storm water discharges to the Heisler Park ASBS are subject terms and conditions of State Water Board Resolution No. 2012-0012. The Special Protections contained in Attachment B to Resolution No. 2012-0012, applicable to these discharges, are hereby incorporated into this Order as if fully set forth herein.

ADMINISTRATIVE FINDINGS

32. **Executive Officer Delegation of Authority.** The San Diego Water Board by prior resolution has delegated all matters that may legally be delegated to its Executive Officer to act on its behalf pursuant to CWC section 13223. Therefore, the Executive Officer is authorized to act on the San Diego Water Board's behalf on any matter within this Order unless such delegation is unlawful under CWC section 13223 or this Order explicitly states otherwise.

33. **Standard Provisions.** Standard Provisions, which apply to all NPDES permits in accordance with 40 CFR 122.41, and additional conditions applicable to specified categories of permits in accordance with 40 CFR 122.42, are provided in Attachment B to this Order.

34. **Fact Sheet.** The Fact Sheet for this Order contains background information, regulatory and legal citations, references and additional explanatory information and data in support of the requirements of this Order. The Fact Sheet is hereby incorporated into this Order and constitutes part of the Findings of this Order.

35. **Public Notice.** In accordance with State and federal laws and regulations, the San Diego Water Board notified the Copermittees, and interested agencies and persons of its intent to prescribe waste discharge requirements for the control of discharges into and from the MS4s to waters of the U.S. and has provided them with an opportunity to submit their written comments and recommendations. Details of notification are provided in the Fact Sheet.

36. **Public Hearing.** The San Diego Water Board held a public hearing on Month Day, 2013 and heard and considered all comments pertaining to the terms and conditions of this Order. Details of the public hearing are provided in the Fact Sheet.

37. **Effective Date.** This Order serves as an NPDES permit pursuant to CWA section 401 or amendments thereto, and becomes effective fifty (50) days after the date of its adoption, provided that the Regional Administrator, USEPA, Region IX, does not object to this Order.

38. **Review by the State Water Board.** Any person aggrieved by this action of the San Diego Water Board may petition the State Water Board to review the action in accordance with CWC section 13320 and California Code of Regulations, title 23,

sections 2050, et seq. The State Water Board must receive the petition by 5:00 p.m., 30 days after the San Diego Water Board action, except that if the thirtieth day following the action falls on a Saturday, Sunday or State holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at: http://www.waterboards.ca.gov/public_notices/petitions/water_quality or will be provided upon request.

THEREFORE, IT IS HEREBY ORDERED that the Copermittees, in order to meet the provisions contained in division 7 of the CWC and regulations adopted thereunder, and the provisions of the CWA and regulations adopted thereunder, must each comply with the following:

II. PROVISIONS

A. PROHIBITIONS AND LIMITATIONS

The purpose of this provision is to describe the conditions under which storm water from and non-storm water discharges into the MS4s are effectively prohibited or limited. The goal of the prohibitions and limitations is to protect the water quality and designated beneficial uses of waters of the state from adverse impacts caused or contributed to by MS4 discharges. This goal will be accomplished through the implementation of water quality improvement strategies and runoff management programs that effectively prohibit non-storm water discharges into the Copermittees' MS4s, and reduce pollutants in storm water discharges from the Copermittees' MS4s to the MEP. The process for determining compliance with the Discharge Prohibitions (A.1), Receiving Water Limitations (A.2), and Effluent Limitations (A.3, including effluent limitations derived from the TMDL requirements – Attachment E) is defined in Provision A.4.

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1. Discharge Prohibitions

a. Except as provided for in Provisions A.1.e or A.4, discharges from MS4s in a manner causing, or threatening to cause, a condition of pollution, contamination, or nuisance in receiving waters of the state are prohibited.

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b. Non-storm water discharges into MS4s are to be effectively prohibited, unless such discharges are either authorized by a separate NPDES permit, or the discharge is a category of non-storm water discharges that must be addressed pursuant to Provisions E.2.a.(1)-(5) of this Order.

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c. Discharges from MS4s are subject to all waste discharge prohibitions in the Basin Plan, included in Attachment A to this Order.

d. Storm water discharges from the City of San Diego's MS4 to the San Diego Marine Life Refuge in La Jolla, and the City of Laguna Beach's MS4 to the Heisler Park ASBS are authorized under this Order subject to the Special Protections contained in Attachment B to State Water Board Resolution No. 2012-0012 applicable to these discharges, included in Attachment A to this Order. All other discharges from the Copermittees' MS4s to ASBS are prohibited.

e. For discharges associated with water body pollutant combinations addressed in a TMDL in Attachment E of this Order, the affected Copermittees shall achieve compliance as outlined in Attachment E.

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2. Receiving Water Limitations

a. Discharges from MS4s must not cause or contribute to the violation of water quality standards in any receiving waters, including but not limited to all applicable provisions contained in the list below to the extent that they remain in effect and are operative, unless such discharges are being addressed by the Copermittee(s) through the processes set forth in this Order (Provision A.4 and Attachment E). Where a TMDL has been developed and its terms have been incorporated into this Order (in a manner that is consistent with the waste load allocations set forth in the TMDL), a Permittee shall also be considered in compliance with such TMDL-related requirements provided in this Order, if it is timely and in good faith implementing the MEP-compliant control measures otherwise established by this Order.

(1) The San Diego Water Board's Basin Plan, including beneficial uses, water quality objectives, and implementation plans;

(2) State Water Board plans for water quality control including the following:

(a) Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries (Thermal Plan), and

(b) The Ocean Plan, including beneficial uses, water quality objectives, and implementation plans;

(3) State Water Board policies for water and sediment quality control including the following:

(a) Water Quality Control Policy for the Enclosed Bays and Estuaries of California,

(b) Sediment Quality Control Plan which includes the following narrative objectives for bays and estuaries:

(i) Pollutants in sediments shall not be present in quantities that, alone or in combination, are toxic to benthic communities, and

(ii) Pollutants shall not be present in sediments at levels that will bioaccumulate in aquatic life to levels that are harmful to human health,

(c) The Statement of Policy with Respect to Maintaining High Quality of Waters in California;[1]

[1] State Water Board Resolution No. 68-16

(4) Priority pollutant criteria promulgated by the USEPA through the following:

(a) National Toxics Rule (NTR)[2] (promulgated on December 22, 1992 and amended on May 4, 1995), and

(b) California Toxics Rule (CTR).[3,4]

b. Discharges from MS4s composed of storm water runoff must not alter natural ocean water quality in an ASBS.

c. For receiving water limitations associated with a water body pollutant combination addressed in a TMDL in Attachment E of this Order, the affected Copermittees shall achieve compliance as outlined in Attachment E.

3. Effluent Limitations

a. Technology Based Effluent Limitations

Pollutants in storm water discharges from MS4s must be reduced to the MEP.[5]

b. Water Quality Based Effluent Limitations

This Order establishes water quality based effluent limitations (WQBELs) consistent with the assumptions and requirements of all available TMDL waste load allocations (WLAs) assigned to discharges from the Copermittees' MS4s. Each Copermittee must comply with applicable WQBELs established for the TMDLs in Attachment E to this Order, pursuant to the applicable TMDL compliance schedules.

4. Compliance with Discharge Prohibitions, Receiving Water Limitations, and Effluent Limitations

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Each Copermittee must achieve compliance with Provisions A.1, A.2, and A.3 of this Order through timely implementation of control measures and other actions as specified in Provisions B and E of this Order, including any modifications. The Water Quality Improvement Plans required under Provision B must be designed and adapted to ultimately achieve compliance with Provisions A.1, A2, and A.3.

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a. Except as provided in Parts 4.c, 4.d, 4.e, or 4.f below, discharges from the MS4

[2] 40 CFR 131.36
[3] 65 Federal Register 31682-31719 (May 18, 2000), adding Section 131.38 to 40 CFR
[4] If a water quality objective and a CTR criterion are in effect for the same priority pollutant, the more stringent of the two applies, unless a previous regulatory action (i.e., TMDL) has specified otherwise.
[5] This does not apply to MS4 discharges which receive subsequent treatment to reduce pollutants in storm water discharges to the MEP prior to entering receiving waters (e.g., low flow diversions to the sanitary sewer). Runoff treatment must occur prior to the discharge of runoff into receiving waters per Finding 7.

for which a Permittee is responsible shall not cause or contribute to an exceedance of any applicable water quality standard.

b. Except as provided in Parts 4.c, 4.d, 4.e, or 4.f below, discharges from the MS4 of storm water, or non-storm water, for which a Permittee is responsible, shall not cause a condition of nuisance.

c. In instances where discharges from the MS4 for which the permittee is responsible (1) causes or contributes to an exceedance of any applicable water quality standard or causes a condition of nuisance in the receiving water; (2) the receiving water is not subject to an approved TMDL that is in effect for the constituent(s) involved; and (3) the constituent(s) associated with the discharge is otherwise not specifically addressed by a provision of this Order (such as specific scheduled actions in a Water Quality Improvement Plan), the Permittee shall comply with the following iterative procedure:

(a) Submit a report to the Regional Water Board that:

(i) Summarizes and evaluates water quality data associated with the pollutant of concern in the context of applicable water quality objectives including the magnitude and frequency of the exceedances.

(ii) Includes a work plan to identify the sources of the constituents of concern (including those not associated with the MS4 such that non-MS4 sources can be pursued).

(iii) Describes the strategy and schedule for implementing best management practices (BMPs) and other controls (including those that are currently being implemented) that will address the Permittee's sources of constituents that are causing or contributing to the exceedances of an applicable water quality standard or causing a condition of nuisance, and are reflective of the severity of the exceedances. The strategy shall demonstrate that the selection of BMPs will address the Permittee's sources of constituents and include a mechanism for tracking BMP implementation. The strategy shall provide for future refinement pending the results of the source identification work plan noted in 4.c.(a)(ii) above.

(iv) Outlines, if necessary, additional monitoring to evaluate improvement in water quality and, if appropriate, special studies that will be undertaken to support future management decisions.

(v) Includes a methodology (ies) that will assess the effectiveness of the BMPs to address the exceedances.

(vi) This report may be submitted in conjunction with the Annual Report unless the Regional Water Board directs an earlier submittal.

Deleted: If exceedance(s) of water quality standards persist in receiving waters notwithstanding implementation of this Order, the Copermittees must comply with the following procedures:

Deleted: <#>For exceedance(s) of a water quality standard in the process of being addressed by the Water Quality Improvement Plan, the Copermittee(s) must implement the Water Quality Improvement Plan as accepted by the San Diego Water Board, and update the Water Quality Improvement Plan, as necessary, pursuant to Provision F.2.c;¶
<#>¶
Upon a determination by either the Copermittees or the San Diego Water Board that discharges from the MS4 are causing or contributing to a new exceedance of an applicable water quality standard not addressed by the Water Quality Improvement Plan, the Copermittees must submit the following updates to the Water Quality Improvement Plan pursuant to Provision F.2.c or as part of the Annual Report required under Provision F.3.b, unless the San Diego Water Board directs an earlier submittal

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¶
Section Break (Continuous)
Water quality improvement strategies (i.e. BMPs, retrofitting projects, stream and/or habitat rehabilitation or restoration projects, adjustments to jurisdictional runoff management programs, etc.) that will be implemented to reduce or eliminate any pollutants or conditions that are causing or contributing to the exceedance of water quality standards,¶
¶
Updates to the schedule for implementation of the existing and additional water quality improvement strategies, and¶
¶
Updates to the monitoring and assessment program to track progress toward achieving compliance with Provisions A.1.a, A.1.c and A.2.a of this Order;

(b) Submit any modifications to the report required by the Regional Water Board within 60 days of notification. The report is deemed approved within 60 days of its submission if no response is received from the Regional Water Board.

(c) Implement the actions specified in the report in accordance with the acceptance or approval, including the implementation schedule and any modifications to this Order.

(d) As long as the Permittee has complied with the procedure set forth above and is implementing the actions, the Permittee does not have to repeat the same procedure for continuing or recurring exceedances of the same receiving water limitations unless directed by the Regional Water Board to develop additional BMPs.

(e) The information developed pursuant to A.4.c must be evaluated and incorporated into the Water Quality Improvement Plans and/or the Jurisdictional Runoff Management Plans, as needed.

d. For Receiving Water Limitations associated with waterbody-pollutant combinations addressed in an adopted TMDL that is in effect and that has been incorporated in this Order, a Permittee that is in compliance with Attachment E (Total Maximum Daily Load Provisions) is in compliance with Parts 4.a and 4.b above. For Receiving Water Limitations associated with waterbody-pollutant combinations on the CWA 303(d) list, which are not otherwise addressed by Attachment E or other applicable pollutant-specific provision of this Order, a Permittee that is in compliance with Part 4.c is in compliance with Parts 4.a and 4.b.

e. Alternatively, a Permittee that is in compliance with Provision B (Development and Implementation of Water Quality Improvement Plans) is in compliance with Parts 4.a and 4.b above.

f. If a Permittee is found to have discharges from the MS4 for which it is responsible that causes an exceedance of an applicable water quality standard in the receiving water or causes a condition of nuisance in the receiving water, the Permittee shall be in compliance with Parts 4.a and 4.b above, if the Permittee is in compliance with Parts 4.c, 4.d, or 4.e, or requirements otherwise covered by a provision of this Order specifically addressing the constituent in question, as applicable.

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The San Diego Water Board may require the incorporation of additional modifications to the Water Quality Improvement Plan required under Provision B. The applicable Copermittees must submit any modifications to the update to the Water Quality Improvement Plan within 90 days of notification that additional modifications are required by the San Diego Water Board, or as otherwise directed

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<#>Within 90 days of the San Diego Water Board determination that the update to the Water Quality Improvement Plan meets the requirements of this Order, the applicable Copermittees must revise the jurisdictional runoff management program documents to incorporate the updated water quality improvement strategies that have been and will be implemented, the implementation schedule, and any additional monitoring required; and¶
¶
<#>Each Copermittee must implement the updated Water Quality Improvement Plan.¶

Deleted: The procedure set forth above to achieve compliance with Provisions A.1.a, A.1.c and A.2.a of this Order do not have to be repeated for continuing or recurring exceedances of the same water quality standard(s) following implementation of scheduled actions unless directed to do otherwise by the San Diego Water Board.

Deleted: Nothing in Provisions A.4.a and A.4.b prevents the San Diego Water Board from enforcing any provision of this Order while the applicable Copermittees prepare and implement the above update to the Water Quality Improvement Plan and jurisdictional runoff management programs.

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B. WATER QUALITY IMPROVEMENT PLANS[6]

The purpose of this provision is to develop Water Quality Improvement Plans (WQIPs) that guide the Copermittees' jurisdictional runoff management programs towards achieving the outcome of improved water quality in MS4 discharges and receiving waters. The goal of the Water Quality Improvement Plans is to address the impacts of MS4 discharges so that such discharges do not impair the water quality and designated beneficial uses of waters of the state. Therefore, implementation of the WQIPs also provides the basis for complying with Provisions II.A.1, II.A.2, and II.A.3, as described in Provision II.A.4. This goal will be accomplished through an adaptive planning and management process that identifies the highest priority water quality conditions within a watershed and implements strategies through the jurisdictional runoff management programs to achieve improvements in the quality of discharges from the MS4s and receiving waters. As such, the requirements outlined in Provision E may be modified for consistency with the WQIP priorities for the applicable Watershed Management Area, if appropriate justification is provided.

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1. Watershed Management Areas

The Copermittees must develop a Water Quality Improvement Plan for each of the Watershed Management Areas in Table B-1. A total of ten Water Quality Improvement Plans must be developed for the San Diego Region.

Table B-1. Watershed Management Areas

Hydrologic Unit(s)	Watershed Management Area	Major Surface Water Bodies	Responsible Copermittees
San Juan (901.00)	South Orange County	- Aliso Creek - San Juan Creek - San Mateo Creek - Pacific Ocean - Heisler Park ASBS	- City of Aliso Viejo[1] - City of Dana Point[1] - City of Laguna Beach[1] - City of Laguna Hills[1] - City of Laguna Niguel[1] - City of Laguna Woods[1] - City of Lake Forest[1] - City of Mission Viejo[1] - City of Rancho Santa Margarita[1] - City of San Clemente[1] - City of San Juan Capistrano[1] - County of Orange[1] - Orange County Flood Control District[1]
Santa Margarita (902.00)	Santa Margarita River	- Murrieta Creek - Temecula Creek - Santa Margarita River - Santa Margarita Lagoon - Pacific Ocean	- City of Murrieta[2] - City of Temecula[2] - City of Wildomar[2] - County of Riverside[2] - County of San Diego[3] - Riverside County Flood Control and Water Conservation District[2]

[6] Once developed and approved, the Water Quality Improvement Plan and corresponding Jurisdictional Runoff Management Plan will functionally replace the Load Reduction Plans.

Table B-1. Watershed Management Areas

Hydrologic Unit(s)	Watershed Management Area	Major Surface Water Bodies	Responsible Copermittees
San Luis Rey (903.00)	San Luis Rey River	- San Luis Rey River - San Luis Rey Estuary - Pacific Ocean	- City of Oceanside - City of Vista - County of San Diego
Carlsbad (904.00)	Carlsbad	- Loma Alta Slough - Buena Vista Lagoon - Agua Hedionda Lagoon - Batiquitos Lagoon - San Elijo Lagoon - Pacific Ocean	- City of Carlsbad - City of Encinitas - City of Escondido - City of Oceanside - City of San Marcos - City of Solana Beach - City of Vista - County of San Diego
San Dieguito (905.00)	San Dieguito River	- San Dieguito River - San Dieguito Lagoon - Pacific Ocean	- City of Del Mar - City of Escondido - City of Poway - City of San Diego - City of Solana Beach - County of San Diego
Penasquitos (906.00)	Penasquitos	- Los Penasquitos Lagoon - Pacific Ocean	- City of Del Mar - City of Poway - City of San Diego - County of San Diego
	Mission Bay	- Mission Bay - Pacific Ocean - San Diego Marine Life Refuge ASBS	- City of San Diego
San Diego (907.00)	San Diego River	- San Diego River - Pacific Ocean	- City of El Cajon - City of La Mesa - City of San Diego - City of Santee - County of San Diego
Pueblo San Diego (908.00) Sweetwater (909.00) Otay (910.00)	San Diego Bay	- Sweetwater River - Otay River - San Diego Bay - Pacific Ocean	- City of Chula Vista - City of Coronado - City of Imperial Beach - City of La Mesa - City of Lemon Grove - City of National City - City of San Diego - County of San Diego - San Diego County Regional Airport Authority - San Diego Unified Port District
Tijuana (911.00)	Tijuana River	- Tijuana River - Tijuana Estuary - Pacific Ocean	- City of Imperial Beach - City of San Diego - County of San Diego

Notes:
1. The Orange County Copermittees will be covered under this Order after expiration of Order No. R9-2009-0002, or earlier if the Orange County Copermittees meet the conditions in Provision F.6.
2. The Riverside County Copermittees will be covered under this Order after expiration of Order No. R9-2010-0016, or earlier if the Riverside County Copermittees meet the conditions in Provision F.6.
3. The County of San Diego is required to implement the requirements of Provision B for its jurisdiction within the Santa Margarita River Watershed Management Area until the Riverside County Copermittees have been notified of coverage under this Order.

2. Priority Water Quality Conditions

The Copermittees must identify the water quality priorities within each Watershed Management Area that will be addressed by the Water Quality Improvement Plan. Where appropriate, Watershed Management Areas may be separated into subwatersheds to focus water quality prioritization and jurisdictional runoff management program implementation efforts by receiving water.

a. ASSESSMENT OF RECEIVING WATER CONDITIONS

The Copermittees must consider the following, at a minimum, to identify water quality priorities based on impacts of MS4 discharges on receiving water beneficial uses:

(1) Receiving waters listed as impaired on the CWA Section 303(d) List of Water Quality Limited Segments (303(d) List);

(2) TMDLs adopted and under development by the San Diego Water Board;

(3) Receiving waters recognized as sensitive or highly valued by the Copermittees, including estuaries designated under the National Estuary Program under CWA section 320, wetlands defined by the State or U.S. Fish and Wildlife Service's National Wetlands Inventory as wetlands, and receiving waters identified as ASBS subject to the provisions of Attachment B to State Water Board Resolution No. 2012-0012 (Attachment A);

(4) The receiving water limitations of Provision A.2;

(5) Known historical versus current physical, chemical, and biological water quality conditions;

(6) Available, relevant, and appropriately collected and analyzed physical, chemical, and biological receiving water monitoring data, including, but not limited to, data describing:

(a) Chemical constituents,

(b) Water quality parameters (i.e. pH, temperature, conductivity, etc.),

(c) Toxicity Identification Evaluations for both receiving water column and sediment,

(d) Trash impacts,

(e) Bioassessments, and

(f) Physical habitat;

(7) Available evidence of erosional impacts in receiving waters due to accelerated flows (i.e. hydromodification);

(8) Available evidence of adverse impacts to the chemical, physical, and biological integrity of receiving waters; and

(9) The potential improvements in the overall condition of the Watershed Management Area that can be achieved.

b. ASSESSMENT OF IMPACTS FROM MS4 DISCHARGES

The Copermittees must consider the following, at a minimum, to identify the potential impacts to receiving waters that may be caused or contributed to by discharges from the Copermittees' MS4s:

(1) The discharge prohibitions of Provision A.1 and effluent limitations of Provision A.3; and

(2) Available, relevant, and appropriately collected and analyzed storm water and non-storm water monitoring data from the Copermittees' MS4 outfalls;

(3) Locations of each Copermittee's MS4 outfalls that discharge to receiving waters;

(4) Locations of MS4 outfalls that are known to persistently discharge non-storm water to receiving waters likely causing or contributing to impacts on receiving water beneficial uses;

(5) Locations of MS4 outfalls that are known to discharge pollutants in storm water causing or contributing to impacts on receiving water beneficial uses; and

(6) The potential improvements in the quality of discharges from the MS4 that can be achieved.

c. IDENTIFICATION OF PRIORITY WATER QUALITY CONDITIONS

(1) The Copermittees must use the information gathered for Provisions B.2.a and B.2.b to develop a list of priority water quality conditions as pollutants, stressors and/or receiving water conditions that are the highest threat to receiving water quality or that most adversely affect the physical, chemical, and biological integrity of receiving waters. The list must include the following information for each priority water quality condition:

(a) The beneficial use(s) associated with the priority water quality condition;

(b) The geographic extent of the priority water quality condition within the Watershed Management Area, if known;

(c) The temporal extent of the priority water quality condition (e.g., dry weather and/or wet weather);

(d) The Copermittees with MS4s discharges that may cause or contribute to the priority water quality condition; and

(e) An assessment of the adequacy of and data gaps in the monitoring data to characterize the conditions causing or contributing to the priority water quality condition, including a consideration of spatial and temporal variation.

(2) The Copermittees must identify the highest priority water quality conditions to be addressed by the Water Quality Improvement Plan, and provide a rationale for selecting a subset of the water quality conditions identified pursuant to Provision B.2.c.(1) as the highest priorities.

d. IDENTIFICATION OF MS4 SOURCES OF POLLUTANTS AND/OR STRESSORS

The Copermittees must identify and prioritize known and suspected sources of storm water and non-storm water pollutants and/or other stressors associated with MS4 discharges that cause or contribute to the highest priority water quality conditions identified under Provision B.2.c. The identification of known and suspected sources of pollutants and/or stressors that cause or contribute to the highest priority water quality conditions as identified for Provision B.2.c must consider the following:

(1) Pollutant generating facilities, areas, and/or activities within the Watershed Management Area, including:

(a) Each Copermittee's inventory of construction sites, commercial facilities or areas, industrial facilities, municipal facilities, and residential areas,

(b) Publicly owned parks and/or recreational areas,

(c) Open space areas,

(d) All currently operating or closed municipal landfills or other treatment, storage or disposal facilities for municipal waste, and

(e) Areas not within the Copermittees' jurisdictions (e.g., Phase II MS4s, tribal lands, state lands, federal lands) that are known or suspected to be discharging to the Copermittees' MS4s;

(2) Locations of the Copermittees' MS4s, including the following:

(a) All MS4 outfalls that discharge to receiving waters, and

(b) Locations of major structural controls for storm water and non-storm water (e.g., retention basins, detention basins, major infiltration devices, etc.);

(3) Other known and suspected sources of non-storm water or pollutants in storm water discharges to receiving waters within the Watershed Management Area, including the following:

(a) Other MS4 outfalls (e.g., Phase II Municipal and Caltrans),

(b) Other NPDES permitted discharges,

(c) Any other discharges that may be considered point sources (e.g., private outfalls), and

(d) Any other discharges that may be considered non-point sources (e.g., agriculture, wildlife or other natural sources);

(4) Review of available data, including but not limited to:

(a) Findings from the Copermittees' illicit discharge detection and elimination programs,

(b) Findings from the Copermittees' MS4 outfall discharge monitoring,

(c) Findings from the Copermittees' receiving water monitoring,

(d) Findings from the Copermittees' MS4 outfall discharge and receiving water assessments, and

(e) Other available, relevant, and appropriately collected data, information, or studies related to pollutant sources and/or stressors that contribute to the highest priority water quality conditions as identified for Provision B.2.c.

(5) The adequacy of the available data to identify and prioritize sources and/or stressors associated with MS4 discharges that cause or contribute to the highest priority water quality conditions identified under Provision B.2.c.

e. NUMERIC GOALS AND SCHEDULES

The Copermittees must develop and incorporate action levels, interim and final numeric goals[7] and schedules into the Water Quality Improvement Plan. Numeric goals must be used to support Water Quality Improvement Plan implementation and measure progress towards addressing the highest priority water quality conditions identified under Provision B.2.c. Action levels and numeric goals, themselves, are not enforceable compliance standards, effluent limitations, or receiving water limitations. When establishing numeric goals and corresponding schedules, the Copermittees must consider the following:

(1) Final numeric goals must be based on measureable criteria or indicators, to be achieved in the receiving waters and/or MS4 discharges for the highest priority water quality conditions which will be capable of demonstrating the protection of water quality standards in receiving waters;

(2) Interim numeric goals must be based on measureable criteria or indicators capable of demonstrating incremental progress toward achieving the final numeric goals in the receiving waters and/or MS4 discharges; and

(3) Schedules must be adequate for measuring progress toward achieving the interim and final numeric goals required for Provisions B.2.e.(1) and B.2.e.(2). Schedules must incorporate the following:

(a) Interim dates for achieving the interim numeric goals,

(b) Compliance schedules for any applicable TMDLs in Attachment E to this Order,

(c) Compliance schedules for any ASBS subject to the provisions of Attachment B to State Water Board Resolution No. 2012-0012 (see Attachment A),

(d) Achievement of the final numeric goals in the receiving waters and/or MS4 discharges for the highest water quality priorities must be as soon as possible, and

(4) The schedules for achieving the interim and final goals will be evaluated with each annual report [F.3.b.(1)(d)] and/or as a part of the ROWD development [B.5.a] to determine if they should be modified.

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Final dates for achieving the final numeric goals must not initially extend more than 10 years beyond the effective date of this Order, unless a longer period of time is authorized by the San Diego Water Board Executive Officer or the schedule includes an applicable TMDL in Attachment E to this Order.

[7] Interim and final numeric goals may take a variety of forms such as TMDL established WQBELs, action levels, pollutant concentration, load reductions, number of impaired water bodies delisted from the List of Water Quality Impaired Segments, Index of Biotic Integrity (IBI) scores, or other appropriate metrics. Interim and final numeric goals are not necessarily limited to one criterion or indicator, but may include multiple criteria and/or indicators. Except for TMDL established WQBELs, interim and final numeric goals and corresponding schedules may be revised through the adaptive management process under Provision B.5.

3. Water Quality Improvement Strategies and Schedules

The Copermittees must develop specific water quality improvement strategies to address the highest priority water quality conditions identified within a Watershed Management Area. The water quality improvement strategies must address the highest priority water quality conditions by preventing or eliminating non-storm water discharges to and from the MS4, reducing pollutants in storm water discharges from the MS4 to the MEP, and protecting the water quality standards of receiving waters.

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a. WATER QUALITY IMPROVEMENT STRATEGIES

The Copermittees must identify and prioritize water quality improvement strategies based on their likely effectiveness and efficiency, and implement strategies to effectively prohibit non-storm water discharges to the MS4, reduce pollutants in storm water discharges from the MS4 to the MEP, improve the physical, chemical, and biological receiving water conditions, and achieve the interim and final numeric goals in accordance with the schedules required for Provision B.2.e.(3). The following water quality improvement strategies must be included and described in the Water Quality Improvement Plan:

(1) Specific strategies and/or activities that may be implemented by one or more Copermittees within their jurisdictions through the jurisdictional runoff management programs that will address the highest priority water quality conditions within the Watershed Management Area, in accordance with the following requirements:

(a) Strategies and/or activities must, at a minimum, be described for each jurisdictional runoff management program component where strategies to address the highest priority water quality conditions are required under Provision E;

(b) The Water Quality Improvement Plan must describe the circumstances or conditions when and where the strategies or/activities should be or will be implemented, but specific details about how each Copermittee will implement the strategies and/or activities within its jurisdiction are not required; and

(c) Descriptions of strategies and/or activities must include any monitoring, information collection, special studies, and/or data analysis that is necessary to assess the effectiveness of the strategy and/or activity toward addressing the highest priority water quality conditions.

(2) Additional strategies and/or activities that may be implemented within the Watershed Management Area on a jurisdictional, sub-watershed, or watershed scale by one or more Copermittees, not specifically required under Provision E, which are designed to achieve the interim and final numeric goals identified in Provisions B.2.e.(1) and B.2.e.(2);

b. IMPLEMENTATION SCHEDULES

(1) The Copermittees must develop schedules for implementing the water quality improvement strategies identified under Provision B.3.a to achieve the interim and final numeric goals identified under Provision B.2.e.(1) and B.2.e.(2). Schedules must be developed for both the water quality improvement strategies implemented by each Copermittee within its jurisdiction and for strategies that the Copermittees choose to implement on a collaborative basis.

(2) The Copermittees must incorporate the implementation compliance schedules for any ASBS subject to the provisions of Attachment B to State Water Board Resolution No. 2012-0012 (see Attachment A).

4. Water Quality Improvement Monitoring and Assessment Program

a. The Copermittees in each Watershed Management Area must develop and incorporate an integrated monitoring and assessment program into the Water Quality Improvement Plan that assesses: 1) the progress toward achieving the numeric goals and schedules, 2) the progress toward addressing the highest priority water quality conditions for each Watershed Management Area, and 3) each Copermittee's overall efforts to implement the Water Quality Improvement Plan.

b. The monitoring and assessment program must incorporate the monitoring and assessment requirements of Provision D, which may allow the Copermittees to modify the program to be consistent with and focus on the highest priority water quality conditions for each Watershed Management Area.

c. For Watershed Management Areas with applicable TMDLs, the monitoring and assessment program must incorporate the specific monitoring and assessment requirements of Attachment E.

d. For Watershed Management Areas with any ASBS, the water quality monitoring and assessment program must incorporate the monitoring requirements of Attachment B to State Water Board Resolution No. 2012-0012 (see Attachment A).

5. Iterative Approach and Adaptive Management Process

The Copermittees in each Watershed Management Area must implement the iterative approach pursuant to Provision A.4 to adapt the Water Quality Improvement Plan, monitoring and assessment program, and jurisdictional runoff management programs to become more effective toward achieving compliance with Provisions A.1, A.2, and A.3, and must include the following:

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a. RE-EVALUATION OF PRIORITY WATER QUALITY CONDITIONS

The priority water quality conditions, and numeric goals and corresponding schedules, included in the Water Quality Improvement Plan pursuant to Provisions B.2.c and B.2.e, may be re-evaluated by the Copermittees as needed during the term of this Order as part of the Annual Report. Re-evaluation and recommendations for modifications to the priority water quality conditions, and numeric goals and corresponding schedules must be provided in the Report of Waste Discharge, and must consider the following:

(1) Achieving the outcome of improved water quality in MS4 discharges and receiving waters through implementation of the water quality improvement strategies identified in the Water Quality Improvement Plan;

(2) Progress toward achieving interim and final numeric goals in receiving waters and/or MS4 discharges for the highest priority water quality conditions in the Watershed Management Area,

(3) Progress toward achieving outcomes according to established schedules;

(4) New information developed when the requirements of Provisions B.2.a-c have been re-evaluated;

(5) New policies or regulations that may affect identified numeric goals;

(6) Spatial and temporal accuracy of monitoring data collected to inform prioritization of water quality conditions and implementation strategies to address the highest priority water quality conditions;

(7) Availability of new information and data from sources other than the jurisdictional runoff management programs within the Watershed Management Area that informs the effectiveness of the actions implemented by the Copermittees;

(8) San Diego Water Board recommendations; and

(9) Recommendations for modifications solicited through a public participation process.

b. ADAPTATION OF STRATEGIES AND SCHEDULES

The water quality improvement strategies and schedules, included in the Water Quality Improvement Plan pursuant to Provisions B.3, must be re-evaluated and adapted as new information becomes available to result in more effective and efficient measures to achieve the numeric goals established pursuant to Provision B.2.e. Re-evaluation of and modifications to the water quality improvement strategies must be provided in the Annual Report, and must consider the following:

(1) Modifications to the priority water quality conditions, and numeric goals and corresponding schedules based on Provision B.5.a;

(2) Measurable or demonstrable reductions of non-storm water discharges to and from each Copermittee's MS4;

(3) Measurable or demonstrable reductions of pollutants in storm water discharges from each Copermittee's MS4 to the MEP;

(4) New information developed when the requirements of Provisions B.2.b and B.2.d have been re-evaluated;

(5) Efficiency in implementing the Water Quality Improvement Plan;

(6) San Diego Water Board recommendations; and

(7) Recommendations for modifications solicited through a public participation process.

c. ADAPTATION OF MONITORING AND ASSESSMENT PROGRAM

The water quality improvement monitoring and assessment program, included in the Water Quality Improvement Plan pursuant to Provisions B.4, must be re-evaluated and adapted when new information becomes available. Re-evaluation and recommendations for modifications to the monitoring and assessment program, pursuant to the requirements of Provision D, may be provided in the Annual Report, but must be provided in the Report of Waste Discharge.

6. Water Quality Improvement Plan Submittal, Updates, and Implementation

a. The Copermittees must submit the Water Quality Improvement Plans in accordance with the requirements of Provision F.1.

b. The Copermittees must submit proposed updates to the Water Quality Improvement Plan for acceptance by the San Diego Water Board Executive Officer in accordance with the requirements of Provision F.2.c.

c. The Copermittees must commence with implementation of the Water Quality Improvement Plans immediately after acceptance by the San Diego Water Board, in accordance with the schedules, or subsequently updated schedules, within the Water Quality Improvement Plan.

C. ACTION LEVELS

The purpose of this provision is for the Copermittees to incorporate numeric non-stormwater action levels (NALs) and stormwater action levels (SALs) in the Water Quality Improvement Plans (WQIP) and numeric non-stormwater action levels (NALs) in the Illicit Discharge Detection and Elimination (IDDE) Program.

- For the purposes of the WQIPs, the goal of the action levels is to guide the implementation efforts and measure progress towards the protection of the high priority water quality conditions and designated beneficial uses of waters of the state from adverse impacts caused or contributed to by MS4 discharges. This goal will be accomplished through monitoring and assessing the quality of the MS4 discharges during the implementation of the Water Quality Improvement Plans.

- For the purposes of the IDDE program, the goal of the action levels is to assist in the effective prohibition of non-stormwater discharges into the MS4.

Action levels will be developed and incorporated into the WQIP (Provision B) and the IDDE Program (Provision E). Depending upon the goals/objectives for the use of the action levels and the priority receiving water conditions, the constituents and values at which they are set may differ between watersheds. Copermittees may develop Watershed Management Area specific numeric action levels for non-stormwater and stormwater MS4 discharges using an approach approved by the Regional Board or use the default non-stormwater and stormwater action levels prescribed in C.1 and C.2 below.

The Copermittees will submit the action levels as a part of the WQIP and JURMP submittals. The action levels currently established will serve as the interim action levels until revised action levels are completed and approved. Exceedances of the action levels are not subject to enforcement or non-compliance actions under this Order.

1. Default Non-Storm Water Action Levels[8]

The following non-stormwater action levels (NALs) must be incorporated in the WQIPs and IDDE program if the Copermittees have not developed their own NALs for the identified high priority constituents using an approach approved by the Regional Board EO.

a. The following NALs must be incorporated:

(1) Non-Storm Water Discharges from MS4s to Ocean Surf Zone

[8] NALs are not considered by the San Diego Water Board to be enforceable limitations.

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Deleted: The Copermittees must develop and incorporate numeric non-storm water action levels (NALs) into the Water Quality Improvement Plan to: 1) support the development and prioritization of water quality improvement strategies for addressing non-storm water discharges to and from the MS4s, 2) assess the effectiveness of the water quality improvement strategies toward addressing MS4 non-storm water discharges, required pursuant to Provision D.4.b.(1), and 3) support the detection and elimination of non-storm water and illicit discharges to and from the MS4, required pursuant to Provision E.2.

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Table C-1. Non-Storm Water Action Levels for Discharges from MS4s to Ocean Surf Zone

Parameter	Units	AMAL	MDAL	Instantaneous Maximum	Basis
Total Coliform	MPN/100 ml	1,000	-	10,000/1,000[1]	OP
Fecal Coliform	MPN/100 ml	200[2]	-	400	OP
Enterococci	MPN/100 ml	35	-	104[3]	OP

Abbreviations/Acronyms
AMAL – average monthly action level
MDAL – maximum daily action level
OP – Ocean Plan water quality objective
MPN/100 ml – most probable number per 100 milliliters

Notes:
1. Total coliform density NAL is 1,000 MPN/100 ml when the fecal/total coliform ratio exceeds 0.1.
2. Fecal coliform density NAL is 200 MPN per 100 ml during any 30 day period.
3. This value has been set to the Basin Plan water quality objective for saltwater "designated beach areas."

(2) Non-Storm Water Discharges from MS4s to Bays, Harbors, and Lagoons/Estuaries

Table C-2. Non-Storm Water Action Levels for Discharges from MS4s to Bays, Harbors, and Lagoons/Estuaries

Parameter	Units	AMAL	MDAL	Instantaneous Maximum	Basis
Turbidity	NTU	75	-	225	OP
pH	Units	Within limit of 6.0 to 9.0 at all times			OP
Fecal Coliform	MPN/100 ml	200[1]	-	400[2]	BP
Enterococci	MPN/100 ml	35	-	104[3]	BP
Priority Pollutants	ug/L	See Table C-3			

Abbreviations/Acronyms:
AMAL – average monthly action level
MDAL – maximum daily action level
OP – Ocean Plan water quality objective
BP – Basin Plan water quality objective
NTU – Nephelometric Turbidity Units
MPN/100 ml – most probable number per 100 milliliters
ug/L – micrograms per liter

Notes:
1. Based on a minimum of not less than five samples for any 30-day period.
2. The NAL is reached if more than 10 percent of total samples exceed 400 MPN per 100 ml during any 30 day period.
3. This value has been set to the Basin Plan water quality objective for saltwater "designated beach areas" and is not applicable to waterbodies that are not designated with the water contact recreation (REC-1) beneficial use.

Table C-3. Non-Storm Water Action Levels for Priority Pollutants

		Freshwater (CTR)		Saltwater (CTR)	
Parameter	Units	MDAL	AMAL	MDAL	AMAL
Cadmium	ug/L	**	**	16	8
Copper	ug/L	*	*	5.8	2.9
Chromium III	ug/L	**	**	-	-
Chromium VI	ug/L	16	8.1	83	41
Lead	ug/L	*	*	14	2.9
Nickel	ug/L	**	**	14	6.8
Silver	ug/L	*	*	2.2	1.1
Zinc	ug/L	*	*	95	47

Abbreviations/Acronyms:
CTR – California Toxic Rule
ug/L – micrograms per liter
AMAL – average monthly action level
MDAL – maximum daily action level

Notes:
* Action levels developed on a case-by-case basis (see below)

** Action levels developed on a case-by-case basis (see below), but calculated criteria are not to exceed Maximum Contaminant Levels (MCLs) under the California Code of Regulations, Title 22, Division 4, Chapter 15, Article 4, Section 64431

The Cadmium, Copper, Chromium (III), Lead, Nickel, Silver and Zinc NALs for MS4 discharges to freshwater receiving waters will be developed on a case-by-case basis because the freshwater criteria are based on site-specific water quality data (receiving water hardness). For these priority pollutants, the following equations (40 CFR 131.38.b.2) will be required:

Cadmium (Total Recoverable)	= exp(0.7852[ln(hardness)] - 2.715)
Chromium III (Total Recoverable)	= exp(0.8190[ln(hardness)] + 0.6848)
Copper (Total Recoverable)	= exp(0.8545[ln(hardness)] - 1.702)
Lead (Total Recoverable)	= exp(1.273[ln(hardness)] - 4.705)
Nickel (Total Recoverable)	= exp(.8460[ln(hardness)] + 0.0584)
Silver (Total Recoverable)	= exp(1.72[ln(hardness)] - 6.52)
Zinc (Total Recoverable)	= exp(0.8473[ln(hardness)] + 0.884)

(3) Non-Storm Water Discharges from MS4s to Inland Surface Waters

Table C-4. Non-Storm Water Action Levels for Discharges from MS4s to Inland Surface Waters

Parameter	Units	AMAL	MDAL	Instantaneous Maximum	Basis
Dissolved Oxygen	mg/L	Not less than 5.0 in WARM waters and not less than 6.0 in COLD waters			BP
Turbidity	NTU	-	20	See MDAL	BP
pH	Units	Within limit of 6.5 to 8.5 at all times			BP
Fecal Coliform	MPN/100 ml	200[1]	-	400[2]	BP
Enterococci	MPN/100 ml	33	-	61[3]	BP
Total Nitrogen	mg/L	-	1.0	See MDAL	BP
Total Phosphorus	mg/L	-	0.1	See MDAL	BP
MBAS	mg/L	-	0.5	See MDAL	BP
Iron	mg/L	-	0.3	See MDAL	BP
Manganese	mg/L	-	0.05	See MDAL	BP
Priority Pollutants	ug/L	See Table C-3			

Abbreviations/Acronyms:
AMAL – average monthly action level
BP – Basin Plan water quality objective
COLD – cold freshwater habitat beneficial use
NTU – Nephelometric Turbidity Units
mg/L – milligrams per liter
MDAL – maximum daily action level
WARM – warm freshwater habitat beneficial use
MBAS – Methylene Blue Active Substances
MPN/100 ml – most probable number per 100 milliliters
ug/L – micrograms per liter

Notes:
1. Based on a minimum of not less than five samples for any 30-day period.
2. The NAL is reached if more than 10 percent of total samples exceed 400 MPN per 100 ml during any 30 day period.
3. This value has been set to the Basin Plan water quality objective for freshwater “designated beach areas” and is not applicable to waterbodies that are not designated with the water contact recreation (REC-1) beneficial use.

b. If not identified in Provision C.1.a, NALs must be identified, developed and incorporated in the Water Quality Improvement Plan for any pollutants or waste constituents that cause or contribute, or are threatening to cause or contribute to a condition of pollution or nuisance in waters of the state associated with the highest priority water quality conditions related to non-storm water discharges from the MS4s. NALs must be based on:

(1) Applicable water quality standards which may be dependent upon site-specific or receiving water-specific conditions or assumptions to be identified by the Copermittees; or

(2) Applicable numeric WQBELs required to meet the WLAs established for the TMDLs in Attachment E to this Order.

c. Dry weather monitoring data from MS4 outfalls collected in accordance with Provision D.2.b may be utilized to develop or revise NALs based on watershed-specific data, subject to San Diego Water Board Executive Officer approval.

Deleted: <#>For the NALs incorporated into the Water Quality Improvement Plan, the Copermittees may develop and incorporate secondary NALs specific to the Watershed Management Area at levels greater than the NALs required by Provisions C.1.a and C.1.b which can be utilized to further refine the prioritization and assessment of water quality improvement strategies for addressing non-storm water discharges to and from the MS4s, as well as the detection and elimination of non-storm water and illicit discharges to and from the MS4. The secondary NALs may be developed using an approach acceptable to the San Diego Water Board.¶
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2. Default Storm Water Action Levels[10]

The Copermittees must develop and incorporate numeric storm water action levels (SALs) in the Water Quality Improvement Plans to: 1) support the development and prioritization of water quality improvement strategies for reducing pollutants in storm water discharges from the MS4s, and 2) assess the effectiveness of the water quality improvement strategies toward reducing pollutants in storm water discharges, required pursuant to Provision D.4.b.(2).[11]

The following stormwater action levels (SALs) must be incorporated in the WQIPs if the Copermittees have not developed their own SALs for the identified high priority constituents using an approach approved by the Regional Board EO.

a. The following SALs for discharges of storm water from the MS4 must be incorporated:

Table C-5. Storm Water Action Levels for Discharges from MS4s to Receiving Waters

Parameter	Units	Action Level
Turbidity	NTU	126
Nitrate & Nitrite (Total)	mg/L	2.6
Phosphorus (Total P)	mg/L	1.46
Cadmium (Total Cd)*	µg/L	3.0
Copper (Total Cu)*	µg/L	127
Lead (Total Pb)*	µg/L	250
Zinc (Total Zn)*	µg/L	976

Abbreviations/Acronyms:
NTU – Nephelometric Turbidity Units
mg/L – milligrams per liter
ug/L – micrograms per liter

Notes:
* The sampling must include a measure of receiving water hardness at each MS4 outfall. If a total metal concentration exceeds the corresponding metals SAL in Table C-5, that concentration must be compared to the California Toxics Rule criteria and the USEPA 1-hour maximum concentration for the detected level of receiving water hardness associated with that sample. If it is determined that the sample's total metal concentration for that specific metal exceeds that SAL, but does not exceed the applicable USEPA 1-hour maximum concentration criterion for the measured level of hardness, then the sample result will not be considered above the SAL for that measurement.

[10] SALs are not considered by the San Diego Water Board to be enforceable limitations.
[11] The Copermittees may utilize SALs or other benchmarks currently established by the Copermittees as interim SALs until the Water Quality Improvement Plans are accepted by the San Diego Water Board Executive Officer.

b. If not identified in Provision C.2.a, SALs must be identified, developed and incorporated in the Water Quality Improvement Plan for pollutants or waste constituents that cause or contribute, or are threatening to cause or contribute to a condition of pollution or nuisance in waters of the state associated with the highest water quality priorities related to storm water discharges from the MS4s. SALs must be based on:

(1) Federal and State water quality guidance and/or water quality standards; and

(2) Site-specific or receiving water-specific conditions; or

(3) Applicable numeric WQBELs required to meet the WLAs established for the TMDLs in Attachment E to this Order.

c. Wet weather monitoring data from MS4 outfalls collected in accordance with Provision D.2.c may be used to develop or revise SALs based upon watershed-specific data, subject to San Diego Water Board Executive Officer approval.

Deleted: For the SALs incorporated into the Water Quality Improvement Plan, the Copermittees may develop and incorporate secondary SALs specific to the Watershed Management Area at levels greater than the SALs required by Provisions C.2.a and C.2.b which can be utilized to further refine the prioritization and assessment of water quality improvement strategies for reducing pollutants in storm water discharges from the MS4s. The secondary SALs may be developed based on the approaches recommended by the State Water Board's Storm Water Panel

Deleted: [12] or using an approach acceptable to the San Diego Water Board.¶
¶

D. MONITORING AND ASSESSMENT PROGRAM REQUIREMENTS

The purpose of this provision is for the Copermittees to monitor and assess the impact on the chemical, physical, and biological conditions of receiving waters caused by discharges from the Copermittees' MS4s under wet weather and dry weather conditions. The goal of the monitoring and assessment program is to inform the Copermittees about the nexus between the health of receiving waters and the water quality condition of the discharges from their MS4s. This goal will be accomplished through monitoring and assessing the conditions of the receiving waters, discharges from the MS4s, pollutant sources and/or stressors, and effectiveness of the water quality improvement strategies implemented as part of the Water Quality Improvement Plans.

1. Receiving Water Monitoring Requirements

The Copermittees must develop and conduct a program to monitor the condition of the receiving waters in each Watershed Management Area during dry weather and wet weather. Following acceptance of the Water Quality Improvement Plans for each Watershed Management Area, the Copermittees must conduct long-term receiving water monitoring during implementation of the Water Quality Improvement Plan to assess the long term trends and determine if conditions in receiving waters are improving. Any available monitoring data not collected specifically for this Order that meet the quality assurance criteria of the Copermittees and the monitoring requirements of this Order may be utilized by the Copermittees. The Copermittees must conduct the following receiving water monitoring procedures:

a. TRANSITIONAL RECEIVING WATER MONITORING

Until the monitoring requirements of Provisions D.1.b-e are incorporated into a Water Quality Improvement Plan that is accepted by the San Diego Water Board pursuant to Provision F.1, the Copermittees must conduct the following receiving water monitoring in the Watershed Management Area:

(1) Continue the receiving water monitoring programs required in Order Nos. R9-2007-0001, R9-2009-0002, and R9-2010-0016;

(2) Continue the monitoring in the Hydromodification Management Plans approved by the San Diego Water Board;

(3) Participate in the following regional receiving water monitoring programs, as applicable to the Watershed Management Area:

(a) Storm Water Monitoring Coalition Regional Monitoring,

(b) Southern California Bight Regional Monitoring, and

(c) Sediment Quality Monitoring;

(4) Implement the monitoring programs developed as part of any implementation plans or load reduction plans (e.g. Bacteria Load Reduction Plans, Comprehensive Load Reduction Plans) for the TMDLs in Attachment E to this Order; and

(5) For Watershed Management Areas with ASBS, implement the monitoring requirements of Attachment B to State Water Board Resolution No. 2012-0012, included in Attachment A to this Order.

b. LONG-TERM RECEIVING WATER MONITORING STATIONS

The Copermittees must select at least one long-term receiving water monitoring station from among the existing mass loading stations, temporary watershed assessment stations, bioassessment stations, and stream assessment stations previously established by the Copermittees to be representative of the receiving water quality in the Watershed Management Area. Additional long-term receiving water monitoring stations must be selected where necessary to support the implementation and adaptation of the Water Quality Improvement Plan.

c. DRY WEATHER RECEIVING WATER MONITORING

During the term of the Order, the Copermittees must perform monitoring during at least three dry weather monitoring events at each of the long-term receiving water monitoring stations. At least one monitoring event must be conducted during the dry season (May 1 – September 30) and at least one monitoring event must be conducted during a dry weather period during the wet season (October 1

– April 30), after the first wet weather event of the season, with an antecedent dry period of at least 72 hours following a storm event producing measureable rainfall of greater than 0.1 inch.

(1) Dry Weather Receiving Water Field Observations

For each dry weather monitoring event, the Copermittees must record field observations consistent with Table D-1 at each long-term receiving water monitoring station.

Table D-1. Field Observations for Receiving Water Monitoring Stations

Field Observations

• Station identification and location
• Presence of flow, or pooled or ponded water
• If flow is present:
  - Flow estimation (i.e. width of water surface, approximate depth of water, approximate flow velocity, flow rate)
  - Flow characteristics (i.e. presence of floatables, surface scum, sheens, odor, color)
• If pooled or ponded water is present:
  - Characteristics of pooled or ponded water (i.e. presence of floatables, surface scum, sheens, odor, color)
• Station description (i.e. deposits or stains, vegetation condition, structural condition, and observable biology)
• Presence and assessment of trash in and around station

(2) Dry Weather Receiving Water Field Monitoring

For each dry weather monitoring event, if conditions allow the collection of the data, the Copermittees must monitor and record the parameters in Table D-2 at each long-term receiving water monitoring station.

Table D-2. Field Monitoring Parameters for Receiving Water Monitoring Stations

Parameters
• pH • Temperature • Specific conductivity • Dissolved oxygen • Turbidity

(3) Dry Weather Receiving Water Analytical Monitoring

For each dry weather monitoring event, the Copermittees must collect and analyze samples from each long-term receiving water monitoring station as follows:

(a) Analytes that are field measured are not required to be analyzed by a laboratory;

(b) The Copermittees must implement consistent sample collection methods for regional comparability of data, unless site-specific conditions indicate the need for alternate methods;

(c) Grab samples may be collected for pH, temperature, specific conductivity, dissolved oxygen, turbidity, hardness, and indicator bacteria;

(d) For all other constituents, composite samples must be collected for a duration adequate to be representative of changes in pollutant concentrations and runoff flows using one of the following techniques:

(i) Time-weighted composites composed of 24 discrete hourly samples, which may be collected through the use of automated equipment, or

(ii) Flow-weighted composites collected over a typical 24-hour period, which may be collected through the use of automated equipment;

(e) Only one analysis of the composite of aliquots is required;

(f) Analysis for the following constituents is required:

(i) Constituents contributing to the highest priority water quality conditions identified in the Water Quality Improvement Plan,

(ii) Constituents listed as a cause for impairment of receiving waters in the Watershed Management Area listed on the CWA section 303(d) List,

(iii) Constituents for implementation plans or load reduction plans (e.g. Bacteria Load Reduction Plans, Comprehensive Load Reduction Plans) developed for watersheds where the Copermittees are listed responsible parties under the TMDLs in Attachment E to this Order,

(iv) Applicable NAL constituents, and

(v) Constituents listed in Table D-3.

Table D-3. Analytical Monitoring Constituents for Receiving Water Monitoring Stations

Conventionals, Nutrients	Metals (Total and Dissolved)	Pesticides	Indicator Bacteria
• Total Dissolved Solids • Total Suspended Solids • Turbidity • Total Hardness • Total Organic Carbon • Dissolved Organic Carbon • Sulfate • Methylene Blue Active Substances (MBAS) • Total Phosphorus • Orthophosphate • Nitrite[1] • Nitrate[1] • Total Kjeldhal Nitrogen • Ammonia	• Arsenic • Cadmium • Chromium • Copper • Iron • Lead • Mercury • Nickel • Selenium • Thallium • Zinc	• Organophosphate Pesticides • Pyrethroid Pesticides	• Total Coliform • Fecal Coliform[2] • *Enterococcus*

Notes:
1. Nitrite and nitrate may be combined and reported as nitrite+nitrate.
2. *E. Coli* may be substituted for Total Coliform at inland receiving water monitoring stations.

Deleted: Fecal

(4) Dry Weather Receiving Water Toxicity Monitoring

For each dry weather monitoring event, the Copermittees must collect grab or composite samples from each long-term receiving water monitoring station to be analyzed for toxicity in accordance with Table D-4:

Table D-4. Dry Weather Toxicity Testing for Receiving Water Monitoring Stations

Freshwater Organism	Test Approach	USEPA Protocol[2]
Pimephales promelas	1 acute 1 chronic[1]	EPA-821-R-02-012
Hyalella Azteca	1 acute 1 chronic[1]	EPA-821-R-02-012
Psuedokirchneriella subcapitata	1 acute 1 chronic[1]	EPA-821-R-02-013

Notes:
1. Chronic toxicity testing is not required at receiving water monitoring stations located at mass loading stations if the channel flows are diverted year-round during dry weather conditions to the sanitary sewer for treatment.
2. USEPA protocols must be utilized for toxicity testing unless alternate toxicity testing protocols have been approved by the San Diego Water Board.

(5) Dry Weather Receiving Water Bioassessment Monitoring

Bioassessment monitoring for each long-term receiving water monitoring station is required at least once during the term of this Order. The Copermittees must conduct bioassessment monitoring during at least one dry weather monitoring event at each long-term receiving water monitoring station as follows:

(a) The following bioassessment samples and measurements must be collected:

(i) Macroinvertebrate samples must be collected in accordance with the "Reachwide Benthos (Multihabitat) Procedure" in the most current Surface Water Ambient Monitoring Program (SWAMP) Bioassessment Standard Operating Procedures (SOP), and amendments, as applicable;[13]

(ii) The "Full" suite of physical habitat characterization measurements must be collected in accordance with the most current SWAMP Bioassessment SOP, and as summarized in the SWAMP Stream Habitat Characterization Form – Full Version;[14] and

(iii) Freshwater algae samples must be collected in accordance with the

[13] Ode, P.R.. 2007. Standard operating procedures for collecting macroinvertebrate samples and associated physical and chemical data for ambient bioassessments in California. California State Water Resources Control Board Surface Water Ambient Monitoring Program (SWAMP) Bioassessment SOP 001. http://www.swrcb.ca.gov/water_issues/programs/swamp/tools.shtml#monitoring
[14] Available at:
http://www.waterboards.ca.gov/water_issues/programs/swamp/docs/reports/fieldforms_fullversion052908.pdf

SWAMP Standard Operating Procedures for Collecting Algae Samples.[15] Analysis of samples must include algal taxonomic composition (diatoms and soft algae) and algal biomass.

(b) The bioassessment samples, measurements, and appropriate water chemistry data must be used to calculate the following:

(i) An Index of Biological Integrity (IBI) for macroinvertebrates for each monitoring station where bioassessment monitoring was conducted, based on the most current calculation method;[16] and

(ii) An IBI for algae for each monitoring station where bioassessment monitoring was conducted, when a calculation method is developed.[17]

(c) In lieu of the requirements of Provision D.1.c.(5)(a), the Copermittees may conduct the bioassessment monitoring in accordance with the "Triad" assessment approach[18] to calculate the IBIs required for Provision D.1.c.(5)(b). The Copermittees must conduct sampling, analysis, and reporting of specified in-stream biological and habitat data according to the protocols specified in the SCCWRP Technical Report No. 539, or subsequent protocols, if developed.

(6) Dry Weather Receiving Water Hydromodification Monitoring

In addition to the hydromodification monitoring conducted as part of the Copermittees' Hydromodification Management Plans, hydromodification monitoring for each long-term receiving water monitoring station is required at least once during the term of this Order. The Copermittees must collect the following hydromodification monitoring observations and measurements within an appropriate domain of analysis during at least one dry weather monitoring event for each long-term receiving water monitoring station:

(a) Channel conditions, including:

(i) Channel dimensions,

[15] Fetscher et al. 2009. Standard Operating Procedures for Collecting Stream Algae Samples and Associated Physical Habitat and Chemical Data for Ambient Bioassessments in California.
[16] The most current calculation method at the time the Order was adopted is outlined in "A Quantitative Tool for Assessing the Integrity of Southern California Coastal Streams" (Ode, et al. 2005. Environmental Management. Vol. 35, No. 1, pp. 1-13). If an updated or new calculation method is developed, either both (i.e. current and updated/new) methods must be used, or historical IBIs must be recalculated with the updated or new calculation method.
[17] When a calculation method is developed, IBIs must be calculated for all available and appropriate historical data.
[18] Stormwater Monitoring Coalition Model Monitoring Technical Committee, 2004. Model Monitoring Program for Municipal Separate Storm Sewer Systems in Southern California. Technical Report #419. August 2004.

(ii) Hydrologic and geomorphic conditions, and

(iii) Presence and condition of vegetation and habitat;

(b) Location of discharge points;

(c) Habitat integrity;

(d) Photo documentation of existing erosion and habitat impacts, with location (i.e. latitude and longitude coordinates) where photos were taken;

(e) Measurement or estimate of dimensions of any existing channel bed or bank eroded areas, including length, width, and depth of any incisions; and

(f) Known or suspected cause(s) of existing downstream erosion or habitat impact, including flow, soil, slope, and vegetation conditions, as well as upstream land uses and contributing new and existing development.

d. WET WEATHER RECEIVING WATER MONITORING

During the term of the Order, the Copermittees must perform monitoring during at least three wet weather monitoring events at each long-term receiving water monitoring station. At least one wet weather monitoring event must be conducted during the first wet weather event of the wet season (October 1 – April 30), and at least one wet weather monitoring event during a wet weather event that occurs after February 1.

(1) Wet Weather Receiving Water Field Observations

For each wet weather monitoring event, the following narrative descriptions and observations must be recorded at each long-term receiving water monitoring station:

(a) A narrative description of the station that includes the location, date and duration of the storm event(s) sampled, rainfall estimates of the storm event, and the duration between the storm event sampled and the end of the previous measurable (greater than 0.1 inch rainfall) storm event;

(b) The flow rates and volumes measured or estimated (data from nearby USGS gauging stations may be utilized, or flow rates may be measured or estimated in accordance with the USEPA Storm Water Sampling Guidance Document (EPA-833-B-92-001), section 3.2.1, or other method proposed by the Copermittees that is acceptable to the San Diego Water Board);

(c) Station condition (i.e. deposits or stains, vegetation condition, structural condition, observable biology); and

(d) Presence and assessment of trash in and around station.

(2) Wet Weather Receiving Water Field Monitoring

For each wet weather monitoring event, the Copermittees must monitor and record the parameters in Table D-2 at each long-term receiving water monitoring station.

(3) Wet Weather Receiving Water Analytical Monitoring

For each wet weather monitoring event, the Copermittees must collect and analyze samples from each long-term receiving water monitoring station as follows:

(a) Analytes that are field measured are not required to be analyzed by a laboratory;

(b) The Copermittees must implement consistent sample collection methods for regional comparability of data, unless site-specific conditions indicate the need for alternate methods;

(c) Grab samples may be collected for pH, temperature, specific conductivity, dissolved oxygen, turbidity, hardness, and indicator bacteria;

(d) For all other constituents, composite samples must be collected for a duration adequate to be representative of changes in pollutant concentrations and runoff flows using one of the following techniques:

(i) Time-weighted composites composed of 24 discrete hourly samples, which may be collected through the use of automated equipment, or

(ii) Flow-weighted composites collected over the length of the storm event or a typical 24-hour period, which may be collected through the use of automated equipment;

(e) Only one analysis of the composite of aliquots is required;

(f) Analysis for the following constituents is required:

(i) Constituents contributing to the highest priority water quality conditions identified in the Water Quality Improvement Plan,

(ii) Constituents listed as a cause for impairment of receiving waters in the Watershed Management Area listed on the CWA section 303(d) List,

(iii) Constituents for implementation plans or load reduction plans (e.g. Bacteria Load Reduction Plans, Comprehensive Load Reduction Plans) developed for watersheds where the Copermittees are listed responsible parties under the TMDLs in Attachment E to this Order,

(iv) Applicable SAL constituents, and

(v) Constituents listed in Table D-3.

(4) Wet Weather Receiving Water Toxicity Monitoring

For each wet weather monitoring event, the Copermittees must collect grab or composite samples from each long-term receiving water monitoring station to be analyzed for toxicity in accordance with Table D-5:

Table D-5. Wet Weather Toxicity Testing for Receiving Water Monitoring Stations

Freshwater Organism	Test Approach	USEPA Protocol[1]
Pimephales promelas	1 acute	EPA-821-R-02-012
Hyalella Azteca	1 acute	EPA-821-R-02-012
Psuedokirchneriella subcapitata	1 acute	EPA-821-R-02-013

Notes:
1. USEPA protocols must be utilized for toxicity testing unless alternate toxicity testing protocols have been approved by the San Diego Water Board.

e. Other Receiving Water Monitoring Requirements

(1) Regional Monitoring

The Copermittees must participate in the following regional receiving waters monitoring programs, as applicable to the Watershed Management Area:

(a) Storm Water Monitoring Coalition Regional Monitoring; and

(b) Southern California Bight Regional Monitoring.

(2) Sediment Quality Monitoring

The Copermittees must perform sediment monitoring to assess compliance with sediment quality receiving water limits applicable to MS4 discharges to enclosed bays and estuaries. The monitoring may be performed either by individual or multiple Copermittees to assess compliance with receiving water limits, or through participation in a water body monitoring coalition. The Copermittees must identify sediment sampling stations that are spatially representative of the sediment within the water body segment or region of interest. Sediment quality monitoring must be conducted in conformance with the monitoring requirements set forth in the State Water Board Sediment Quality Control Plan.

(3) ASBS Monitoring

For Watershed Management Areas with ASBS, the Copermittees must implement the monitoring requirements of Attachment B to State Water Board Resolution No. 2012-0012, included in Attachment A to this Order.

f. ALTERNATIVE WATERSHED MONITORING REQUIREMENTS

The San Diego Water Board may direct the Copermittees to participate in an effort to develop alternative watershed monitoring with other regulated entities, other interested parties, and the San Diego Water Board to refine, coordinate, and implement regional monitoring and assessment programs to determine the status and trends of water quality conditions in 1) coastal waters, 2) enclosed bays, harbors, estuaries, and lagoons, and 3) streams.

In lieu of the Receiving Water Monitoring Program requirements specified in 1.a to 1.d, the Copermittees may participate in the development and implementation of monitoring for the collaborative receiving waters monitoring program. It is expected that a regional monitoring will allow for a more effective and efficient receiving waters monitoring program. The regional monitoring plan must be submitted to the Executive Officer for review and approval. Documentation of participation and monitoring shall be included in the annual report.

2. MS4 Outfall Discharge Monitoring Requirements

The Copermittees must develop and conduct a program to monitor the discharges from the MS4 outfalls in each Watershed Management Area during dry weather and wet weather. Following acceptance of the Water Quality Improvement Plans for each Watershed Management Area, the Copermittees must conduct MS4 outfall discharge monitoring during implementation of the Water Quality Improvement Plan to assess the effectiveness of their jurisdictional runoff management programs toward effectively prohibiting non-storm water discharges and reducing pollutants in storm water discharges to and from their MS4s. Any available monitoring data not collected specifically for this Order that meet the quality assurance criteria of the Copermittees and the monitoring requirements of this Order may be utilized by the Copermittees. The Copermittees must conduct the following MS4 outfall monitoring procedures:

a. TRANSITIONAL MS4 OUTFALL DISCHARGE MONITORING

Until the monitoring requirements of Provisions D.2.b-c are incorporated into a Water Quality Improvement Plan that is accepted by the San Diego Water Board pursuant to Provision F.1, the Copermittees must conduct the following MS4 outfall discharge monitoring in the Watershed Management Area:

(1) MS4 Outfall Discharge Monitoring Station Inventory

Each Copermittee must identify all major MS4 outfalls that discharge directly to receiving waters within its jurisdiction and geo-locate those outfalls on a map of the MS4 pursuant to Provision E.2.b.(1). This information must be compiled into a MS4 outfall discharge monitoring station inventory, and must include the following information:

(a) Latitude and longitude of MS4 outfall point of discharge;

(b) Watershed Management Area;

(c) Hydrologic subarea;

(d) Outlet size;

(e) Accessibility (i.e. safety and without disturbance of critical habitat);

(f) Approximate drainage area; and

(g) Classification of whether the MS4 outfall is known to have persistent dry weather flows, transient dry weather flows, no dry weather flows, or unknown dry weather flows.

(2) Transitional Dry Weather MS4 Outfall Discharge Field Screening Monitoring

Until the monitoring requirements of Provision D.2.b are incorporated into a Water Quality Improvement Plan that is accepted by the San Diego Water Board pursuant to Provision F.1, each Copermittee must perform dry weather MS4 outfall field screening monitoring to identify non-storm water and illicit discharges within its jurisdiction in accordance with Provision E.2.c, to determine which discharges are transient flows and which are persistent flows, and prioritize the dry weather MS4 discharges that will be investigated and eliminated in accordance with Provision E.2.d. Each Copermittee must conduct the following dry weather MS4 outfall discharge field screening monitoring within its jurisdiction:

(a) Transitional Dry Weather MS4 Outfall Discharge Field Screening Monitoring Frequency

Each Copermittee must field screen the MS4 outfalls in its inventory developed pursuant to Provision D.2.a.(1) as follows:

(i) For Copermittees with less than 125 major MS4 outfalls that discharge to receiving waters within a Watershed Management Area, at least 80 percent of the outfalls must be visually inspected two times per year during dry weather conditions.

(ii) For Copermittees with 125 major MS4 outfalls or more, but less than or equal to 500, that discharge to receiving waters within a Watershed Management Area all the outfalls must be visually inspected at least annually during dry weather conditions.

(iii) For Copermittees with more than 500 major MS4 outfalls that discharge to receiving waters within a Watershed Management Area, at least 500 outfalls must be visually inspected at least annually during dry weather conditions. Copermittees with more than 500 major MS4 outfalls within a Watershed Management Area must identify and prioritize at least 500 outfalls to be inspected considering the following:

[a] Assessment of connectivity of the discharge to a flowing receiving water;
[b] Reported exceedances of NALs in water quality monitoring data;
[c] Surrounding land uses;
[d] Presence of constituents listed as a cause for impairment of receiving waters in the Watershed Management Area listed on the CWA section 303(d) List; and
[e] Flow rate.

(iv) For Copermittees with more than 500 major MS4 outfalls within its jurisdiction that are located in more than one Watershed Management Area, at least 500 major MS4 outfalls within its inventory must be visually inspected at least annually during dry weather conditions. Copermittees with more than 500 major MS4 outfalls in more than one Watershed Management Area must identify and prioritize at least 500 outfalls to be inspected considering the following:

[a] Assessment of connectivity of the discharge to a flowing receiving water;
[b] Reported exceedances of NALs in water quality monitoring data;
[c] Surrounding land uses;
[d] Presence of constituents listed as a cause for impairment of receiving waters in the Watershed Management Area listed on the CWA section 303(d) List; and
[e] Flow rate.

(v) Inspections of major MS4 outfalls conducted in response to public reports and staff or contractor reports and notifications may count toward the required visual inspections of MS4 outfall discharge monitoring stations.

(b) Transitional Dry Weather MS4 Outfall Discharge Field Screening Visual Observations

(i) An antecedent dry period of at least 72 hours following any storm event producing measurable rainfall greater than 0.1 inch is required prior to conducting field screening visual observations during a field screening monitoring event.

(ii) During the field screening monitoring event, each Copermittee must record visual observations consistent with Table D-6 at each MS4 outfall discharge monitoring station inspected.

Table D-6. Field Screening Visual Observations for MS4 Outfall Discharge Monitoring Stations

Field Observations
• Station identification and location • Presence of flow, or pooled or ponded water • If flow is present: - Flow estimation (i.e. width of water surface, approximate depth of water, approximate flow velocity, flow rate) - Flow characteristics (i.e. presence of floatables, surface scum, sheens, odor, color) - Flow source(s) suspected or identified from non-storm water source investigation - Flow source(s) eliminated during non-storm water source identification • If pooled or ponded water is present: - Characteristics of pooled or ponded water (i.e. presence of floatables, surface scum, sheens, odor, color) - Known or suspected source(s) of pooled or ponded water • Station description (i.e. deposits or stains, vegetation condition, structural condition, observable biology) • Presence and assessment of trash in and around station • Evidence or signs of illicit connections or illegal dumping

(iii) Each Copermittee must implement the requirements of Provisions E.2.d.(2)(c)-(e) based on the field observations.

(iv) Each Copermittee must evaluate field observations together with existing information available from prior reports, inspections and monitoring results to determine whether any observed flowing, pooled, or ponded waters are likely to be transient or persistent flow.[19]

(c) Transitional Dry Weather MS4 Outfall Discharge Field Screening Monitoring Records

[19] Persistent flow is defined as the presence of flowing, pooled, or ponded water more than 72 hours after a measureable rainfall event of 0.1 inch or greater during three consecutive monitoring and/or inspection events. All other flowing, pooled, or ponded water is considered transient.

Based upon the results of the transitional dry weather MS4 outfall discharge field screening monitoring conducted pursuant to Provisions D.2.a.(2)(a)-(b), each Copermittee must update its MS4 outfall discharge monitoring station inventory, compiled pursuant to Provision D.2.a.(1), with any new information on the classification of whether the MS4 outfall produces persistent flow, transient flow, or no dry weather flow.

(3) Transitional Wet Weather MS4 Outfall Discharge Monitoring

Until the monitoring requirements of Provision D.2.c are incorporated into a Water Quality Improvement Plan that is accepted by the San Diego Water Board pursuant to Provision F.1, the Copermittees must conduct the following wet weather MS4 outfall discharge monitoring within the Watershed Management Area:

(a) Transitional Wet Weather MS4 Outfall Discharge Monitoring Stations

The Copermittees must select at least five wet weather MS4 outfall discharge monitoring stations from the inventories developed pursuant to Provision D.2.a.(1) that are representative of storm water discharges from areas consisting primarily of residential, commercial, industrial, and typical mixed-use land uses present within the Watershed Management Area.

(b) Transitional Wet Weather MS4 Outfall Discharge Monitoring Frequency

Each wet weather MS4 outfall discharge monitoring station selected pursuant to Provision D.2.a.(3)(a) must be monitored twice during the wet season (October 1 – April 30). One wet weather monitoring event must be conducted during the first wet weather event of the wet season, and one wet weather monitoring event at least a month after the first wet weather event of the wet season.

Transitional wet weather MS4 outfall discharge monitoring may begin in year 2 of the transitional period once the MS4 outfall discharge monitoring stations have been inventoried and evaluated pursuant to Provision D.2.a.(1)

(c) Transitional Wet Weather MS4 Outfall Discharge Field Observations

For each wet weather monitoring event, the following narrative descriptions and observations must be recorded at each wet weather MS4 outfall discharge monitoring station:

(i) A narrative description of the station that includes the location, date and duration of the storm event(s) sampled, rainfall estimates of the storm event, and the duration between the storm event sampled and the end of the previous measurable (greater than 0.1 inch rainfall) storm event; and

(ii) The flow rates and volumes measured or estimated (data from nearby USGS gauging stations may be utilized, or flow rates may be measured or estimated in accordance with the USEPA Storm Water Sampling Guidance Document (EPA-833-B-92-001), section 3.2.1, or other method proposed by the Copermittees that is acceptable to the San Diego Water Board);

(iii) Station condition (i.e. deposits or stains, vegetation condition, structural condition, observable biology); and

(iv) Presence and assessment of trash in and around station.

(d) Transitional Wet Weather MS4 Outfall Discharge Field Monitoring

For each wet weather monitoring event, the Copermittees must monitor and record the parameters in Table D-2 at each wet weather MS4 outfall discharge monitoring station.

(e) Transitional Wet Weather MS4 Outfall Discharge Analytical Monitoring

For each wet weather monitoring event, the Copermittees must collect and analyze samples from each wet weather MS4 outfall discharge monitoring station as follows:

(i) Analytes that are field measured are not required to be analyzed by a laboratory;

(ii) The Copermittees must implement consistent sample collection methods for regional comparability of data, unless site-specific conditions indicate the need for alternate methods;

(iii) Grab samples may be collected for pH, temperature, specific conductivity, dissolved oxygen, turbidity, and indicator bacteria;

(iv) For all other constituents, composite samples must be collected for a duration adequate to be representative of changes in pollutant concentrations and runoff flows using one of the following techniques:

[a] Time-weighted composites collected over the length of the storm event or the first 24 hour period, whichever is shorter, composed of discrete samples, which may be collected through the use of automated equipment, or

[b] Flow-weighted composites collected over the length of the storm event or a typical 24 hour period, whichever is shorter, which may be collected through the use of automated equipment, or

[c] If automated compositing is not feasible, a composite sample may be collected using a minimum of 4 grab samples, collected during

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the first 24 hours of the storm water discharge, or for the entire storm water discharge if the storm event is less than 24 hours;

(v) Only one analysis of the composite of aliquots is required;

(vi) The samples must be analyzed for the following constituents:

[a] Constituents listed as a cause for impairment of receiving waters in the Watershed Management Area listed on the CWA section 303(d) List with the exception of toxicity[20],
[b] Constituents for implementation plans or load reduction plans (e.g. Bacteria Load Reduction Plans, Comprehensive Load Reduction Plans) developed for watersheds where the Copermittees are listed responsible parties under the TMDLs in Attachment E to this Order, and
[c] Constituents listed in in Table D-7.
[e] The Copermittee may be relieved of analytical monitoring requirements [a] to [c] if supporting information can be provided or has historical data that can demonstrate or provide justification that the analysis of the constituent is not necessary.

[20] Copermittees may provide an alternate approach to evaluate and identify the cause of toxicity currently affecting receiving waters and to iteratively adapt the monitoring program to address these chemical stressors in their MS4 outfall discharges in the monitoring plan which is subject to Regional Board approval.

Table D-7. Analytical Monitoring Constituents for Wet Weather MS4 Outfall Discharge Monitoring Stations

Conventionals, Nutrients	Metals (Total and Dissolved)	Indicator Bacteria
• Total Dissolved Solids • Total Suspended Solids • Turbidity • Total Hardness • Total Organic Carbon • Dissolved Organic Carbon • Sulfate • Methylene Blue Active Substances (MBAS) • Total Phosphorus • Orthophosphate • Nitrite[1] • Nitrate[1] • Total Kjeldhal Nitrogen • Ammonia	• Arsenic • Cadmium • Chromium • Copper • Iron • Lead • Nickel • Selenium • Thallium • Zinc	• Total Coliform • Fecal Coliform[2] • *Enterococcus*

Notes:
1. Nitrite and nitrate may be combined and reported as nitrite+nitrate.
2. *E. Coli* may be substituted for Total Coliform for dishcarges to inland surface waters.

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(f) Other Transitional Wet Weather MS4 Outfall Discharge Monitoring

The San Diego County Copermittees must continue the wet weather MS4 outfall monitoring program developed under Order No. R9-2007-0001, as approved by the San Diego Water Board, through its planned completion.

b. DRY WEATHER MS4 OUTFALL DISCHARGE MONITORING

Each Copermittee must perform dry weather MS4 outfall monitoring to identify non-storm water and illicit discharges within its jurisdiction pursuant to Provision E.2.c, and to prioritize the dry weather MS4 discharges that will be investigated and eliminated pursuant to Provision E.2.d. Each Copermittee must conduct the following dry weather MS4 outfall discharge monitoring within its jurisdiction:

(1) Dry Weather MS4 Outfall Discharge Field Screening Monitoring

Each Copermittee must continue to perform the dry weather MS4 outfall discharge field screening monitoring in accordance with the requirements of Provision D.2.a.(2). The Copermittee may adjust the field screening monitoring frequencies and locations for the MS4 outfalls in its inventory, as needed, to identify and eliminate sources of persistent flow non-storm water discharges in accordance with the highest priority water quality conditions identified in the Water Quality Improvement Plan, provided the number of visual inspections performed is equivalent to the number of visual inspections required under Provision D.2.a.(2)(a).

(2) Non-Storm Water Persistent Flow MS4 Outfall Discharge Monitoring

Each Copermittee must perform non-storm water persistent flow MS4 outfall discharge monitoring to determine which persistent non-storm water discharges contain concentrations of pollutants below NALs, and which persistent non-storm water discharges impact receiving water quality during dry weather. Each Copermittee must conduct the following non-storm water persistent flow MS4 outfall discharge monitoring within its jurisdiction:

(a) Prioritization of Non-Storm Water Persistent Flow MS4 Outfalls

Based upon the dry weather MS4 outfall discharge field screening monitoring records developed pursuant to Provision D.2.a.(2)(c), each Copermittee must identify and prioritize the MS4 outfalls with persistent flows based on the highest priority water quality conditions identified in the Water Quality Improvement Plan and any additional criteria developed by the Copermittee, which may include historical data and data from sources other than what the Copermittee collects.

(b) Non-Storm Water Persistent Flow MS4 Outfall Discharge Monitoring Frequency

(i) Based on the prioritization of major MS4 outfalls developed under Provision D.2.b.(2)(a), each Copermittee must identify, at a minimum, the 10 highest priority major MS4 outfalls with non-storm water persistent flows that the Copermittee will monitor within each Watershed Management Area within its jurisdiction. The location of the highest priority non-storm water persistent flow MS4 outfall monitoring stations must be identified on the map required pursuant to Provision E.2.b.(1).

(ii) Each of the highest priority non-storm water persistent flow MS4 outfall monitoring stations identified pursuant to Provision D.2.b.(2)(b)(i) must be monitored under dry weather conditions at least semi-annually until one of the following occurs:

[a] The non-storm water discharges have been effectively eliminated (i.e. no flowing, pooled, or ponded water) for three consecutive dry weather monitoring events; or
[b] The source(s) of the persistent flows has been identified as a category of non-storm water discharges that does not require an NPDES permit and does not have to be addressed as an illicit discharge because it was not identified as a source of pollutants (i.e. constituents in non-storm water discharge do not exceed NALs), and the persistent flow can be re-prioritized to a lower priority; or

[c] The constituents in the persistent flow non-storm water discharge do not exceed NALs, and the persistent flow can be re-prioritized to a lower priority; or
[d] The source(s) of the persistent flows has been identified as a non-storm water discharge authorized by a separate NPDES permit.

(iii) Where the criteria under Provision D.2.b.(2)(c)(ii) are not met, but the threat to water quality has been reduced by the Copermittee, the highest priority persistent flow MS4 outfall monitoring stations may be reprioritized accordingly for continued dry weather MS4 outfall discharge field screening monitoring required pursuant to Provision D.2.b.(1).

(iv) Each Copermittee must document removal or re-prioritization of the highest priority persistent flow MS4 outfall monitoring stations identified under Provision D.2.b.(2)(b) in the Annual Report. Persistent flow MS4 outfall monitoring stations that have been removed must be replaced with the next highest prioritized MS4 major outfall in the Watershed Management Area within its jurisdiction, unless there are no remaining qualifying major MS4 outfalls within the Copermittee's jurisdiction in the Watershed Management Area.

(c) Non-Storm Water Persistent Flow MS4 Outfall Discharge Field Observations

During each semi-annual monitoring event, each Copermittee must record field observations consistent with Table D-6 at each of the highest priority persistent flow MS4 outfall monitoring stations within its jurisdiction.

(d) Non-Storm Water Persistent Flow MS4 Outfall Discharge Field Monitoring

During each semi-annual monitoring event, if conditions allow the collection of the data, each Copermittee must monitor and record the parameters in Table D-2 at each of the highest priority persistent flow MS4 outfall monitoring stations within its jurisdiction.

(e) Non-Storm Water Persistent Flow MS4 Outfall Discharge Analytical Monitoring

During each semi-annual monitoring event in which measurable flow is present, each Copermittee must collect and analyze samples from each of the highest priority persistent flow MS4 outfall monitoring stations within its jurisdiction as follows:

(i) Analytes that are field measured are not required to be analyzed by a laboratory;

(ii) The Copermittees must implement consistent sample collection methods for regional comparability of data, unless site-specific conditions indicate the need for alternate methods;

(iii) Collect grab or composite samples to be analyzed for the following constituents:

[a] Constituents contributing to the highest priority water quality conditions identified in the Water Quality Improvement Plan,
[b] Constituents listed as a cause for impairment of receiving waters in the Watershed Management Area listed on the CWA section 303(d) List with the exception of toxicity[21],
[c] Constituents for implementation plans or load reduction plans (e.g. Bacteria Load Reduction Plans, Comprehensive Load Reduction Plans) developed for watersheds where the Copermittees are listed responsible parties under the TMDLs in Attachment E to this Order,
[d] Applicable NAL constituents, and
[e] Constituents listed in Table D-8, unless the Copermittee has historical data that can demonstrate or provide justification that the analysis of the constituent is not necessary.
[f] The Copermittee may be relieved of analytical monitoring requirements if supporting information can be provided or has historical data that can demonstrate or provide justification that the analysis of the constituent is not necessary.

Table D-8. Analytical Monitoring Constituents for Persistent Flow MS4 Outfall Discharge Monitoring Stations

Conventionals, Nutrients	Metals (Total and Dissolved)	Indicator Bacteria
• Total Dissolved Solids • Total Suspended Solids • Total Hardness • Total Phosphorus • Orthophosphate • Nitrite[1] • Nitrate[1] • Total Kjeldhal Nitrogen • Ammonia	• Cadmium • Copper • Lead • Zinc	• Total Coliform • Fecal Coliform[2] • *Enterococcus*

Notes:
1. Nitrite and nitrate may be combined and reported as nitrite+nitrate.
2. *E. Coli* may be substituted for Total Coliform for discharges to inland surface waters.

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[21] Copermittees may provide an alternate approach to evaluate and identify the cause of toxicity currently affecting receiving waters and to iteratively adapt the monitoring program to address these chemical stressors in their MS4 outfall discharges in the monitoring plan which is subject to Regional Board approval.

(iv) If the Copermittee identifies and eliminates the source of the persistent flow non-storm water discharge, analysis of the sample is not required.

c. Wet Weather MS4 Outfall Discharge Monitoring

The Copermittees must perform wet weather MS4 outfall monitoring to identify sources of pollutants in storm water discharges from the MS4s in the Watershed Management Area. The Copermittees must conduct the following wet weather MS4 outfall discharge monitoring within the Watershed Management Area:

(1) Wet Weather MS4 Outfall Discharge Monitoring Stations

The Copermittees may adjust the wet weather MS4 outfall discharge monitoring locations and frequencies in the Watershed Management Area, as needed, to identify sources of pollutants in storm water discharges from MS4s in the Watershed Management Area in accordance with the highest priority water quality conditions identified in the Water Quality Improvement Plan, provided the number of stations is at least equivalent to the number of stations required under Provision D.2.a.(3)(a).

(2) Wet Weather MS4 Outfall Discharge Monitoring Frequency

The Copermittees must monitor the wet weather MS4 outfall discharge monitoring stations in the Watershed Management Area at an appropriate frequency to identify sources of pollutants in storm water discharges from the MS4s causing or contributing to the highest priority water quality conditions identified in the Water Quality Improvement Plan.

(3) Wet Weather MS4 Outfall Discharge Field Observations

For each wet weather monitoring event, the following narrative descriptions and observations must be recorded at each wet weather MS4 outfall discharge monitoring station:

(a) A narrative description of the station that includes the location, date and duration of the storm event(s) sampled, rainfall estimates of the storm event, and the duration between the storm event sampled and the end of the previous measurable (greater than 0.1 inch rainfall) storm event; and

(b) The flow rates and volumes measured or estimated (data from nearby USGS gauging stations may be utilized, or flow rates may be measured or estimated in accordance with the USEPA Storm Water Sampling Guidance Document (EPA-833-B-92-001), section 3.2.1, or other method proposed by the Copermittees that is acceptable to the San Diego Water Board);

(c) Station condition (i.e. deposits or stains, vegetation condition, structural condition, observable biology); and

(d) Presence and assessment of trash in and around station.

(4) Wet Weather MS4 Outfall Discharge Field Monitoring

For each wet weather monitoring event, the Copermittees must monitor and record the parameters in Table D-2 at each wet weather MS4 outfall discharge monitoring station.

(5) Wet Weather MS4 Outfall Discharge Analytical Monitoring

For each wet weather monitoring event, the Copermittees must collect and analyze samples from each wet weather MS4 outfall discharge monitoring station as follows:

(a) Analytes that are field measured are not required to be analyzed by a laboratory;

(b) The Copermittees must implement consistent sample collection methods for regional comparability of data, unless site-specific conditions indicate the need for alternate methods;

(c) Grab samples may be collected for pH, temperature, specific conductivity, dissolved oxygen, turbidity, hardness, and indicator bacteria;

(d) For all other constituents, composite samples must be collected for a duration adequate to be representative of changes in pollutant concentrations and runoff flows using one of the following techniques:

(i) Time-weighted composites collected over the length of the storm event or the first 24 hour period, whichever is shorter, composed of discrete samples, which may be collected through the use of automated equipment, or

(ii) Flow-weighted composites collected over the length of the storm event or a typical 24 hour period, whichever is shorter, which may be collected through the use of automated equipment, or

(iii) If automated compositing is not feasible, a composite sample may be collected using a minimum of 4 grab samples, collected during the first 24 hours of the storm water discharge, or for the entire storm water discharge if the storm event is less than 24 hours.

(e) Only one analysis of the composite of aliquots is required;

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(f) Analysis for the following constituents is required:

(i) Constituents contributing to the highest priority water quality conditions identified in the Water Quality Improvement Plan,

(ii) Constituents listed as a cause for impairment of receiving waters in the Watershed Management Area listed on the CWA section 303(d) List, with the exception of toxicity[22],

(iii) Constituents for implementation plans or load reduction plans (e.g. Bacteria Load Reduction Plans, Comprehensive Load Reduction Plans) developed for watersheds where the Copermittees are listed responsible parties under the TMDLs in Attachment E to this Order, and

(iv) Applicable SAL constituents.

(v) The Copermittee may be relieved of analytical monitoring requirements if supporting information can be provided or has historical data that can demonstrate or provide justification that the analysis of the constituent is not necessary.

[22] Copermittees may provide an alternate approach to evaluate and identify the cause of toxicity currently affecting receiving waters and to iteratively adapt the monitoring program to address these chemical stressors in their MS4 outfall discharges in the monitoring plan which is subject to Regional Board approval.

3. Special Studies

a. Within the term of this Order, the Copermittees must develop and implement the following special studies:

(1) At least three special studies in each Watershed Management Area to address pollutant and/or stressor data gaps and/or develop information necessary to more effectively address the pollutants and/or stressors that cause or contribute to highest priority water quality conditions identified in the Water Quality Improvement Plan.

(2) At least two special studies for the San Diego Region to address pollutant and/or stressor data gaps and/or develop information necessary to more effectively address the pollutants and/or stressors that are impacting receiving waters on a regional basis in the San Diego Region.

(3) One of the three special studies in each Watershed Management Area may be replaced by a special study implemented pursuant to Provision D.3.a.(2).

b. The special studies must, at a minimum, be in conformance with the following criteria:

(1) The special studies must be related to the highest priority water quality conditions identified by the Copermittees in the Watershed Management Area and/or for the entire San Diego Region;

(2) The special studies developed pursuant to Provision D.3.a.(1) must:

(a) Be implemented within the applicable Watershed Management Area, and

(b) Require some form of participation by all the Copermittees within the Watershed Management Area;

(3) The special studies developed pursuant to Provision D.3.a.(2) must:

(a) Be implemented within the San Diego Region, and

(b) Require some form of participation by all Copermittees covered under the requirements of this Order.

c. Special studies developed to identify sources of pollutants and/or stressors should be pollutant and/or stressor specific and based on historical monitoring data and monitoring performed pursuant to Provisions D.1 and D.2. Development of source identification special studies should include the following:

(1) A compilation of known information on the specific pollutant and/or stressor, including data on potential sources and movement of the pollutant and/or

stressor within the watershed. Data generated by the Copermittees and others, as well as information available from a literature research on the pollutant and/or stressor should be compiled and analyzed as appropriate.

(2) An identification of data gaps, based on the compiled information generated on the specific pollutant and/or stressor in Provision D.3.d.(1). Source identification special studies should be developed to fill identified data gaps.

(3) A monitoring plan that will collect and provide data the Copermittees can utilize to do the following:

(a) Quantify the relative loading or impact of a pollutant and/or stressor from a particular source or pollutant generating activity;

(b) Improve understanding of the fate of a pollutant and/or stressor in the environment;

(c) Develop an inventory of known and suspected sources of a pollutant and/or stressor in the Watershed Management Area; and/or

(d) Prioritize known and suspected sources of a pollutant and/or stressor based on relative magnitude in discharges, geographical distribution (i.e., regional or localized), frequency of occurrence in discharges, human health risk, and controllability.

d. Special studies initiated prior to the acceptance of the Water Quality Improvement Plan that meet the requirements of Provision D.3.b and are completed during the term of this Order may be utilized to fulfill the special study requirements of Provision D.3.a.

e. The Copermittees must submit the monitoring plans for the special studies in the Water Quality Improvement Plans required pursuant to Provision F.1.

f. The Copermittees are encouraged to share the results of the special studies regionally among the Copermittees to provide information useful in improving and adapting the management of non-storm water and storm water runoff through the implementation of the Water Quality Improvement Plans.

4. Assessment Requirements

Each Copermittee must evaluate the data collected pursuant to Provisions D.1, D.2 and D.3, and information collected during the implementation of the jurisdictional runoff management programs required pursuant to Provision E, to assess the progress of the water quality improvement strategies in the Water Quality Improvement Plan toward achieving compliance with Provisions A.1.a, A.1.c and A.2.a. Assessments must be performed as described in the following provisions:

a. RECEIVING WATERS ASSESSMENTS

(1) The Copermittees must assess and report the conditions of the receiving waters in the Watershed Management Area as follows:

(a) Based on data collected pursuant to Provision D.1.a, the assessments under Provision D.4.a.(2) must be included in the first Annual Report required pursuant to Provision F.3.b.(1).

(b) Based on the data collected pursuant to Provisions D.1.a-e, the assessments required under Provision D.4.a.(2) must be included in the Report of Waste Discharge required pursuant to Provision F.5.b.

(2) The Copermittees must assess the status and trends of receiving water quality conditions in 1) coastal waters, 2) enclosed bays, harbors, estuaries, and lagoons, and 3) streams under dry weather and wet weather conditions. For each of the three types of receiving waters in each Watershed Management Area the Copermittees must:

(a) Determine whether or not the conditions of the receiving waters are protective of the designated beneficial uses;

(b) Identify the most critical beneficial uses that must be protected to ensure overall health of the receiving water;

(c) Determine whether or not those critical beneficial uses are being protected;

(d) Identify short-term and/or long-term improvements or degradation of those critical beneficial uses;

(e) Identify data gaps in the monitoring data necessary to assess Provisions D.4.a.(2)(a)-(d).

b. MS4 OUTFALL DISCHARGES ASSESSMENTS

(1) <u>Non-Storm Water Discharges Reduction Assessments</u>

(a) Each Copermittee must assess and report the progress of its illicit discharge detection and elimination program, required to be implemented pursuant to Provision E.2, toward effectively prohibiting non-storm water and illicit discharges into the MS4 within its jurisdiction as follows:

(i) Based on data collected pursuant to Provisions D.2.a.(2), the assessments under Provision D.4.b.(1)(b) must be included in the first Annual Report required pursuant to Provision F.3.b.(1).

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(ii) Based on the data collected pursuant to Provisions D.2.b, the assessments required under Provision D.4.b.(1)(c) must be included in the first Annual Report required pursuant to Provision F.3.b.(1), and annually thereafter.

(iii) Based on the data collected pursuant to Provisions D.2.b, the assessment required under Provision D.4.b.(1)(c) must be included in the Report of Waste Discharge required pursuant to F.5.b.

(b) Based on the transitional dry weather MS4 outfall discharge field screening monitoring required pursuant to Provision D.2.a.(2), each Copermittee must assess and report the following:

(i) Identify the known and suspected controllable sources (e.g. facilities, areas, land uses, pollutant generating activities) of transient and persistent flows within the Copermittee's jurisdiction in the Watershed Management Area;

(ii) Identify sources of transient and persistent flows within the Copermittee's jurisdiction in the Watershed Management Area that have been reduced or eliminated; and

(iii) Identify modifications to the field screening monitoring locations and frequencies for the MS4 outfalls in its inventory necessary to identify and eliminate sources of persistent flow non-storm water discharges pursuant to Provision D.2.b.(1).

(c) Based on the dry weather MS4 outfall discharge field screening monitoring required pursuant to Provision D.2.b, each Copermittee must assess and report the following:

(i) The assessments required pursuant to Provision D.4.b.(1)(b);

(ii) Based on the data collected and applicable NALs in the Water Quality Improvement Plan, rank the MS4 outfalls in the Copermittee's jurisdiction according to potential threat to receiving water quality, and produce a prioritized list of major MS4 outfalls for follow-up action to update the Water Quality Improvement Plan, with the goal of eliminating persistent flow non-storm water discharges and/or pollutant loads in order of the ranked priority list through targeted programmatic actions and source investigations;

(iii) For the highest priority major MS4 outfalls with persistent flows that are in exceedance of NALs, identify the known and suspected sources within the Copermittee's jurisdiction in the Watershed Management Area that may cause or contribute to the NAL exceedances;

(iv) Each Copermittee must analyze the data collected pursuant to Provision D.2.b, and utilize a model or other method, to calculate or estimate the non-storm water volumes and pollutant loads discharged from all the major MS4s outfalls in its jurisdiction identified as having persistent dry weather flows during the monitoring year. These calculations or estimates must be updated annually. Each Copermittee must calculate or estimate:

[a] Annual non-storm water volumes and pollutant loads discharged from the Copermittee's major MS4 outfalls to receiving waters within the Copermittee's jurisdiction, with an estimate of the percent contribution from each known and suspected source for each MS4 outfall;
[b] Annual non-storm water volumes and pollutant loads from areas or facilities subject to the Copermittee's legal authority that are discharged from the Copermittee's major MS4 outfalls to downstream receiving waters.

(v) Each Copermittee must review the data collected pursuant to Provision D.2.b and findings from the assessments required pursuant to Provision D.4.b.(1)(c)(i)-(iv) on an annual basis to:

[a] Identify reductions and progress in achieving reductions in non-storm water and illicit discharges to the Copermittee's MS4 in the Watershed Management Area;
[b] Assess the effectiveness of water quality improvement strategies being implemented by the Copermittees within the Watershed Management Area toward reducing or eliminating non-storm water and pollutant loads discharging from the MS4 to receiving waters within its jurisdiction, with an estimate, if possible, of the non-storm water volume and/or pollutant load reductions attributable to specific water quality strategies implemented by the Copermittee; and
[c] Identify modifications necessary to increase the effectiveness of the water quality improvement strategies implemented by the Copermittee in the Watershed Management Area toward reducing or eliminating non-storm water and pollutant loads discharging from the MS4 to receiving waters within its jurisdiction.

(vi) Identify data gaps in the monitoring data necessary to assess Provisions D.4.b.(2)(c)(i)-(v).

(2) Storm Water Pollutant Discharges Reduction Assessments

(a) The Copermittees must assess and report the progress of the water quality improvement strategies, required to be implemented pursuant to Provisions B and E, toward reducing pollutants in storm water discharges from the MS4s within the Watershed Management Area as follows:

(i) Based on data collected pursuant to Provisions D.2.a.(3), the assessments under Provision D.4.b.(2)(b) must be included in the first Annual Report required pursuant to Provision F.3.b.(1).

(ii) Based on the data collected pursuant to Provisions D.2.c, the assessments required under Provision D.4.b.(2)(c) must be included in the first Annual Report required pursuant to Provision F.3.b.(1), and annually thereafter.

(iii) Based on the data collected pursuant to Provisions D.2.c, the assessment required under Provisions D.4.b.(2)(c)-(d) must be included in the Report of Waste Discharge required pursuant to F.5.b.

(b) Based on the transitional wet weather MS4 outfall discharge monitoring required pursuant to Provision D.2.a.(3) the Copermittees must assess and report the following:

(i) The Copermittees must analyze the monitoring data collected pursuant to Provision D.2.a.(3), and utilize a watershed model or other method, to calculate or estimate storm water volumes and pollutant loads discharged from the MS4s in each Copermittee's jurisdiction within the Watershed Management Area. The Copermittees must calculate or estimate the following for each monitoring year:

[a] The average storm water runoff coefficient for each land use type within the Watershed Management Area;
[b] The volume of storm water discharged from the Copermittee's major MS4 outfalls in its jurisdiction to receiving waters within the Watershed Management Area for each storm event with measurable rainfall greater than 0.1 inch;
[c] The pollutant loads discharged from the Copermittee's major MS4 outfalls in its jurisdiction to receiving waters within the Watershed Management Area for each storm event with measurable rainfall greater than 0.1 inch; and
[d] The percent contribution of storm water volumes and pollutant loads discharged from each land use type within the drainage basin to the Copermittee's major MS4 outfalls in its jurisdiction to receiving waters within the Watershed Management Area for each storm event with measurable rainfall greater than 0.1 inch.

(ii) Identify modifications to the wet weather MS4 outfall discharge monitoring locations and/or frequencies necessary to identify sources pollutants in storm water discharges from the MS4s in the Watershed Management Area pursuant to Provision D.2.c.(1).

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(c) Based on the wet weather MS4 outfall discharge monitoring required pursuant to Provision D.2.c the Copermittees must assess and report the following:

(i) The assessments required pursuant to Provision D.4.b.(2)(b);

(ii) Based on the data collected and applicable SALs in the Water Quality Improvement Plan, rank the MS4 outfalls in the Watershed Management Area according to potential threat to receiving water quality, and produce a prioritized list of major MS4 outfalls for follow-up action to update the Water Quality Improvement Plan;

(iii) The Copermittees must review the data collected pursuant to Provision D.2.c and findings from the assessments required pursuant to Provisions D.4.b.(2)(c)(i)-(ii) on an annual basis to:

[a] Identify reductions or progress in achieving reductions in pollutant concentrations and/or pollutant loads from different land uses and/or drainage areas discharging from the Copermittees' MS4s in the Watershed Management Area;

[b] Assess the effectiveness of water quality improvement strategies being implemented by the Copermittees within the Watershed Management Area toward reducing pollutants in storm water discharges from the MS4s to receiving waters within the Watershed Management Area to the MEP, with an estimate, if possible, of the pollutant load reductions attributable to specific water quality strategies implemented by the Copermittees; and

[c] Identify modifications necessary to increase the effectiveness of the water quality improvement strategies implemented by the Copermittees in the Watershed Management Area toward reducing pollutants in storm water discharges from the MS4s to receiving waters in the Watershed Management Area to the MEP.

(iv) Identify data gaps in the monitoring data necessary to assess Provisions D.4.b.(2)(c)(i)-(iii).

(d) The Copermittees must evaluate all the data collected pursuant to Provision D.2.c, and incorporate new outfall monitoring data into time series plots for each long-term monitoring constituent for the Watershed Management Area, and perform statistical trends analysis on the cumulative long-term wet weather MS4 outfall discharge water quality data set.

c. Special Studies Assessments

The Copermittees must annually evaluate the results and findings from the special studies developed and implemented pursuant to Provision D.3, and assess their relevance to the Copermittees' efforts to characterize receiving water conditions, understand sources of pollutants and/or stressors, and control

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and reduce the discharges of pollutants from the MS4 outfalls to receiving waters in the Watershed Management Area. The Copermittees must report the results of the special studies assessments applicable to the Watershed Management Area, and identify any necessary modifications or updates to the Water Quality Improvement Plan based on the results in the Annual Reports required pursuant to Provision F.3.b.

d. INTEGRATED ASSESSMENT OF WATER QUALITY IMPROVEMENT PLAN

As part of the iterative approach and adaptive management process required for the Water Quality Improvement Plan pursuant to Provision B.5, the Copermittees in each Watershed Management Area must integrate the data collected pursuant to Provisions D.1-D.3, the findings from the assessments required pursuant to Provisions D.4.a-c, and information collected during the implementation of the jurisdictional runoff management programs required pursuant to Provision E to assess the effectiveness of, and identify necessary modifications to, the Water Quality Improvement Plan as follows:

(1) The Copermittees must re-evaluate the priority water quality conditions and numeric goals for the Watershed Management Area, as needed, during the term of this Order pursuant to Provision B.5.a. The re-evaluation and recommendations for modifications to the priority water quality conditions, and/or numeric goals and corresponding schedules may be provided in the Annual Reports required pursuant to Provision F.3.b, but must at least be provided in the Report of Waste Discharge pursuant to Provision F.5.b. The priority water quality conditions and numeric goals for the Watershed Management Area must be re-evaluated as follows:

(a) Re-evaluate the receiving water conditions in the Watershed Management Area in accordance with Provision B.2.a;

(b) Re-evaluate the impacts on receiving waters in the Watershed Management Area from MS4 discharges in accordance with Provision B.2.b;

(c) Re-evaluate the identification of MS4 sources of pollutants and/or stressors in accordance with Provision B.2.d;

(d) Identify beneficial uses of the receiving waters that are protected in accordance with Provision D.4.a;

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(e) Evaluate the progress toward achieving the interim and final numeric goals for protecting beneficial uses in the receiving waters.

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(2) The Copermittees must re-evaluate the water quality improvement strategies for the Watershed Management Area during the term of this Order pursuant to Provision B.5.b. The re-evaluation and recommendations for modifications

to the water quality improvement strategies and schedules must be provided in the Annual Reports required pursuant to Provision F.3.b, and provided in the Report of Waste Discharge pursuant to Provision F.5.b. The water quality improvement strategies for the Watershed Management Area must be re-evaluated as follows:

(a) Identify the non-storm water and storm water pollutant loads from the Copermittees' MS4 outfalls in the Watershed Management Area, calculated or estimated pursuant to Provisions D.4.b;

(b) Identify the non-storm water and storm water pollutant load reductions, or other improvements to receiving water or water quality conditions, that are necessary to attain the interim and final numeric goals for protecting beneficial uses in the receiving waters;

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(c) Identify the non-storm water and storm water pollutant load reductions, or other improvements to the quality of MS4 discharges, that are necessary for the Copermittees to demonstrate that non-storm water and storm water discharges from their MS4s are not causing or contributing to exceedances of receiving water limitations;

(d) Evaluate the progress of the water quality improvement strategies toward achieving the interim and final numeric goals for protecting beneficial uses in the receiving waters.

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(3) The Copermittees must re-evaluate and adapt the water quality monitoring and assessment program for the Watershed Management Area when new information becomes available to improve the monitoring and assessment program pursuant to Provision B.5.c. The re-evaluation and recommendations for modifications to the monitoring and assessment program may be provided in the Annual Reports required pursuant to Provision F.3.b, but must at least be provided in the Report of Waste Discharge pursuant to Provision F.5.b. Modifications to the water quality monitoring and assessment program must be consistent with the requirements of Provision D.1-D.3. The re-evaluation of the water quality monitoring and assessment program for the Watershed Management Area must consider the data gaps identified by the assessments required pursuant to Provisions D.4.a-b, and results of the special studies implemented pursuant to Provision D.4.c.

5. Monitoring Provisions

Each Copermittee must comply with all the monitoring, reporting, and recordkeeping provisions of the Standard Permit Provisions and General Provisions contained in Attachment B to this Order.

E. JURISDICTIONAL RUNOFF MANAGEMENT PROGRAMS

The purpose of this provision is for each Copermittee to implement a program to control non-stormwater discharges into and stormwater discharges from the MS4 within its jurisdiction and to focus and prioritize those implementation actions based on the highest water quality priorities identified within the associated Water Quality Improvement Plan. The goal of the jurisdictional runoff management programs is to implement strategies and actions that effectively prohibit non-storm water discharges into the MS4 and reduce the discharge of pollutants in storm water to the MEP. This goal will be accomplished through implementing the jurisdictional runoff management programs in accordance with the water quality priorities and strategies identified in the Water Quality Improvement Plans.

Each Copermittee must update its jurisdictional runoff management program document, in accordance with Provision F.2.a, to incorporate the requirements of Provision E consistent with the highest water quality priorities as identified in the corresponding Water Quality Improvement Plan. Until the Copermittee has updated its jurisdictional runoff management program document with the requirements of Provision E, the Copermittee must continue implementing its current jurisdictional runoff management program.

1. Legal Authority Establishment and Enforcement

a. Each Copermittee must establish, maintain, and enforce adequate legal authority within its jurisdiction to control pollutant discharges into and from its MS4 through statute, ordinance, permit, contract, order, or similar means. This legal authority must, at a minimum, authorize the Copermittee to:

(1) Effectively prohibit and eliminate all illicit discharges and illicit connections into its MS4;

(2) Control the contribution of pollutants in discharges of runoff associated with industrial and construction activity into its MS4 and control the quality of runoff from industrial and construction sites[23];

(3) Control the discharge of spills, dumping, or disposal of materials other than storm water into its MS4;

(4) Control through interagency agreements among Copermittees the contribution of pollutants from one portion of the MS4 to another portion of the MS4;

(5) Control, by coordinating and cooperating with other owners of the MS4 such

[23] The Copermittees will only be responsible for administering and enforcing the codes and ordinances applicable to their jurisdictions (i.e., a municipality is not responsible for administering and/or enforcing a permit issued by the State of California).

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Deleted: , including industrial and construction sites which have coverage under the statewide General Permit for Discharges of Storm Water Associated with Industrial Activities (Industrial General Permit) or General Permit for Discharges of Storm Water Associated with Construction Activities (Construction General Permit), as well as to those sites which do not

as Caltrans, the U.S. federal government, or sovereign Native American Tribes through interagency agreements, where possible, the contribution of pollutants from their portion of the MS4 to the portion of the MS4 within the Copermittee's jurisdiction;

(6) Require compliance with conditions in its statutes, ordinances, permits, contracts, orders, or similar means to hold dischargers to its MS4 accountable for their contributions of pollutants and flows;

(7) Require the use of BMPs to prevent or reduce the discharge of pollutants in storm water from its MS4 to the MEP;

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(9) Utilize enforcement mechanisms to require compliance with its statutes, ordinances, permits, contracts, orders, or similar means; and

(10) Carry out all inspections, surveillance, and monitoring procedures necessary to determine compliance and noncompliance with its statutes, ordinances, permits, contracts, orders, or similar means and with the requirements of this Order, including the effective prohibition of illicit discharges and connections to its MS4. The Copermittee's ordinance must include adequate legal authority, to the extent permitted by California and Federal Law and subject to the limitations on municipal action under the constitutions of California and the United States. The Copermittee must also have authority to enter, monitor, inspect, take measurements, review and copy records, and require regular reports from industrial facilities, including construction sites, discharging into its MS4.

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b. With the first Annual Report required pursuant to Provision F.3.b, each Copermittee must submit a statement certified by its Principal Executive Officer, Ranking Elected Official, or Duly Authorized Representative that the Copermittee has taken the necessary steps to obtain and maintain full legal authority within its jurisdiction to implement and enforce each of the requirements contained in this Order.

2. Illicit Discharge Detection and Elimination

Each Copermittee must implement a program to actively detect and eliminate illicit discharges and improper disposal into the MS4, or otherwise require the discharger to apply for and obtain a separate NPDES permit. The illicit discharge detection and elimination program must be implemented in accordance with the strategies identified in the Water Quality Improvement Plan. The requirements of the jurisdictional runoff management programs as outlined below may be modified and prioritized as appropriate for consistency with the highest water quality priorities and strategies as identified in the corresponding Water Quality Improvement Plan(s).

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a. STRATEGIES TO ADDRESS THE HIGHEST PRIORITY WATER QUALITY CONDITIONS

Each Copermittee must describe in its jurisdictional runoff management program document the strategies and/or activities that will be implemented as part of the illicit discharge detection and elimination program to address illicit discharges and connections that the Copermittee has identified as potential sources of pollutants and/or stressors that contribute to the highest priority water quality conditions in the Watershed Management Area as follows:

(1) Provide specific details about how the strategies and/or activities will be implemented (e.g. designate BMPs, focus education, and/or increase/decrease frequency of inspections in specific areas); and

(2) The strategies and/or activities must be consistent with the requirements of Provisions E.2.a-d and the strategies identified in the Water Quality Improvement Plan.

b. NON-STORM WATER DISCHARGES

Each Copermittee must address non-storm water discharges as illicit discharges, where the likelihood exists that they are a source of pollutants to the waters of the state, unless the discharge is either identified as a discharge authorized by a separate NPDES permit, or identified as a category of non-storm water discharges that must be addressed pursuant to the following requirements:

(1) Discharges of non-storm water from water line flushing and water main breaks to the MS4 must be addressed as illicit discharges unless the discharge has coverage under NPDES Permit No. CAG 679001 (Order No. R9-2010-0003, or subsequent order). This category includes water line flushing and water main break discharges from water purveyors issued a water supply permit by the California Department of Public Health or federal military installations. Discharges from recycled or reclaimed water lines to the MS4 must be addressed as illicit discharges, unless the discharges have coverage under a separate NPDES permit.

(2) Discharges of non-storm water to the MS4 from the following categories must be addressed by the Copermittee as illicit discharges only if the Copermittee or the San Diego Water Board identifies the discharge as a source of pollutants to receiving waters:

(a) Diverted stream flows;

(b) Rising ground waters;

(c) Uncontaminated ground water infiltration to MS4s;

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<#>Uncontaminated pumped ground water;¶
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Discharges from foundation drains;

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<#>Water from crawl space pumps; and¶
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<#>Water from footing drains.[19]¶
¶

(d) Uncontaminated pumped ground water;

(e) Discharges from foundation drains;[25]

(f) Springs;

(g) Water from crawl space pumps;

(h) Water from footing drains;[24]

(i) Flows from riparian habitats and wetlands;

(j) Discharges from potable water sources;

(k) Discharges from foundation drains;[26] and

(l) Discharges from footing drains.[26]

(3) Discharges of non-storm water into the MS4 from the following categories must be controlled by the requirements given below through statute, ordinance, permit, contract, order, or similar means, where there is evidence that those discharges are a source of pollutants to waters of the state. Discharges of non-storm water into the MS4 from the following categories not controlled by the requirements given below through statute, ordinance, permit, contract, order, or similar means must be addressed by the Copermittee as illicit discharges.

(a) Air conditioning condensation

The discharge of air conditioning condensation must be directed to landscaped areas or other pervious surfaces where feasible.

(b) Individual residential vehicle washing

(i) The discharge of wash water must be directed to landscaped areas or other pervious surfaces where feasible; and

(ii) Minimize the use of water for vehicle washing, use as little washing detergent and other vehicle wash products as possible, wash vehicles at commercial wash facilities, and implement other practices or behaviors that will prevent the discharge of pollutants associated

[25] Provision E.2.a.(1) only applies to this category on non-storm water if the system is designed to be located at or below the highest historical groundwater table to actively or passively extract groundwater during any part of the year.
[26] Provision E.2.a.(3) only applies to this category of non-storm water discharge if the system is designed to be located above the highest historical groundwater table at all times of the year, and the system is only expected to discharge non-storm water under unusual circumstances.

with individual residential vehicle washing from entering the MS4.

(c) Dechlorinated swimming pool discharges

(i) Eliminate residual chlorine, algaecide, filter backwash, or other pollutants from swimming pools prior to discharging to the MS4; and

(ii) The discharge of saline swimming pool water must be directed to the sanitary sewer, landscaped areas, or other pervious surfaces that can accommodate the volume of water, unless the saline swimming pool water can be discharged via a pipe or concrete channel directly to a naturally saline water body (e.g. Pacific Ocean).

(4) Firefighting discharges to the MS4 must continue to be addressed by the Copermittees as follows:

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(a) Non-emergency firefighting discharges

(i) Building fire suppression system maintenance discharges (e.g. sprinkler line flushing) to the MS4 must be addressed as illicit discharges.

(ii) Non-emergency firefighting discharges (i.e., discharges from controlled or practice blazes, firefighting training, and maintenance activities not associated with building fire suppression systems) must be addressed by a program, to be developed and implemented by the Copermittee in conjunction with the local Fire Authority/District, to reduce or eliminate pollutants in such discharges from entering the MS4.

(b) Emergency firefighting discharges (i.e., flows necessary for the protection of life or property) do not require BMPs and need not be prohibited.

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Each Copermittee should develop and encourage implementation of BMPs to reduce or eliminate pollutants in emergency firefighting discharges to the MS4s and receiving waters within its jurisdiction. During emergency situations, priority of efforts should be directed toward life, property, and the environment (in descending order). BMPs should not interfere with immediate emergency response operations or impact public health and safety.¶

(5) If the Copermittee or San Diego Water Board identifies any category of non-storm water discharges listed under Provisions E.2.a.(1)-(4) as a source of pollutants to receiving waters, the category must be prohibited through ordinance, order, or similar means and addressed as an illicit discharge.

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(7) Each Copermittee must, where feasible, reduce or eliminate non-storm water discharges listed under Provisions E.2.a.(1)-(4) into its MS4 whether or not the non-storm water discharge has been identified as an illicit discharge, unless a non-storm water discharge is identified as a discharge authorized by a separate NPDES permit.

c. Prevent And Detect Illicit Discharges And Connections

Each Copermittee must include the following measures within its program to prevent and detect illicit discharges to the MS4:

(1) Each Copermittee must maintain an updated map of its entire MS4 and the corresponding drainage areas. The accuracy of the MS4 map must be confirmed during the field screening required pursuant to Provision E.2.c. The MS4 map must be included as part of the jurisdictional runoff management program document. Any geographic information system (GIS)

layers or files used by the Copermittee to maintain the MS4 map must be made available to the San Diego Water Board upon request. The MS4 map must identify the following:

(a) All segments of the MS4 owned, operated, and maintained by the Copermittee;

(b) All known locations of inlets that discharge and/or collect runoff into the Copermittee's MS4;

(c) All known locations of connections with other MS4s not owned or operated by the Copermittee (e.g. Caltrans MS4s);

(d) All known locations of MS4 outfalls and private outfalls that discharge runoff collected from areas within the Copermittee's jurisdiction;

(e) All segments of receiving waters within the Copermittee's jurisdiction that receive and convey runoff discharged from the Copermittee's MS4 outfalls;

(f) Locations of the MS4 outfalls, identified pursuant to Provision D.2.a.(1), within its jurisdiction; and

(g) Locations of the non-storm water persistent flow MS4 outfall discharge monitoring stations, identified pursuant to Provision D.2.b.(2)(b), within its jurisdiction.

(2) Each Copermittee must use Copermittee personnel and contractors to assist in identifying and reporting illicit discharges and connections during their daily employment activities.

(3) Each Copermittee must promote, publicize, and facilitate public reporting of the presence of illicit discharges or water quality impacts associated with discharges into or from the MS4, including the following methods for public reporting:

(a) Operate a public hotline, which can be Copermittee-specific or shared by the Copermittees, and must be capable of receiving reports in both English and Spanish 24 hours per day and seven days per week; and

(b) Designate an e-mail address for receiving electronic reports from the public, which can be Copermittee-specific or shared by the Copermittees, and must be prominently displayed on the Copermittee's webpage and the Regional Clearinghouse required pursuant to Provision F.4.

(4) Each Copermittee must implement practices and procedures (including a notification mechanism) to prevent, respond to, contain, and clean up any

spills that may discharge into the MS4 within its jurisdiction from any source. The Copermittee must coordinate, to the extent possible, with spill response teams to prevent entry of spills into the MS4, and prevent contamination of surface water, ground water, and soil. The Copermittee must coordinate spill prevention, containment, and response activities throughout all appropriate Copermittee departments, programs, and agencies.

(5) Each Copermittee must implement practices and procedures to prevent and limit infiltration of seepage from sanitary sewers (including private laterals and failing septic systems) to the MS4.

(6) Each Copermittee must coordinate, when necessary, with upstream Copermittees and/or entities to prevent illicit discharges from upstream sources into the MS4 within its jurisdiction.

d. Field Screening

Each Copermittee must conduct field screening (i.e. visual observations, field testing, and/or analytical testing) of MS4 outfalls and other portions of its MS4 within its jurisdiction to detect illicit discharges and connections to the MS4 in accordance with the dry weather MS4 outfall discharge monitoring requirements in Provisions D.2.a.(2) and D.2.b.(1).

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e. Investigate and Eliminate Illicit Discharges And Connections

Each Copermittee must include the following measures within its program to investigate and eliminate illicit discharges to the MS4:

(1) Each Copermittee must prioritize and determine when follow-up investigations will be performed in response to visual observations and/or water quality monitoring data collected during an investigation of a detected non-storm water or illicit discharge into or from the MS4. The criteria for prioritizing investigations must consider the following:

(a) Pollutants identified as causing or contributing to the highest water quality priorities identified in the Water Quality Improvement Plan;

(b) Pollutants identified as causing or contributing, or threatening to cause or contribute to impairments in water bodies on the 303(d) List and/or in environmentally sensitive areas (ESAs), located within its jurisdiction;

(c) Pollutants identified from sources or land uses known to exist within the area, drainage basin, or watershed that discharges to the portion of the MS4 within its jurisdiction included in the investigation;

(d) Pollutants identified as causing or contributing to an exceedance of an

NAL described in Provision C.1; and

(e) Pollutants identified as an immediate and significant threat to human health or the environment.

(2) Each Copermittee must implement procedures to investigate and inspect portions of its MS4 that, based on reports or notifications, field screening, or other appropriate information, indicate a reasonable potential of receiving, containing, or discharging pollutants due to illicit discharges or illicit connections. The procedures must include the following:

(a) Each Copermittee must develop criteria to:

(i) Assess the validity of each report or notification received; and

(ii) Prioritize the response to each report or notification received.

(b) Each Copermittee must prioritize and respond to each valid report or notification (e.g., public reports, staff or contractor reports and notifications, etc.) of an incident in a timely manner.

(c) Each Copermittee must investigate and seek to identify the source(s) of illicit discharges or illicit connections observed into and from the MS4 during the field screening required pursuant to Provision D.2.b.(1) as follows:

(i) Obvious illicit discharges must be immediately investigated to identify the source(s);

(ii) The investigation must include field investigations to identify sources or potential sources for the discharge, unless the source or potential source has already been identified during previous investigations; and

(iii) The investigation may include follow-up field investigations and/or reviewing Copermittee inventories and other land use data to identify potential sources of the discharge.

(d) Each Copermittee must maintain records and a database of the following information:

(i) Location of incident, including hydrologic subarea, portion of MS4 receiving the illicit discharge or connection, and point of discharge or potential discharge from MS4 to receiving water;

(ii) Source of information initiating the investigation (e.g., public reports, staff or contractor reports and notifications, field screening, etc.);

(iii) Date the information used to initiate the investigation was received;

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(iv) Date the investigation was initiated;

(v) Dates of follow-up investigations;

(vi) Identified or suspected source of the illicit discharge or connection, if determined;

(vii) Known or suspected related incidents, if any;

(viii) Result of the investigation; and

(ix) If a source cannot be identified and the investigation is not continued, a rationale for why a discharge does not pose a threat to water quality and/or does not require additional investigation.

(e) Each Copermittee must track and seek to identify the source(s) of illicit discharges or connections from the MS4 where there is evidence of illicit discharges or connections having been discharged into or from the MS4 (e.g., pooled water), in accordance with MS4 outfall discharge monitoring requirements in Provisions D.2.a.(2) and D.2.b.

(3) Each Copermittee must initiate the implementation of procedures, in a timely manner, to eliminate all detected and identified illicit discharges and connections within its jurisdiction. The procedures must include the following responses:

(a) Each Copermittee must enforce its legal authority, as required under Provision E.1, to eliminate illicit discharges and connections to the MS4.

(b) If the Copermittee identifies the source as a controllable source, the Copermittee must implement its Enforcement Response Plan pursuant to Provision E.6 and enforce its legal authority to prohibit and eliminate illicit discharges and connections to its MS4.

(c) If the Copermittee identifies the source of the discharge as a category of non-storm water discharges in Provision E.2.a, and the discharge is in exceedance of the NALs, then the Copermittee must determine if: (1) this is an isolated incident or set of circumstances that will be addressed through its Enforcement Response Plan pursuant to Provision E.6, or (2) the category of discharge must be addressed through the prohibition of that category of discharge as an illicit discharge pursuant to Provision E.2.a.(6).

(d) If the Copermittee suspects the source of the illicit discharge or connection as natural in origin (i.e. non-anthropogenically influenced) and in conveyance into the MS4, then the Copermittee must document and provide the data and evidence necessary to demonstrate to the San Diego Water Board that it is natural in origin and does not require further investigation.

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(e) If the Copermittee is unable to identify and document the source of a recurring illicit discharges or connections into or from the MS4, then the Copermittee must address the discharge and update its jurisdictional runoff management program to address the common and suspected sources of the discharge within its jurisdiction in accordance with the Copermittee's priorities.

(4) Each Copermittee must submit a summary of the illicit discharges and connections investigated and eliminated within its jurisdiction with each Annual Report required under Provision F.3.b of this Order.

3. Development Planning

Each Copermittee must use their land use and planning authorities to implement a development planning program in accordance with the strategies identified in the Water Quality Improvement Plan. The requirements of the jurisdictional runoff management programs as outlined below may be modified and prioritized as appropriate for consistency with the highest water quality priorities and strategies as identified in the corresponding Water Quality Improvement Plan(s).

a. Strategies to Address the Highest Priority Water Quality Conditions

Each Copermittee must describe in its jurisdictional runoff management program document the strategies and/or activities that will be implemented as part of the development planning program to address development and redevelopment projects that may become sources of pollutants and/or stressors that contribute to the highest priority water quality conditions in the Watershed Management Area as follows:

(1) Provide specific details about how the strategies and/or activities will be implemented (e.g. designate BMPs, focus education, increase frequency of verifications and/or inspections, alternative compliance options);

(2) Each Copermittee must identify areas within its jurisdiction where Priority Development Projects may be allowed or should be encouraged to implement or contribute toward the implementation of alternative compliance retrofitting and/or stream, channel, or habitat rehabilitation projects;

(3) Each Copermittee should collaborate and cooperate with other Copermittees and/or entities in the Watershed Management Area to identify regional alternative compliance projects that Priority Development Projects may be allowed or should be encouraged to implement or participate in implementing; and

(4) The strategies and/or activities must be consistent with the requirements of Provisions E.3.b-d and E.3.f-g and the strategies identified in the Water Quality Improvement Plan.

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<#>Strategies to Address the Highest Priority Water Quality Conditions ¶
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Each Copermittee must describe in its jurisdictional runoff management program document the strategies and/or activities that will be implemented as part of the illicit discharge detection and elimination program to address non-storm water and illicit discharges and connections that the Copermittee has identified as potential sources of pollutants and/or stressors that contribute to the highest priority water quality conditions in the Watershed Management Area as follows:¶
¶
<#>Provide specific details about how the strategies and/or activities will be implemented (e.g. designate additional BMPs, focus education, and/or increase/decrease frequency of inspections in specific areas); and¶
¶
<#>The strategies and/or activities must be consistent with the requirements of Provisions E.2.a-d and the strategies identified in the Water Quality Improvement Plan.¶

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b. BMP Requirements for All Development Projects

Each Copermittee must prescribe the following BMP requirements during the planning process (i.e. prior to project approval and issuance of local permits) for all development projects (regardless of project type or size), where local permits are issued, including unpaved roads and flood management projects:

(1) General Requirements

(a) Onsite BMPs must be located so as to remove pollutants from runoff prior to its discharge to any receiving waters, and as close to the source as possible; and

(b) Structural BMPs must not be constructed within a waters of the U.S. or waters of the state.

(2) Source Control BMP Requirements

The following source control BMPs must be implemented at all development projects where applicable and feasible:

(a) Prevention of illicit discharges into the MS4;

(b) Storm drain system stenciling or signage;

(c) Properly designed outdoor material storage areas;

(d) Properly designed outdoor work areas;

(e) Properly designed trash storage areas; and

(f) Any additional BMPs necessary to minimize pollutant generation at each project.

(3) Low Impact Development (LID) BMP Requirements

The following LID BMPs must be implemented at all development projects where applicable and feasible:

(a) Maintenance or restoration of natural storage reservoirs and drainage corridors (including topographic depressions, areas of permeable soils, natural swales, and ephemeral and intermittent streams);[27]

[27] Development projects proposing to dredge or fill materials in waters of the U.S. must obtain a CWA Section 401 Water Quality Certification. Projects proposing to dredge or fill waters of the state must obtain waste discharge requirements.

(b) Buffer zones for natural water bodies (where buffer zones are technically infeasible, require project applicant to include other buffers such as trees, access restrictions, etc.);

(c) Conservation of natural areas within the project footprint including existing trees, other vegetation, and soils;

(d) Construction of streets, sidewalks, or parking lot aisles to the minimum widths necessary, provided public safety is not compromised;

(e) Minimization of the impervious footprint of the project;

(f) Minimization of soil compaction to landscaped areas;

(g) Disconnection of impervious surfaces through distributed pervious areas;

(h) Landscaped or other pervious areas designed and constructed to effectively receive and infiltrate, retain and/or treat runoff from impervious areas, prior to discharging to the MS4;

(i) Small collection strategies located at, or as close as possible to, the source (i.e. the point where storm water initially meets the ground) to minimize the transport of runoff and pollutants to the MS4 and receiving waters;

(j) Use of permeable materials for projects with low traffic areas and appropriate soil conditions;

(k) Landscaping with native or drought tolerant species; and

(l) Harvesting and using precipitation.

c. PRIORITY DEVELOPMENT PROJECTS

(1) Definition of Priority Development Project

Priority Development Projects include the following:
(a) All new development projects that fall under the Priority Development Project categories listed under Provision E.3.b.(2); and

(b) Those redevelopment projects that create, add, or replace at least 5,000 square feet of impervious surfaces on an already developed site, and the redevelopment project is a Priority Development Project category listed under Provision E.3.b.(2) (where redevelopment results in an increase of less than fifty percent of the impervious surfaces of a previously existing

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(2) Priority Development Project Categories

(a) New development projects that create 10,000 square feet or more of impervious surfaces (collectively over the entire project site). This category includes commercial, industrial, residential, mixed-use, and public development projects on public or private land which fall under the planning and building authority of the Copermittee.

(b) Automotive repair shops. This category is defined as a facility that is categorized in any one of the following Standard Industrial Classification (SIC) codes: 5013, 5014, 5541, 7532-7534, or 7536-7539.

(c) Restaurants. This category is defined as a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC code 5812), where the land area for development is 5,000 square feet or more.

(d) Hillside development projects. This category includes any development which creates 5,000 square feet or more of impervious surface which is located in an area with known erosive soil conditions, where the development will grade on any natural slope that is twenty-five percent or greater.

(e) Environmentally sensitive areas (ESAs). This category includes any development located within, directly adjacent to, or discharging directly to an ESA, which either creates 2,500 square feet of impervious surface on a proposed project site or increases the area of imperviousness of a proposed project site to 10 percent or more of its naturally occurring condition. “Directly adjacent to” means situated within 200 feet of the ESA. “Discharging directly to” means outflow from a drainage conveyance system that collects runoff from the subject development or redevelopment site and terminates at or in receiving waters within the ESA.

(f) Parking lots. This category is defined as a land area or facility for the temporary parking or storage of motor vehicles used personally, for business, or for commerce that has 5,000 square feet or more of impervious surface.

(g) Streets, roads, highways, and freeways. This category is defined as any paved impervious surface that is 5,000 square feet or more used for the transportation of automobiles, trucks, motorcycles, and other internal combustion vehicles.

(h) Retail gasoline outlets (RGOs). This category includes RGOs that meet the following criteria: (a) 5,000 square feet or more or (b) a projected Average Daily Traffic (ADT) of 100 or more vehicles per day.

(i) Large development projects. This category includes any post-construction pollutant-generating new development projects that result in the disturbance of one acre or more of land.

(3) Priority Development Project Exemptions

Each Copermittee has the discretion to exempt the following projects from being defined as Priority Development Projects:

(a) Sidewalks, bicycle lanes, driveways, parking lots, or trails that meet the following criteria:

(i) Designed and constructed to direct storm water runoff to adjacent vegetated areas, or other non-erodible permeable areas; OR

(ii) Designed and constructed to be hydraulically disconnected from paved streets or roads; OR

(iii) Designed and constructed with permeable pavements or surfaces in accordance with USEPA Green Streets guidance.[28]

(b) Any impervious surface that is 5,000 square feet or more used for the transportation of automobiles, trucks, motorcycles, and other vehicles that follows the USEPA guidance regarding Managing Wet Weather with Green Infrastructure: Green Streets1to the MEP. ;

(c) Single-family residential projects that are not part of a larger development or proposed subdivision.

[32] This volume is not a single volume to be applied to all areas covered by this Order. The size of the 85th percentile storm event is different for various parts of the San Diego Region. The Copermittees are encouraged to calculate the 85th percentile storm event for each of its jurisdictions using local rain data pertinent to its particular jurisdiction. In addition, isopluvial maps may be used to extrapolate rainfall data to areas where insufficient data exists in order to determine the volume of the local 85th percentile storm event in such areas. Where the Copermittees will use isopluvial maps to determine the 85th percentile storm event in areas lacking rain data, the Copermittees must describe their method for using isopluvial maps in its BMP Design Manuals.

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<#>Must be a retrofitting project implemented as part of an alternative compliance project option under Provision E.3.c.(3)(b)(v) to achieve the performance requirements of Provisions E.3.c.(1) and/or E.3.c.(2) for a Priority Development Project; AND¶
¶
<#>Designed and constructed in accordance with the USEPA Green Streets guidance.[29]¶

Deleted: New single family residences that meet the following criteria:

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Deleted: <#>Must not be constructed as part of a larger development or proposed subdivision; AND¶
¶
<#>Designed and constructed to be certified under the U.S. Green Building Council (USGCB) Leadership in Energy and Environmental Design (LEED) for Homes green building certification program, receiving at least four (4) Surface Water Management credits under the Sustainable Sites category;[30] OR¶
¶
<#>Designed and constructed with structural BMPs that will achieve the performance requirements of Provisions E.3.c.(1) and E.3.c.(2) onsite.¶

Deleted: [28] See "Managing Wet Weather with Green Infrastructure – Municipal Handbook: Green Streets" (USEPA, 2008).¶

(d) Flood control and stream restoration projects.

(e) Emergency public safety projects in any of the Priority Development Categories may be excluded if the delay caused due to the requirement for a SSMP compromises public safety, public health and/or environmental protection

d. PRIORITY DEVELOPMENT PROJECT STRUCTURAL BMP PERFORMANCE REQUIREMENTS

In addition to the BMP requirements listed for all development projects under Provision E.3.a, Priority Development Projects must also implement structural BMPs that conform to performance requirements below. If watershed-specific performance requirements are developed as part of a Water Quality Improvement Plan; these requirements would take precedence over the general performance requirements below. The watershed-specific requirement must provide at least equal protection as the general performance requirements below.

(1) On-site Storm Water Pollutant Control Structural BMP Requirements

Each Copermittee must require each Priority Development Project to implement onsite structural BMPs to control pollutants in storm water that may be discharged from a project as follows:

(a) Each Priority Development Project must be required to implement LID BMPs that are designed to retain (i.e. intercept, store, infiltrate, evaporate, and evapotranspire) onsite the pollutants contained in the design capture volume. The design capture volume is equivalent to:

(i) The volume of storm water runoff produced from a 24-hour 85th percentile storm event;[32] OR

(ii) The average annual volume of storm water runoff that would be retained onsite annually if the site was fully undeveloped and naturally vegetated, as determined using continuous simulation modeling or other techniques based on site-specific soil conditions and typical native vegetative cover.

(b) A Priority Development Project may be allowed to utilize alternative compliance under Provision E.3.c.(3) to comply with the storm water

[32] This volume is not a single volume to be applied to all areas covered by this Order. The size of the 85th percentile storm event is different for various parts of the San Diego Region. The Copermittees are encouraged to calculate the 85th percentile storm event for each of its jurisdictions using local rain data pertinent to its particular jurisdiction. In addition, isopluvial maps may be used to extrapolate rainfall data to areas where insufficient data exists in order to determine the volume of the local 85th percentile storm event in such areas. Where the Copermittees will use isopluvial maps to determine the 85th percentile storm event in areas lacking rain data, the Copermittees must describe their method for using isopluvial maps in its BMP Design Manuals.

Deleted: Redevelopment of existing single family residences that meet the following criteria:

Deleted: Designed and constructed to be certified under the USGCB LEED for Homes green building certification program, receiving at least four (4) Surface Water Management credits under the Sustainable Sites category;

Deleted: [31] OR¶
¶
Designed and constructed with structural BMPs that will achieve the performance requirements of Provisions E.3.c.(1) and E.3.c.(2) onsite

pollutant control BMP performance requirements of Provision E.3.c.(1)(a).

(c) If a Priority Development project is allowed to utilize alternative compliance pursuant to Provisions E.3.c.(1)(b), flow-thru conventional treatment control BMPs must be implemented to treat the portion of the design capture volume that is not retained onsite. Additionally, project applicants must mitigate for the portion of the pollutant load in the design capture volume that is not retained onsite through one or more alternative compliance options under Provision E.3.c.(3). Conventional treatment control BMPs must be sized and designed to:

(i) Remove pollutants from storm water to the MEP;

(ii) Filter or treat either: 1) the maximum flow rate of runoff produced from a rainfall intensity of 0.2 inch of rainfall per hour, for each hour of a storm event, or 2) the maximum flow rate of runoff produced by the 85th percentile hourly rainfall intensity (for each hour of a storm event), as determined from the local historical rainfall record, multiplied by a factor of two;

(iii) Be ranked with high or medium pollutant removal efficiency for the Priority Development Project's most significant pollutants of concern. Conventional treatment control BMPs with a low removal efficiency ranking must only be approved by a Copermittee when a feasibility analysis has been conducted which exhibits that implementation of conventional treatment control BMPs with high or medium removal efficiency rankings are infeasible for a Priority Development Project or portion of a Priority Development Project.

(2) On-site Hydromodification Management Structural BMP Requirements

Each Copermittee must require each Priority Development Project to implement onsite structural BMPs to manage hydromodification to ensure that storm water runoff discharged from a project does not cause adverse hydromodification impacts in the downstream receiving waters.

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Deleted: as follows:

The Copermittees in each Watershed Management Area may establish, as part of the WQIP, watershed specific requirements that will apply to priority development projects based on the susceptibility of the receiving waters to hydromodification impacts and historic receiving water changes from development. If watershed specific requirements are developed they will supersede requirements in the HMP. The watershed specific requirements must include the following:

(a) Post-project runoff flow rates and durations must not exceed the performance standard for runoff flow rates and durations to be determined as part of the development of the WQIPs for each Watershed Management Area by more than 10 percent (for the range of flows that result in increased potential for erosion, or degraded instream habitat conditions downstream of Priority Development Projects).

(i) In evaluating the range of flows that results in increased potential for erosion of natural (non-hardened) channels, the lower boundary must correspond with the critical channel flow that produces the critical shear stress that initiates channel bed movement or that erodes the toe of channel banks.

(ii) The Copermittees may use monitoring results collected pursuant to Provision D.1.a.(2) to re-define the range of flows resulting in increased potential for erosion, or degraded instream habitat conditions, as warranted by the data.

Deleted: <#>For artificially hardened channels, analysis to identify the lower boundary must use characteristics of a natural stream segment similar to that found in the watershed. The lower boundary must correspond with the critical channel flow that produces the critical shear stress that initiates channel bed movement or erodes the toe of the channel banks.¶

(b) Post-project runoff flow rates and durations must compensate for the loss of sediment supply due to the development project, should loss of sediment supply occur as a result of the development project.

(c) A Priority Development Project may be allowed to utilize alternative compliance under Provision E.3.c.(3) to comply with the performance requirements of Provisions E.3.c.(2)(a)-(b).

(d) Exemptions

Each Copermittee has the discretion to exempt a Priority Development Project from the hydromodification management BMP performance requirements of Provisions E.3.c.(2)(a)-(b) where the project:

(i) Discharges storm water runoff into existing underground storm drains discharging directly to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean;

(ii) Discharges storm water runoff into conveyance channels that are engineered for the capacity to convey the 10-year ultimate build out condition flow and are regularly maintained to ensure flow capacity all the way from the point of discharge to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.

(iii) Discharges to large rivers where large rivers are defined as reaches for which the contributing drainage area exceeds 100 square miles and with a 100-year design flow in excess of 20,000 cfs.

(iv) Discharges from infill redevelopment projects that meet criteria to be established in updates to the Copermittees' HMPs.

(v) Flood control and stream restoration projects.

(vi) Is a redevelopment Priority Development Project that meets the alternative compliance requirements of Provision E.3.c.(3)(b)(ii); or

(vii) Discharges storm water runoff into other areas identified by the San Diego Water Board as exempt from the requirements of Provisions E.3.c.(2)(a)-(b).

If the Copermittees in a Watershed Management Area select not to develop watershed specific requirements, development projects will be subject to the current Copermitee HMPs inclusive of the exemptions identified in Section E.3.c.(2)(d) that will integrated into updated Copermittee HMPs.

(3) Alternative Compliance to Onsite Structural BMP Performance Requirements

(a) Applicability

At the discretion of each Copermittee, Priority Development Projects may be allowed to utilize an alternative option to comply with the onsite structural BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2) under the following conditions:

(i) The Copermittee must determine that implementation of the alternative compliance option will have a greater overall water quality benefit for the Watershed Management Area than fully complying with the performance requirements of Provisions E.3.c.(1) and E.3.c.(2) onsite;

(ii) The alternative compliance options must be designed by a registered professional engineer, geologist, architect, or landscape architect;

(iii) The alternative compliance options must be implemented within the same hydrologic unit as the Priority Development Project, and preferably within the same hydrologic subarea;

(iv) Receiving waters must not be utilized to convey storm water runoff to the alternative compliance options;

(v) The pollutants in storm water runoff from the Priority Development Project must be treated to the MEP by the alternative compliance options prior to being discharged to receiving waters;

(vi) Unless otherwise allowed by Provision E.3.c.(3)(b), the alternative compliance options must have a net result of at least the same level of pollutant removal as would have been achieved if the Priority Development Project had fully complied with the storm water pollutant control BMP performance requirements of Provision E.3.c.(1) onsite;

(vii) Unless otherwise allowed by Provision E.3.c.(3)(b), the alternative compliance options must have a net result of at least the same level of protection from potential downstream and upstream erosion in the receiving water as would have been achieved if the Priority Development Project had fully complied with the hydromodification management BMP performance requirements of Provision E.3.c.(2) onsite; and

(viii) The alternative compliance options utilized by the Priority Development Project to comply with the performance requirements of Provisions E.3.c.(1) and E.3.c.(2) must have reliable sources of funding for operation and maintenance.

(b) Alternative Compliance Project Options

The Copermittee may allow implementation of one or more of the following project options as part of an alternative approach to complying with the onsite structural BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2):

(i) *Onsite LID Biofiltration Treatment Control BMPs*

The Copermittee may allow Priority Development Projects to utilize onsite LID biofiltration treatment control BMPs to comply with the storm water pollutant control BMP performance requirements of Provision E.3.c.(1). Onsite LID biofiltration treatment control BMPs must be sized and designed to:

[a] Remove pollutants from storm water to the MEP; AND
[b] Have an appropriate surface loading rate to prevent erosion, scour and channeling within the BMP; AND
[c] Biofilter up to the design capture volume that is not reliably retained onsite, and if necessary, mitigate for the portion of the pollutant load in the design capture volume not retained onsite through one or more alternative compliance project, in-lieu fee and/or water quality credit system options below.

(ii) *Watershed-Based Planned Development Projects*

The Copermittee may allow Priority Development Projects greater than 100 acres in total project size (or smaller than 100 acres in size yet part of a larger common plan of development that is over 100 acres) to comply with the onsite structural BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2). The Priority Development Project must comply with the following conditions:

[a] The Priority Development Project was planned utilizing watershed and/or subwatershed based water quality, hydrologic, and fluvial geomorphologic planning principles that implement regional LID BMPs in accordance with the performance and location criteria of

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[c] Biofilter at least 1.5 times the design capture volume that is not reliably retained onsite; OR

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Deleted: AND 1) treat the remaining portion of the design capture volume not retained onsite with conventional treatment control BMPs in accordance with Provision E.3.c.(1)(c),

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Deleted: <#>*LEED Certified Redevelopment Projects*¶
¶
The Copermittee may allow redevelopment Priority Development Projects to comply with the hydromodification management BMP performance requirements of Provision E.3.c.(2) where the project is designed and constructed to be certified under the USGCB LEED for New Construction and Major Renovations green building certification program. The Priority Development Project must receive at least one (1) Site Design credit and two (2) Stormwater Design credits under the Sustainable Sites category.[33] In addition, the existing and future configuration of the receiving water must not be unnaturally altered or adversely impacted by storm water flow rates and durations discharged from the site.¶

this Order and acceptable to the San Diego Water Board;

[b] Regional BMPs may be used provided that the BMPs capture and retain the volume of runoff produced from the design capture volume defined in Provision E.3.c.(1)(a)(i) and that such controls are located upstream of receiving waters;

[c] Regional BMPs must clearly exhibit that they will not result in a net impact from pollutant loadings over and above the impact caused by capture and retention of the design capture volume;

[d] Any portion of the design capture volume that is not retained by the regional BMPs must be treated using biofiltration BMPs; and

[e] Where regional BMPs are demonstrated to the Copermittee as technically infeasible to retain the entire design capture volume, any volume up to and including the design capture volume not retained by regional BMPs, nor treated by biofiltration BMPs, must be treated using conventional treatment control BMPs and the project applicant must implement additional alternative compliance project, in-lieu fee and/or water quality credit system options below.

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(iii) *Offsite Regional BMPs*

[a] The Copermittee may allow Priority Development Projects to utilize offsite regional BMPs to comply with the storm water pollutant control BMP performance requirements of Provision E.3.c.(1) if the offsite regional BMPs have the capacity to receive and retain the design capture volume that is not reliably retained onsite.

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[b] The Copermittee may allow Priority Development Projects to utilize offsite regional BMPs to comply with the hydromodification management BMP performance requirements of Provision E.3.c.(2) if the offsite regional BMPs have the capacity to manage the storm water flows rates and durations from the site such that the receiving waters are protected from the potential for increased erosion that would be caused if the unmanaged portion of the runoff was discharged from the site.

(iv) *Offsite Retrofitting Projects*

The Copermittee may allow Priority Development Projects to utilize offsite retrofitting projects to comply with the storm water pollutant control and hydromodification management BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2) if the retrofitting projects have been identified within the strategies included in the Water Quality Improvement Plan, or identified as potential retrofitting projects by the Copermittee pursuant to Provision E.5.

(v) *Offsite Channel, Stream, or Habitat Rehabilitation Projects*

The Copermittee may allow Priority Development Projects to utilize offsite channel, stream, or habitat rehabilitation projects to comply with the hydromodification management BMP performance requirements of Provision E.3.c.(2) if the rehabilitation projects have been identified within the strategies included in the Water Quality Improvement Plan, or identified as potential channel rehabilitation projects by the Copermittee pursuant to Provision E.5. The channel, stream, or habitat rehabilitation project cannot be utilized for pollutant treatment except where artificial wetlands are constructed and located upstream of receiving waters.

(vi) *Offsite Regional Water Supply Augmentation Projects*

The Copermittee may allow Priority Development Projects to utilize offsite regional water supply augmentation projects (i.e. groundwater recharge, recycled water, storm water harvesting) to comply with Provisions E.3.c.(1) and E.3.c.(2) if the projects have been identified within the strategies included in the Water Quality Improvement Plan.

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(vii) *Project Applicant Proposed Alternative Compliance Projects*

The Copermittee may allow one or more Priority Development Project applicant(s) to propose and implement alternative compliance projects to comply with Provisions E.3.c.(1) and E.3.c.(2) if the alternative compliance projects are consistent with, and will address the highest water quality priorities of the Water Quality Improvement Plan, and comply with the requirements of Provision E.3.c.(3)(a).

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(c) Alternative Compliance In-Lieu Fee Option

The Copermittee may develop and implement an alternative compliance in-lieu fee option, individually or with other Copermittees and/or entities, as a means for designing, developing, constructing, operating and maintaining offsite alternative compliance projects under Provision E.3.c.(3)(b). Priority Development Projects allowed to utilize the alternative compliance in-lieu fee option must comply with the following conditions:

(i) The in-lieu fee should be collected and held in accordance with the Mitigation Fee Act and all other applicable development fee laws.

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Deleted: transferred to the Copermittee (for public projects) or an escrow account (for private projects) prior to the date construction of the Priority Development Project is initiated.

(ii) If the in-lieu fee is applied to the development, design and construction of offsite alternative compliance projects, the following conditions must be met:

[a] The offsite alternative compliance projects must allow the Priority Development Project to comply with the onsite BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2);

[b] The offsite alternative compliance projects must be constructed

as soon as possible, but no later than 4 years after the certificate of occupancy is granted for the first Priority Development Project that contributed funds toward the construction of the offsite alternative compliance projects, unless a longer period of time is authorized by the San Diego Water Board Executive Officer;

[c] The in-lieu fee for the Priority Development Project must include mitigation of the pollutant loads and increased storm water flow rates and durations that are allowed to discharge from the site before the offsite alternative compliance projects are constructed; and

[d]

Deleted: The in-lieu fee must also include the cost to operate and maintain the offsite alternative compliance projects.

(iii) If the in-lieu fee is applied to the operation and maintenance of offsite alternative compliance projects that have already been constructed, the offsite alternative compliance projects must allow the Priority Development Project to comply with the onsite structural BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2).

(d) Alternative Compliance Water Quality Credit System Option

The Copermittee may develop and implement an alternative compliance water quality credit system option, individually or with other Copermittees and/or entities. Any credit system that a Copermittee chooses to implement must be submitted to the San Diego Water Board Executive Officer for review and acceptance as part of the Water Quality Improvement Plan.

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Deleted: provided that such a credit system clearly exhibits that it will not allow discharges from Priority Development Projects to cause or contribute to a net impact over and above the impact caused by projects meeting the onsite structural BMP performance requirements of Provisions E.3.c.(1) and E.3.c.(2).

(4) <u>Long-Term Structural BMP Maintenance</u>

Each Copermittee must require the project applicant to submit proof of the mechanism under which ongoing long-term maintenance of all structural BMPs will be conducted.

(5) <u>Infiltration and Groundwater Protection</u>

(a) Structural BMPs designed to primarily function as large, centralized infiltration devices (such as large infiltration trenches and infiltration basins) must not cause or contribute to an exceedance of an applicable groundwater quality objective. At a minimum, such infiltration BMPs must be in conformance with the design criteria listed below, unless the development project applicant demonstrates to the Copermittee that one or more of the specific design criteria listed below are not necessary to protect groundwater quality. The design criteria listed below do not apply to small infiltration systems dispersed throughout a development project.

(i) Runoff must undergo pretreatment such as sedimentation or filtration prior to infiltration;

(ii) Pollution prevention and source control BMPs must be implemented at a level appropriate to protect groundwater quality at sites where infiltration BMPs are to be used;

(iii) Infiltration BMPs must be adequately maintained to remove pollutants in storm water to the MEP;

(iv) The vertical distance from the base of any infiltration BMP to the seasonal high groundwater mark must be at least 10 feet. Where groundwater basins do not support beneficial uses, this vertical distance criteria may be reduced, provided groundwater quality is maintained;

(v) The soil through which infiltration is to occur must have physical and chemical characteristics (e.g., appropriate cation exchange capacity, organic content, clay content, and infiltration rate) which are adequate for proper infiltration durations and treatment of runoff for the protection of groundwater beneficial uses;

(vi) Infiltration BMPs must not be used for areas of industrial or light industrial activity, and other high threat to water quality land uses and activities as designated by each Copermittee, unless first treated or filtered to remove pollutants prior to infiltration; and

(vii) Infiltration BMPs must be located a minimum of 100 feet horizontally from any water supply wells.

(b) The Copermittee may develop, individually or with other Copermittees, alternative mandatory design criteria to that listed above for infiltration BMPs which are designed to primarily function as centralized infiltration devices. Before implementing the alternative design criteria in the development planning process the Copermitee(s) must:

(i) Notify the San Diego Water Board of the intent to implement the alternative design criteria submitted; and

(ii) Comply with any conditions set by the San Diego Water Board.

e. BMP DESIGN MANUAL UPDATE

Each Copermittee must update its BMP Design Manual[34] pursuant to Provision F.2.b. Until the Copermittee has updated its BMP Design Manual with the requirements of Provisions E.3.a-c, the Copermittee must continue implementing its current BMP Design Manual. Unless directed otherwise by the San Diego Water Board, the Copermittee must implement the BMP Design Manual within 180 days of completing the update. The update of the BMP Design Manual must include the following:

[34] The BMP Design Manual was formerly known as the Standard Storm Water Mitigation Plan under Order Nos. R9-2007-0001, R9-2009-0002, and R9-2010-0016.

(1) Updated procedures to determine the nature and extent of storm water requirements applicable to a potential development or redevelopment projects. These procedures must inform project applicants of the storm water management requirements applicable to their project including, but not limited to, general requirements for all development projects, structural BMP design procedures and requirements, hydromodification management requirements, requirements specific to phased projects, and procedures specific to private developments and public improvement projects;

(2) Updated procedures to identify pollutants and conditions of concern for selecting the most appropriate structural BMPs that consider, at a minimum, the following:

(a) Receiving water quality (including pollutants for which receiving waters are listed as impaired under the CWA section 303(d) List);

(b) Pollutants, stressors, and/or receiving water conditions that cause or contribute to the highest priority water quality conditions identified in the Water Quality Improvement Plan;

(c) Land use type of the project and pollutants associated with that land use type; and

(d) Pollutants expected to be present onsite.

(3) Updated procedures for designing structural BMPs, including any updated performance requirements to be consistent with the requirements of Provision E.3.c for all structural BMPs listed in the BMP Design Manual;

(4) Long-term maintenance criteria for each structural BMP listed in the BMP Design Manual; and

(5) Alternative compliance criteria, in accordance with the requirements under Provision E.3.c.(3), if the Copermittee elects to allow Priority Development Projects within its jurisdiction to utilize alternative compliance.

f. PRIORITY DEVELOPMENT PROJECT BMP IMPLEMENTATION AND OVERSIGHT

Each Copermittee must implement a program that requires and confirms structural BMPs on all Priority Development Projects are designed, constructed, and maintained to remove pollutants in storm water to the MEP.

(1) <u>Structural BMP Approval and Verification Process</u>

(a) Each Copermittee must require and confirm that for all Priority Development Project applications that have not received prior lawful approval by the Copermittee by 18 months after the commencement of coverage under this Order, the requirements of Provision E.3 are implemented. For project applications that have received prior lawful approval by 18 months after the commencement of coverage under this Order, the Copermittee may allow previous land development requirements to apply.

(b) Each Copermittee must identify the roles and responsibilities of various municipal departments in implementing the structural BMP requirements, including each stage of a project from application review and approval through BMP maintenance and inspections.

(c) Each Copermittee must require and confirm that appropriate easements and ownerships are properly recorded in public records and the information is conveyed to all appropriate parties when there is a change in project or site ownership.

(d) Each Copermittee must require and confirm that prior to occupancy and/or intended use of any portion of the Priority Development Project, each structural BMP is inspected to verify that it has been constructed and is operating in compliance with all of its specifications, plans, permits, ordinances, and the requirements of this Order.

(2) <u>Priority Development Project Inventory and Prioritization</u>

(a) Each Copermittee must develop, maintain, and update at least annually, a watershed-based database to track and inventory all Priority Development Projects and associated structural BMPs within its jurisdiction. Inventories must be accurate and complete beginning from January 2002 for the San Diego County Copermittees, February 2003 for the Orange County Copermittees, and July 2005 for the Riverside County Copermittees. The use of an automated database system, such as GIS, is highly recommended. The database must include, at a minimum, the following information:

(i) Priority Development Project location (address and hydrologic subarea);

(ii) Descriptions of structural BMP type(s);

(iii) Date(s) of construction;

(iv) Party responsible for structural BMP maintenance;

(v) Dates and findings of structural BMP maintenance verifications; and

(vi) Corrective actions and/or resolutions.

(b) Each Copermittee must prioritize the Priority Development Projects with structural BMPs within its jurisdiction. The designation of Priority Development Projects as high priority must consider the following:

(i) The highest water quality priorities identified in the Water Quality Improvement Plan;

(ii) Receiving water quality;

(iii) Number and sizes of structural BMPs;

(iv) Recommended maintenance frequency of structural BMPs;

(v) Likelihood of operation and maintenance issues of structural BMPs;

(vi) Land use and expected pollutants generated; and

(vii) Compliance record.

(3) Structural BMP Maintenance Verifications and Inspections

Each Copermittee is required to verify that structural BMPs on each Priority Development Project are adequately maintained, and continue to operate effectively to remove pollutants in storm water to the MEP through inspections, self-certifications, surveys, or other equally effective approaches.

(a) All (100 percent) of the structural BMPs at Priority Development Projects that are designated as high priority must be inspected directly by the Copermittee annually prior to each rainy season;

(b) For verifications performed through a means other than direct Copermittee inspection, adequate documentation must be required by the Copermittee to provide assurance that the required maintenance of structural BMPs at each Priority Development Project has been completed; and

(c) Appropriate follow-up measures (including re-inspections, enforcement, etc.) must be conducted to ensure that structural BMPs at each Priority Development Project continue to reduce pollutants in storm water to the MEP as originally designed.

g. Development Project Enforcement

Each Copermittee must enforce its legal authority established pursuant to Provision E.1 for all development projects, as necessary, to achieve compliance with the requirements of this Order, in accordance with its Enforcement Response Plan pursuant to Provision E.6.

Deleted: <#>Strategies to Address the Highest Priority Water Quality Conditions ¶
¶
Each Copermittee must describe in its jurisdictional runoff management program document the strategies and/or activities that will be implemented as part of the development planning program to address development and redevelopment projects that may become sources of pollutants and/or stressors that contribute to the highest priority water quality conditions in the Watershed Management Area as follows:¶
¶
<#>Provide specific details about how the strategies and/or activities will be implemented (e.g. designate additional BMPs, focus education, increase frequency of verifications and/or inspections, alternative compliance options);¶
¶
<#>Each Copermittee must identify areas within its jurisdiction where Priority Development Projects may be allowed or should be encouraged to implement or contribute toward the implementation of alternative compliance retrofitting and/or stream, channel, or habitat rehabilitation projects;¶
¶
<#>Each Copermittee should collaborate and cooperate with other Copermittees and/or entities in the Watershed Management Area to identify regional alternative compliance projects that Priority Development Projects may be allowed or should be encouraged to implement or participate in implementing; and¶
¶
<#>The strategies and/or activities must be consistent with the requirements of Provisions E.3.a-c and E.3.e-f and the strategies identified in the Water Quality Improvement Plan.¶

4. Construction Management

Each Copermittee must implement a construction management program in accordance with the strategies identified in the Water Quality Improvement Plan. The requirements of the jurisdictional runoff management programs as outlined below may be modified and prioritized as appropriate for consistency with the highest water quality priorities and strategies as identified in the corresponding Water Quality improvement Plan(s).

Deleted: and includes, at a minimum, the following requirements:

a. Strategies to Address the Highest Priority Water Quality Conditions

Comment [K3]: It is recommended that this Provision (4.f) be moved to Provision 4.a

Each Copermittee must describe in its jurisdictional runoff management program document the strategies and/or activities that will be implemented as part of the construction management program to address construction sites that the Copermittee has identified as potential sources of pollutants and/or stressors that contribute to the highest priority water quality conditions in the Watershed Management Area as follows:

(1) Provide specific details about how the strategies and/or activities will be implemented (e.g. designate BMPs, focus education, and/or increase/decrease frequency of inspections for specific types of sites and/or activities); and

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(2) The strategies and/or activities must be consistent with the requirements of Provisions E.4.c-e and the strategies identified in the Water Quality Improvement Plan.

b. Project Approval Process

Prior to issuance of any local permit(s) that allows the commencement of construction projects that involve ground disturbance or soil disturbing activities that can potentially generate pollutants in storm water runoff, each Copermittee must:

(1) Require a site-specific pollution control, construction BMP, and/or erosion and sediment control plan, to be submitted by the project applicant to the Copermittee;

(2) Confirm the pollution control, construction BMP, and/or erosion and sediment control plan, complies with the local grading ordinance, other applicable local ordinances, and the requirements of this Order;

(3) Confirm the pollution control, construction BMP, and/or erosion and sediment control plan, includes seasonally appropriate and effective BMPs and management measures described in Provision E.4.c, as applicable to the project; and

(4) Verify that the project applicant has obtained coverage under the Construction General Permit.

Deleted: applicable permits, including, but not limited to

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c. Construction Site Inventory and Tracking

(1) Each Copermittee must maintain, and update at least quarterly, a watershed-based inventory of all construction projects issued a local permit that allows ground disturbance or soil disturbing activities that can potentially generate pollutants in storm water runoff. The use of an automated database system, such as GIS, is highly recommended. The inventory must include:

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(a) Relevant contact information for each site (e.g., name, address, phone, and email for the owner and contractor);

(b) The basic site information including location (address and hydrologic subarea), Waste Discharge Identification (WDID) number (if applicable), size of the site, and approximate area of disturbance;

(c) Whether or not the site is considered a high threat to water quality, as defined in Provision E.4.b.(2) below;

(d) The project start and anticipated completion dates;

(e) Current construction phase;

(f) The required inspection frequency, as defined in the Copermittee's jurisdictional runoff management program document;

(g) The date the Copermittee accepted and/or approved the site-specific pollution control, construction BMP, and/or erosion and sediment control plan; and

(h) Whether or not there are ongoing enforcement actions administered to the site.

(2) Each Copermittee must identify all construction sites within its jurisdiction that represent a high threat to downstream surface water quality. The designation of construction sites as high threat to water quality must consider the following:

(a) Sites located within a hydrologic subarea where sediment is known or suspected to contribute to the highest priority water quality conditions identified in the Water Quality Improvement Plan;

(b) Sites located within the same hydrologic subarea and tributary to a water body segment listed as impaired for sediment on the CWA section 303(d) List;

(c) Sites located within, directly adjacent to, or discharging directly to a receiving water within an ESA; and

(d) Other sites determined by the Copermittees or the San Diego Water Board as a high threat to water quality.

d. CONSTRUCTION SITE BMP IMPLEMENTATION

Each Copermittee must implement, or require the implementation of effective BMPs to reduce discharges of pollutants in storm water from construction sites to the MEP, and prevent non-storm water discharges from construction sites into the MS4. These BMPs must be site specific, seasonally appropriate, and construction phase appropriate. BMPs must be implemented at each construction site year round. Dry season BMP implementation must plan for and address unseasonal rain events that may occur during the dry season (May 1 through September 30). Copermittees must implement, or require the implementation of, BMPs in the following categories:

(1) Project Planning;

(2) Good Site Management “Housekeeping”, including waste management;

(3) Non-storm Water Management;

(4) Erosion Control;

(5) Sediment Control;

(6) Run-on and Run-off Control; and

(7) Active/Passive Sediment Treatment Systems, where applicable.

e. CONSTRUCTION SITE INSPECTIONS

Each Copermittee must conduct construction site inspections to require and confirm compliance with its local permits and applicable local ordinances, and the requirements of this Order. Priority for site inspections must consider threat to water quality pursuant to Provision E.4.b as well as the nature of the construction activity, topography, and the characteristics of soils and receiving water quality.

(1) Inspection Frequency

(a) Each Copermittee must conduct inspections at all inventoried sites, including high threat to water quality sites, at an appropriate frequency for each phase of construction to ensure the site reduces the discharge of pollutants in storm water from construction sites to the MEP, and prevents non-storm water discharges from entering the MS4.

(b) Each Copermittee must establish appropriate inspection frequencies for high threat to water quality sites, and all other sites, for each phase of construction. Inspection frequencies appropriate for addressing the highest water quality priorities identified in the Water Quality Improvement Plan, and for complying with the requirements of this Order must be identified in each Copermittee's jurisdictional runoff management program document.

(c) Based upon inspection findings, each Copermittee must implement all follow-up actions (i.e., re-inspection, enforcement) necessary to require and confirm site compliance with its local permits and applicable local ordinances, and the requirements of this Order.

(2) Inspection Content

Inspections of construction sites by the Copermittee must include, at a minimum:

(a) Verification of coverage under the Construction General Permit (Notice of Intent (NOI) and/or WDID number) during initial inspections, when applicable;

(b) Assessment of compliance with its local permits and applicable local ordinances related to pollution prevention, including the implementation and maintenance of applicable BMPs;

(c) Assessment of BMP adequacy and effectiveness;

(d) Visual observations of actual non-storm water discharges;

(e) Visual observations of actual or potential discharge of sediment and/or construction related materials from the site;

(f) Visual observations of actual or potential illicit connections; and

(g) If any violations are found and BMP corrections are needed, inspectors must take and document appropriate actions in accordance with the Enforcement Response Plan pursuant to Provision E.6.

(3) Inspection Tracking and Records

Each Copermittee must track all inspections and re-inspections at all inventoried construction sites. The Copermittee must retain all inspection records in an electronic database or tabular format, which must be made available to the San Diego Water Board upon request. Inspection records must include, at a minimum:

(a) Site name, location (address and hydrologic subarea), and WDID number (if applicable);

(b) Inspection date;

(c) Weather condition during inspection;

(d) Description of problems observed with BMPs and indication of need for BMP addition/repair/replacement and any scheduled re-inspection, and date of re-inspection;

(e) Descriptions of any other specific inspection comments which must, at a minimum, include rationales for longer compliance time;

(f) Description of enforcement actions issued in accordance with the Enforcement Response Plan pursuant to Provision E.6; and

(g) Resolution of problems noted and date problems fixed.

f. CONSTRUCTION SITE ENFORCEMENT

Each Copermittee must enforce its legal authority established pursuant to Provision E.1 for all its inventoried construction sites, as necessary, to achieve compliance with the requirements of this Order, in accordance with its Enforcement Response Plan pursuant to Provision E.6.

5. Existing Development Management

Each Copermittee must implement an existing development management program in accordance with the strategies identified in the Water Quality Improvement Plan. The requirements of the jurisdictional runoff management programs as outlined below may be modified and prioritized as appropriate for consistency with the highest water quality priorities and strategies as identified in the corresponding Water Quality improvement Plan(s).

a. STRATEGIES TO ADDRESS THE HIGHEST PRIORITY WATER QUALITY CONDITIONS

Each Copermittee must implement the water quality improvement strategies, where necessary, to address areas of existing development within its jurisdiction that are identified as sources of pollutants and/or stressors contributing to the highest priority water quality conditions in the Watershed Management Area. For the existing development management program, the following strategies must be implemented:

(1) Specific Existing Development Management Program Strategies

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Each Copermittee must describe in its jurisdictional runoff management program document the strategies and/or activities that will be implemented as part of the construction management program to address construction sites that the Copermittee has identified as potential sources of pollutants and/or stressors that contribute to the highest priority water quality conditions in the Watershed Management Area as follows:¶
¶
<#>Provide specific details about how the strategies and/or activities will be implemented (e.g. designate additional BMPs, focus education, and/or increase/decrease frequency of inspections for specific types of sites and/or activities); and¶
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<#>The strategies and/or activities must be consistent with the requirements of Provisions E.4.c-e and the strategies identified in the Water Quality Improvement Plan.¶

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Comment [K4]: It is recommended that this Provision (5.e) be moved to Provision 5.a

Each Copermittee must describe in its jurisdictional runoff management program document the strategies and/or activities that will be implemented within its jurisdiction to address areas of existing development that the Copermittee has identified as sources of pollutants and/or stressors that contribute to the highest priority water quality conditions in the Watershed Management Area as follows:

(a) Provide specific details about how the strategies and/or activities will be implemented (e.g. designate BMPs, focus education, and/or increase/decrease frequency of inspections for specific types of facilities, areas and/or activities);

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(b) The facilities and/or areas within the Copermittee's jurisdiction where the strategies and/or activities will be implemented; and

(c) The strategies and/or activities must be consistent with the requirements of Provisions E.5.b-d and the strategies identified in the Water Quality Improvement Plan.

a. EXISTING DEVELOPMENT INVENTORY AND TRACKING

Each Copermittee must maintain, and update at least annually, a watershed-based inventory of the existing development within its jurisdiction that may discharge a high priority pollutant load to and from the MS4. The use of an automated database system, such as GIS, is highly recommended. The inventory must, at a minimum, evaluate and include the following if identified as a source of a high priority pollutant;

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(1) Name, location (hydrological subarea and address, if applicable) of the following types of existing development with its jurisdiction:

(a) Commercial facilities or areas;

(b) Industrial facilities;

(c) Municipal facilities, including:

(i) MS4 and related structures,[35]

(ii) Roads, streets, and highways,

(iii) Parking facilities,

(iv) Municipal airfields,

(v) Parks and recreation facilities,

[35] The inventory may refer to the MS4 map required to be maintained pursuant to Provision E.2.b.(1).

(vi) Flood management projects and flood control devices and structures,

(vii) Operating or closed municipal landfills,

(viii) Publicly owned treatment works (including water and wastewater treatment plants) and sanitary sewer collection systems,

(ix) Corporate yards, including maintenance and storage yards for materials, waste, equipment, and vehicles,

(x) Hazardous waste collection facilities,

(xi) Other treatment, storage or disposal facilities for municipal waste, and

(xii) Other municipal facilities that the Copermittee determines may contribute a significant high priority pollutant load to the MS4; and

(d) Residential areas, which may be designated by one or more of the following:

(i) Residential management area,

(ii) Drainage basin or area,

(iii) Land use (e.g., single family, multi-family, rural),

(iv) Neighborhood,

(v) Common Interest Area,

(vi) Home Owner Association,

(vii) Mobile home park, and/or

(viii) Other designations accepted by the San Diego Water Board Executive Officer.

(2) A description of the facility or area, including the following information:

(a) Classification as commercial, industrial, municipal, or residential;

(b) Status of facility or area as active or inactive;

(c) Identification if a business is a mobile business;

(d) SIC Code or NAICS Code, if applicable;

(e) Industrial General Permit NOI and/or WDID number, if applicable;

(f) Identification if a residential area is or includes a Common Interest Area / Home Owner Association, or mobile home park;

(g) Identification of the high priority pollutants potentially generated by the facility or area;

(h) Whether the facility or area is adjacent to an ESA;

(i) Whether the facility or area is tributary to and within the same hydrologic subarea as a water body segment listed as impaired on the CWA section 303(d) List and generates pollutants for which the water body segment is impaired; and

(3) An annually updated map showing the location of inventoried existing development, watershed boundaries, and water bodies.

b. Existing Development BMP Implementation and Maintenance

Each Copermittee must designate a set of BMPs required for all inventoried existing development, including special event venues. The designated BMPs must be specific to the identified high priority facility or area types and high priority pollutant generating activities, as appropriate.

(1) Commercial, Industrial, and Municipal Facilities and Areas

(a) Pollution Prevention

Each Copermittee must require the use of pollution prevention methods by the commercial, industrial, and municipal facilities and areas in its inventoried existing development.

(b) BMP Implementation

Each Copermittee must implement, or require the implementation of, designated BMPs at commercial facilities and areas, industrial facilities, and municipal facilities in its inventoried existing development.

(c) BMP Operation and Maintenance

(i) Each Copermittee must properly operate and maintain, or require the proper operation and maintenance of designated BMPs at commercial facilities and areas, industrial facilities, and municipal facilities in its inventoried existing development.

(ii) Each Copermittee must implement a schedule of operation and maintenance activities for its MS4 and related structures (including but not limited to catch basins, storm drain inlets, detention basins, etc.), and verify proper operation of all its municipal structural treatment controls designed to reduce pollutants (including floatables) in storm water discharges to or from its MS4s and related

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<#>Whether the facility or area contributes or potentially contributes to the highest priority water quality conditions identified in the Water Quality Improvement Plan.¶

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drainage structures. Operation and maintenance activities may include, but is not limited to, the following:

[a] Inspections of the MS4 and related structures;
[b] Cleaning of the MS4 and related structures; and
[c] Proper disposal of materials removed from cleaning of the MS4 and related structures.

(iii) Each Copermittee must implement a schedule of operation and maintenance for public streets, unpaved roads, paved roads, and paved highways and freeways within its jurisdiction to minimize pollutants that can be discharged in storm water.

(iv) Each Copermittee must implement controls to prevent infiltration of sewage into the MS4 from leaking sanitary sewers. Copermittees that operate both a municipal sanitary sewer system and a MS4 must implement controls and measures to prevent and eliminate seeping sewage from infiltrating the MS4. Copermittees that do not operate both a municipal sanitary sewer system and a MS4 must coordinate with sewering agencies to keep themselves informed of relevant and appropriate maintenance activities and sanitary sewage projects in their jurisdiction that may cause or contribute to seepage of sewage into the MS4.

(d) Pesticides, Herbicides, and Fertilizers BMPs

Each Copermittee must implement BMPs, or require the implementation of BMPs, to reduce pollutants in storm water discharges to the MEP and effectively prohibit non-storm water discharges associated with the application, storage, and disposal of pesticides, herbicides and fertilizers from commercial facilities and areas, industrial facilities, and municipal facilities in its inventoried existing development. Such BMPs must include, as appropriate, educational activities, permits, certifications and other measures for applicators and distributors.

(2) <u>Residential Areas</u>

(a) Pollution Prevention

Each Copermittee must promote and encourage the use of pollution prevention methods, where appropriate, by the residential areas in its inventoried existing development.

(b) BMP Implementation

Each Copermittee must promote and encourage the implementation of designated BMPs at residential areas in its inventoried existing development.

(c) BMP Operation and Maintenance

Each Copermittee must properly operate and maintain, or require the proper operation and maintenance of designated BMPs at residential areas in its inventoried existing development.

(d) Pesticides, Herbicides, and Fertilizers BMPs

Each Copermittee must promote and encourage the implementation of BMPs to reduce pollutants in storm water discharges to the MEP and effectively prohibit non-storm water discharges associated with the application, storage, and disposal of pesticides, herbicides and fertilizers from residential areas in its inventoried existing development.

c. EXISTING DEVELOPMENT INSPECTIONS

Each Copermittee must conduct inspections of inventoried existing development to ensure compliance with applicable local ordinances and permits, and the requirements of this Order.

(1) Inspection Frequency

(a) Each Copermittee must establish appropriate inspection frequencies for inventoried existing development in accordance with the following requirements:

(i) At a minimum, inventoried existing development must be inspected once every five years utilizing one or more of the following methods:

[a] Drive-by inspections by Copermittee municipal and contract staff,
[b] Onsite inspections by Copermittee municipal and contract staff, and/or
[c] Inspections by volunteer monitoring or patrol programs trained by the Copermittee;

(ii) The frequency of inspections must be appropriate to confirm that BMPs are being implemented to reduce the discharge of pollutants in storm water from the MS4 to the MEP and effectively prohibit non-storm water discharges into the MS4;

(iii) The frequency of inspections must be based on the potential for a facility or area to discharge non-storm water and pollutants in storm water, and should reflect the priorities set forth in the Water Quality Improvement Plan;

(iv) Each Copermittee must annually perform onsite inspections of an equivalent of at least 20 percent of the commercial facilities and areas, industrial facilities, and municipal facilities in its inventoried existing development;[36] and

(v) Inventoried existing development must be inspected by the Copermittee, as needed, in response to valid public complaints and findings from the Copermittee's municipal and contract staff or volunteer monitoring or patrol program inspections.

(b) Based upon inspection findings, each Copermittee must implement all follow-up actions (i.e. education and outreach, re-inspection, enforcement) necessary to require and confirm compliance with its applicable local ordinances and permits and the requirements of this Order, in accordance with its Enforcement Response Plan pursuant to Provision E.6.

(2) Inspection Content

(a) Inspections of existing development by the Copermittee or volunteer monitoring or patrol programs must include, at a minimum:

(i) Visual inspections for actual non-storm water discharges;

(ii) Visual inspections for actual or potential discharge of pollutants;

(iii) Visual inspections for actual or potential illicit connections; and

(iv) Verification that the description of the facility or area in the inventory, required pursuant to Provision E.5.a.(2), has not changed.

(b) Onsite inspections of existing development by the Copermittee must include, at a minimum:

(i) Assessment of compliance with its applicable local ordinances and permits related to non-storm water and storm water discharges and runoff;

(ii) Assessment of the implementation of the designated BMPs;

(iii) Verification of coverage under the Industrial General Permit, when applicable; and

(iv) If any problems or violations are found, inspectors must take and document appropriate actions in accordance with the Enforcement Response Plan pursuant to Provision E.6.

[36] If any commercial, industrial, or municipal facilities or areas require multiple onsite inspections during any given year, those additional inspection may count toward the total annual inspection requirement. This requirement excludes linear municipal facilities (i.e., MS4, streets, roads and highways).

(3) Inspection Tracking and Records

Each Copermittee must track all inspections and re-inspections at all inventoried existing development. The Copermittee must retain all inspection records in an electronic database or tabular format, which must be made available to the San Diego Water Board upon request. Inspection records must include, at a minimum:

(a) Name and location of facility or area (address and hydrologic subarea) consistent with the inventory name and location, pursuant to Provision E.5.a.(1);

(b) Inspection and re-inspection date(s);

(c) Inspection method(s) (i.e. drive-by, onsite);

(d) Observations and findings from the inspection(s);

(e) For onsite inspections of existing development by Copermittee municipal or contract staff, the records must also include, as applicable:

(i) Description of any problems or violations found during the inspection(s),

(ii) Description of enforcement actions issued in accordance with the Enforcement Response Plan pursuant to Provision E.6, and

(iii) The date problems or violations were resolved.

d. EXISTING DEVELOPMENT ENFORCEMENT

Each Copermittee must enforce its legal authority established pursuant to Provision E.1 for all its inventoried existing development, as necessary, to achieve compliance with the requirements of this Order, in accordance with its Enforcement Response Plan pursuant to Provision E.6.

e. RETROFITTING AREAS OF EXISTING DEVELOPMENT

(2) Retrofitting Areas of Existing Development

Each Copermittee must describe in its jurisdictional runoff management program document, a program to retrofit areas of existing development within its jurisdiction to address identified sources of pollutants and/or stressors that contribute to the highest priority water quality conditions in the Watershed Management Area. The program must be implemented as follows:

(a) Each Copermittee must identify areas of existing development as candidates for retrofitting, focusing on areas where retrofitting will address

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¶
<#>Specific Existing Development Management Program Strategies¶
¶
Each Copermittee must describe in its jurisdictional runoff management program document the strategies and/or activities that will be implemented within its jurisdiction to address areas of existing development that the Copermittee has identified as sources of pollutants and/or stressors that contribute to the highest priority water quality conditions in the Watershed Management Area as follows:¶
¶
<#>Provide specific details about how the strategies and/or activities will be implemented (e.g. designate additional BMPs, focus education, and/or increase/decrease frequency of inspections for specific types of facilities, areas and/or activities); ¶
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<#>The facilities and/or areas within the Copermittee's jurisdiction where the strategies and/or activities will be implemented; and¶
¶
<#>The strategies and/or activities must be consistent with the requirements of Provisions E.5.b-d and the strategies identified in the Water Quality Improvement Plan.¶
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pollutants and/or stressors that contribute to the highest priority water quality conditions identified in the Water Quality Improvement Plan;

(b) Candidates for retrofitting projects may be utilized to reduce pollutants that may be discharged in storm water from areas of existing development, and/or address storm water runoff flows and durations from areas of existing development that cause or contribute to hydromodification in receiving waters;

(c) Each Copermittee must develop a strategy to facilitate the implementation of retrofitting projects in areas of existing development identified as candidates;

(d) Each Copermittee should identify areas of existing development where Priority Development Projects may be allowed or should be encouraged to implement or contribute toward the implementation of alternative compliance retrofitting projects; and

(e) Where retrofitting projects within specific areas of existing development are determined to be infeasible to address the highest priority water quality conditions in the Water Quality Improvement Plan, the Copermittee should collaborate and cooperate with other Copermittees and/or entities in the Watershed Management Area to identify, develop, and implement regional retrofitting projects (i.e. projects that can receive and/or treat storm water from one or more areas of existing development and will result in a net benefit to water quality and the environment) adjacent to and/or downstream of the areas of existing development.

(3) Stream, Channel and/or Habitat Rehabilitation in Areas of Existing Development

Each Copermittee must describe in its jurisdictional runoff management program document, a program to rehabilitate streams, channels, and/or habitats in areas of existing development within its jurisdiction or just downstream of its jurisdiction to address the highest priority water quality conditions in the Watershed Management Area. The program must be implemented as follows:

(a) Candidates for stream, channel, and/or habitat rehabilitation projects may be utilized to address storm water runoff flows and durations from areas of existing development that cause or contribute to hydromodification in receiving waters, rehabilitate channelized or hydromodified streams, restore wetland and riparian habitat, restore watershed functions, and/or protect beneficial uses of receiving waters;

(b) Each Copermittee must develop a strategy to facilitate the implementation of stream, channel, and/or habitat rehabilitation projects in areas of

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existing development identified as candidates;

(c) Each Copermittee should identify areas of existing development where Priority Development Projects may be allowed or should be encouraged to implement or contribute toward the implementation of alternative compliance stream, channel, and/or habitat rehabilitation projects; and

(d) Where stream, channel, and/or habitat rehabilitation projects within specific areas of existing development are determined to be infeasible to address the highest priority water quality conditions in the Water Quality Improvement Plan, the Copermittee should collaborate and cooperate with other Copermittees and/or entities in the Watershed Management Area to identify, develop, and implement regional stream, channel, and/or habitat rehabilitation projects (i.e. projects that can receive storm water from one or more areas of existing development and will result in a net benefit to water quality and the environment).

6. Enforcement Response Plans

Each Copermittee must develop and implement an Enforcement Response Plan as part of its jurisdictional runoff management program document. The Enforcement Response Plan must describe the applicable approaches and options to enforce its legal authority established pursuant to Provision E.1, as necessary, to achieve compliance with the requirements of this Order. Copermittees may continue to utilize and implement established, equivalent guidelines and procedures for enforcement. The Enforcement Response Plan must include the following:

a. Enforcement Response Plan Components

The Enforcement Response Plan must include and/or address the following individual components:

(1) Illicit Discharge Detection and Elimination Enforcement Component;

(2) Development Planning Enforcement Component;

(3) Construction Management Enforcement Component; and

(4) Existing Development Enforcement Component.

b. Enforcement Response Approaches and Options

Each component of the Enforcement Response Plan must describe the enforcement response approaches that the Copermittee will implement to compel compliance with its statutes, ordinances, permits, contracts, orders, or similar means, and the requirements of this Order. The description must include the protocols for implementing progressively stricter enforcement responses. The enforcement response approaches must include appropriate sanctions to compel compliance, including, at a minimum, the following tools or their equivalent:

(1) Verbal and written notices of violation;

(2) Cleanup requirements;

(3) Fines;

(4) Bonding requirements;

(5) Administrative and criminal penalties;

(6) Liens;

(7) Stop work orders; and

(8) Permit and occupancy denials.

c. CORRECTION OF VIOLATIONS

(1) Violations must be corrected in a timely manner with the goal of correcting the violations within 30 calendar days after the violations are discovered, or prior to the next predicted rain event, whichever is sooner.

(2) If more than 30 calendar days are required to achieve compliance, then a rationale must be recorded in the applicable electronic database or tabular system used to track violations.

d. PROGRESSIVE ENFORCEMENT

(1) The Enforcement Response Plan must include a definition of "progressive enforcement". Progressive enforcement must include a series of enforcement actions that match the severity of the violations and include distinct, progressive steps. Progressive enforcement may be defined differently for development planning, construction sites, commercial facilities or areas, industrial facilities, municipal facilities, and/or residential areas.

(2) Where the Copermittee determines progressive enforcement is not required, a rationale must be recorded in the applicable electronic database or tabular system used to track violations.

(3) Progressive enforcement actions must continue to increase in severity, as necessary, to compel compliance as soon as possible.

e. REPORTING OF NON-COMPLIANT SITES

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(1) Each Copermittee must notify the San Diego Water Board in writing within 2 working days of issuing escalated enforcement (as defined in the Copermittee's Enforcement Response Plan) to a construction site that poses a significant threat to water quality as a result of violations or other non-compliance with its permits and applicable local ordinances, and the requirements of this Order. Written notification may be provided electronically by email.

(2) Each Copermittee must notify the San Diego Water Board of non-filers under the Industrial General Permit and Construction General Permit by email to Nonfilers_R9@waterboards.ca.gov.

7. Public Education and Participation

Each Copermittee must implement, individually or with other Copermittees, a public education and participation program in accordance with the strategies identified in the Water Quality Improvement Plan to promote and encourage the development of programs, management practices, and behaviors that reduce the discharge of pollutants in storm water to the MEP, prevent controllable non-storm water discharges from entering the MS4, and protect water quality standards in receiving waters. The requirements of the jurisdictional runoff management programs as outlined below may be modified and prioritized as appropriate for consistency with the highest water quality priorities and strategies as identified in the corresponding Water Quality improvement Plan(s).

a. Strategies to Address the Highest Priority Water Quality Conditions

Comment [K5]: It is recommended that this Provision (7.c) be moved to Provision 7.a

Each Copermittee must describe in its jurisdictional runoff management program document the strategies and/or activities that will be implemented within its jurisdiction, as applicable, to educate the public and encourage public participation to address potential sources of pollutants and/or stressors that contribute to the highest priority water quality conditions in the Watershed Management Area as follows:

(1) The target audiences and/or areas within the Copermittee's jurisdiction where the strategies and/or activities will be implemented;

(2) Provide specific details about how the strategies and/or activities will be implemented (e.g. educational topics, materials and/or activities, public outreach and participation programs and/or opportunities);

(3) Each Copermittee should collaborate and cooperate with other Copermittees and/or entities in the Watershed Management Area to identify and implement regional public education and participation activities, programs and opportunities;

(4) Each Copermittee must incorporate a mechanism for evaluating and assessing educational and other public outreach activities, as needed, to identify progress and incorporate modifications necessary to increase the effectiveness of the public education and participation program.

B. PUBLIC EDUCATION

The public education program component implemented within the Copermittee's jurisdiction may include the following:

(1) Educational activities, public information activities, and other appropriate outreach activities intended to reduce pollutants associated with the highest priority water quality conditions identified in the Water Quality Improvement Plan;

(2) Educational activities, public information activities, and other appropriate outreach activities to facilitate the proper management and disposal of used oil and toxic materials; and

(3) Appropriate education and training measures for specific target audiences, such as construction site operators, residents, underserved target audiences and school-aged children, as determined and prioritized by the Copermittee(s) by jurisdiction and/or watershed, based on high risk behaviors and pollutants of concern.

C. PUBLIC PARTICIPATION

The public participation program component implemented within the Copermittee's jurisdiction must include, at a minimum, the following:

(1) A process for members of the public to participate in updating the highest priority water quality conditions, numeric goals, and water quality improvement strategies in the Water Quality Improvement Plan.

(2) Opportunities for members of the public to participate in providing the Copermittee recommendations for improving the effectiveness of the water quality improvement strategies implemented within its jurisdiction.

(3) Opportunities for members of the public to participate in programs and/or activities that can result in the prevention or elimination of non-storm water discharges to the MS4, reduction of pollutants in storm water discharges from the MS4, and/or protection of the quality of receiving waters.

8. Fiscal Analysis

a. Each Copermittee must secure the resources necessary to meet all the

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<#>STRATEGIES TO ADDRESS THE HIGHEST PRIORITY WATER QUALITY CONDITIONS¶
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Each Copermittee must describe in its jurisdictional runoff management program document the strategies and/or activities that will be implemented within its jurisdiction, as applicable, to educate the public and encourage public participation to address potential sources of pollutants and/or stressors that contribute to the highest priority water quality conditions in the Watershed Management Area as follows:¶
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<#>The target audiences and/or areas within the Copermittee's jurisdiction where the strategies and/or activities will be implemented; ¶
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<#>Provide specific details about how the strategies and/or activities will be implemented (e.g. educational topics, materials and/or activities, public outreach and participation programs and/or opportunities);¶
¶
<#>Each Copermittee should collaborate and cooperate with other Copermittees and/or entities in the Watershed Management Area to identify and implement regional public education and participation activities, programs and opportunities;¶
¶
<#>Each Copermittee must incorporate a mechanism for evaluating and assessing educational and other public outreach activities, as needed, to identify progress and incorporate modifications necessary to increase the effectiveness of the public education and participation program.¶

requirements of this Order.

b. Each Copermittee must conduct an annual fiscal analysis of its jurisdictional runoff management program in its entirety. The fiscal analysis must include the following:

(1) Identification of the various categories of expenditures necessary to implement the requirements of this Order, including a description of the specific capital, operation and maintenance, and other expenditure items to be accounted for in each category of expenditures;

(2) The staff resources needed and allocated to meet the requirements of this Order, including any development, implementation, and enforcement activities required;

(3) The estimated expenditures for Provisions E.8.b.(1) and E.8.b.(2) for the current fiscal year; and

(4) The source(s) of funds that are proposed to meet the necessary expenditures described in Provisions E.8.b.(1) and E.8.b.(2), including legal restrictions on the use of such funds, for the current fiscal year and next fiscal year.

c. Each Copermittee must submit a summary of the annual fiscal analysis with each Annual Report required pursuant to Provision F.3.b.

d. Each Copermittee must provide the documentation used to develop the summary of the annual fiscal analysis upon request by the San Diego Water Board.

F. REPORTING

The purpose of this provision is to determine and document compliance with the requirements set forth in this Order. The goal of reporting is to communicate to the San Diego Water Board and the people of the State of California the implementation status of each jurisdictional runoff management program and compliance with the requirements of this Order. This goal is to be accomplished through the submittal of specific deliverables to the San Diego Water Board by the Copermittees.

1. Water Quality Improvement Plans

The Copermittees for each Watershed Management Area must develop and submit the Water Quality Improvement Plan in accordance with the following requirements:

a. WATER QUALITY IMPROVEMENT PLAN DEVELOPMENT

Each Water Quality Improvement Plan must be developed in accordance with the following process:

(1) Priority Water Quality Conditions and Numeric Goals

(a) The Copermittees must implement a public participation process to solicit data and information to be utilized in the development and identification of the priority water quality conditions for the Watershed Management Area.

(b) The Copermittees are encouraged to involve the public and key stakeholders as early and often as possible during the development of the priority water quality conditions and numeric goals to be included in the Water Quality Improvement Plan.

(c) Within 6 months after the commencement of coverage under this Order, the Copermittees must develop and submit the Water Quality Improvement Plan requirements of Provision B.2 to the San Diego Water Board. The San Diego Water Board will issue a public notice and solicit public comments on the Water Quality Improvement Plan for a minimum of 30 days.

(d) Within 30 days of receiving the public comments, the Copermittees must revise the priority water quality conditions and numeric goals based on comments received and/or recommendations or direction from the San Diego Water Board Executive Officer.

(2) Water Quality Improvement Strategies and Schedules

(a) The Copermittees are encouraged to involve the public and key stakeholders as early and often as possible during the development of the water quality improvement strategies and schedules to be included in the Water Quality Improvement Plan.

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(b) Within 3 months after the development of the priority water quality conditions and numeric goals, the Copermittees must develop and submit the Water Quality Improvement Plan requirements of Provision B.3 to the San Diego Water Board. The San Diego Water Board will issue a public notice and solicit public comments on the Water Quality Improvement Plan for a minimum of 30 days.

(c) Within 30 days of receiving the public comments, the Copermittees must revise the water quality improvement strategies and schedules based on comments received and/or recommendations or direction from the San Diego Water Board Executive Officer.

b. Water Quality Improvement Plan Submittal

(1) Within 18 months after the commencement of coverage under this Order, the Copermittees for each Watershed Management Area must submit a complete Water Quality Improvement Plan in accordance with the requirements of Provision B to the San Diego Water Board. The San Diego Water Board will issue a public notice and solicit public comments on the Water Quality Improvement Plan for a minimum of 30 days.

(2) Based on the comments received, the San Diego Water Board will determine whether to hold a public hearing or to limit public input to submittal of written comments. If no hearing is held the San Diego Water Board will notify the Copermittees within 6 months that the Water Quality Improvement Plan has been accepted as complete following its review and determination that the Water Quality Improvement Plan meets the requirements of this Order.

(3) Within 60 days of receiving comments, the Copermittees must revise the Water Quality Improvement Plan based on comments received and/or recommendations or direction from the San Diego Water Board Executive Officer.

(4) The Water Quality Improvement Plan must be made available on the Regional Clearinghouse required pursuant to Provision F.4 within 30 days of the finalization of the Water Quality Improvement Plan and acceptance by the San Diego Water Board.

2. Updates

a. Jurisdictional Runoff Management Program Document Updates

Each Copermittee must update its jurisdictional runoff management program document in accordance with the following requirements:

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(1) Each Copermittee is encouraged to involve the public and key stakeholders as early and often as possible to solicit recommendations for updates to its jurisdictional runoff management program document.

(2) Each Copermittee must update its jurisdictional runoff management program document to incorporate the requirements of Provision E no later than 6 months after the completion of the corresponding Water Quality Improvement Plan and acceptance of the Water Quality Improvement Plan by the San Diego Water Board.

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(3) Each Copermittee must submit updates to its jurisdictional runoff management program, with a rationale for the modifications, either in the Annual Report required pursuant to Provision F.3.b, and/or as part of the Report of Waste Discharge required pursuant to Provision F.5.b. The requested updates are considered accepted by the San Diego Water Board if no response is provided to the Copermittee after 3 months of submitting the request.

(4) The Copermittee must revise the modifications as directed by the San Diego Water Board Executive Officer.

(5) Updated jurisdictional runoff management program documents must be made available on the Regional Clearinghouse required pursuant to Provision F.4 within 30 days of completing the updates ~~submitting the Annual Report~~.

D. BMP Design Manual Updates

Each Copermittee must update its BMP Design Manual in accordance with the following requirements:

(1) Each Copermittee must update its BMP Design Manual to incorporate the requirements of Provisions E.3.a-d no later than 18 months after the commencement of coverage under this Order.

(2) Subsequent updates must be consistent with the requirements of Provisions E.3.a-d and must be submitted as part of the Annual Reports required pursuant to Provision F.3.b, and/or as part of the Report of Waste Discharge required pursuant to Provision F.5.b. The requested updates are considered accepted by the San Diego Water Board if no response is provided to the Copermittee after 3 months of submitting the request.

(3) Updated BMP Design Manuals must be made available on the Regional Clearinghouse required pursuant to Provision F.4 within 30 days of completing the updates.

E. WATER QUALITY IMPROVEMENT PLAN UPDATES

The Water Quality Improvement Plans must be updated in accordance with the following process:

(1) The Copermittees must implement a public participation process to solicit data and information to be utilized in updating the Water Quality Improvement Plan.

(2) The Copermittees are encouraged to involve the public and key stakeholders as early and often as possible during the updates to the Water Quality Improvement Plan.

(3) The Copermittees for each Watershed Management Area must submit requested updates to the Water Quality Improvement Plan, with the public input received and the rationale for the requested updates, either in the Annual Reports required pursuant to Provision F.3.b, and/or as part of the Report of Waste Discharge required pursuant to Provision F.5.b. The requested updates are considered accepted by the San Diego Water Board if no response is provided to the Copermittee after 3 months of submitting the request.

(4) The Copermittees must revise the requested updates as directed by the San Diego Water Board Executive Officer.

(5) Updated Water Quality Improvement Plans must be made available on the Regional Clearinghouse required pursuant to Provision F.4 within 30 days of acceptance of the requested updates by the San Diego Water Board.

3. Progress Reporting

a. PROGRESS REPORT PRESENTATIONS

The Copermittees for each Watershed Management Area must appear before the San Diego Water Board, as requested by the San Diego Water Board, to provide progress reports on the implementation of the Water Quality Improvement Plan and jurisdictional runoff management programs.

B. ANNUAL REPORTS

(1) Transitional Period JRMP Reports: Each Copermittee must complete and submit a Jurisdictional Runoff Management Program Annual Report no later than October 31 of each year prior to the implementation of updated JRMP programs pursuant to F.2.a. Each Copermittee must submit the information on the Jurisdictional Runoff Management Program specific to the area within its jurisdiction in each Watershed Management Area.

(2) Transitional Period Monitoring Report: The transitional period monitoring conducted pursuant to D.1.a and D.2.a. shall be reported in a single report that covers the entire reporting period from the initiation of the transitional period monitoring (as described in D.1.a and D.2.a.), through September 30th following approval of the Water Quality Improvement Plan. The Transitional Period Monitoring Report shall include the assessments required per D.4.a.(1)(a), D.4.b.(1)(a) and D.4.b.(2)(a); and be submitted by January 31st following completion of the above mentioned transitional period.

(3) Post-Transitional Annual Reports – Following the initial transitional period after enrollment into this Order, the Copermittees for each Watershed Management Area must submit a combined Annual Report for each reporting period no later than January 31 of the following year. The annual reporting period consists of two periods: 1) July 1 to June 30 of the following year for the jurisdictional runoff management programs, 2) October 1 to September 30 of the following year for the monitoring and assessment programs. Annual Reports must be made available on the Regional Clearinghouse required pursuant to Provision F.4. Each Annual Report must include the following:

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Deleted: The first Annual Report must be prepared for the reporting period beginning July 1 after commencement of coverage under this Order, and upon San Diego Water Board determination that the Water Quality Improvement Plan meets the requirements of this Order to June 30 in the following year for the jurisdictional runoff management programs, and September 30 in the following year for the monitoring and assessment programs.

(a) The receiving water and MS4 outfall discharge monitoring data collected pursuant to Provisions D.1 and D.2, summarized and presented in tabular and graphical form;

(b) Progress of the special studies required pursuant to Provision D.3, and the results or findings when a special study, or each phase of a special study, is completed;

(c) The findings from the assessments required pursuant to Provision D.4;

(d) The progress of implementing the Water Quality Improvement Plan, including, but not limited to, the following:

(i) The progress toward achieving the interim and final numeric goals for the highest water quality priorities for the Watershed Management Area,

(ii) The water quality improvement strategies that were implemented and/or no longer implemented by each of the Copermittees during the reporting period and previous reporting periods, and are planned to be implemented during the next reporting period,

(iii) Proposed modifications to the water quality improvement strategies, with public input received and rationale for the proposed modifications,

(iv) Previously proposed modifications or updates incorporated into the Water Quality Improvement Plan and/or each Copermittee's jurisdictional runoff management program document and implemented by the Copermittees in the Watershed Management Area, and

(v) Proposed modifications or updates to the Water Quality Improvement Plan and/or each Copermittee's jurisdictional runoff management program document;

(e) For each Water Quality Improvement Plan, the progress of implementing the corresponding Jurisdictional Urban Runoff Management Programs. Each Copermittee should report on the items listed below. The individual JRMP annual reports may be included as attachments to the corresponding WQIP annual report. The JRMP annual report should include, but not be limited to, the following:

(i) The water quality improvement strategies that were implemented and/or no longer implemented by each of the Copermittees during the reporting period and previous reporting periods, and are planned to be implemented during the next reporting period,

(ii) Proposed modifications to the water quality improvement strategies, with public input received and rationale for the proposed modifications,

(iii) Previously proposed modifications or updates incorporated into each Copermittee's jurisdictional runoff management program document and implemented by the Copermittees in the Watershed Management Area, and

(iv) Proposed modifications or updates to each Copermittee's jurisdictional runoff management program document;

(4) Until the Copermittees have updated their jurisdictional runoff management programs consistent with Provision F.2.a, the Copermittees must continue to utilize the current jurisdictional runoff management program annual reporting format. Each Copermittee must submit the information on the Jurisdictional Runoff Management Program Annual Report Form specific to the area within its jurisdiction in each Watershed Management Area.

(5) Each Copermittee must provide any data or documentation utilized in developing the Annual Report upon request by the San Diego Water Board. Any monitoring data utilized in developing the Annual Report must be uploaded to the California Environmental Data Exchange Network (CEDEN).[37] Any monitoring and assessment data utilized in developing the Annual Report must be provided on the Regional Clearinghouse required

[37] Data must be uploaded to CEDEN Southern California Regional Data Center (http://www.sccwrp.org/Data/DataSubmission/SouthernCaliforniaRegionalDataCenter.aspx) using the templates provided on the CEDEN website.

Deleted: <#>A completed Jurisdictional Runoff Management Program Annual Report Form (Attachment D or accepted revision) for each Copermittee in the Watershed Management Area, certified by a Principal Executive Officer, Ranking Elected Official, or Duly Authorized Representative. ¶
¶
Each Copermittee must complete and submit a Jurisdictional Runoff Management Program Annual Report Form (Attachment D or accepted revision) no later than October 31 of each year

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pursuant to Provision F.4.

F. Regional Monitoring and Assessment Report

Comment [K6]: This was moved from F.5.c since it is a part of the ROWD.

Deleted: <#>The Copermittees must submit a Regional Monitoring and Assessment Report no later than 180 days in advance of the expiration date of this Order. The Regional Monitoring and Assessment Report may be submitted as part of the Report of Waste Discharge required pursuant to Provision F.5.b. The Copermittees must review the receiving water and MS4 outfall discharge monitoring data collected pursuant to Provisions D.1 and D.2, and findings from the assessments required pursuant to Provision D.4, to assess the following:¶
¶
<#>The beneficial uses of the receiving waters within the San Diego Region that are protected or must be restored;¶
¶
<#>The progress toward restoring impacted beneficial uses in the receiving waters within the San Diego Region; and¶
¶
<#>Pollutants or conditions of emerging concern that may impact beneficial uses in the receiving waters within the San Diego Region.¶
¶
<#>The Regional Monitoring and Assessment Report must include recommendations for improving the implementation and assessment of the Water Quality Improvement Plans and jurisdictional runoff management programs.¶
¶
<#>Each Copermittee must provide any data or documentation utilized in developing the Regional Monitoring and Assessment Report upon request by the San Diego Water Board. Any monitoring and assessment data utilized in developing the Regional Monitoring and Assessment Report must be provided on the Regional Clearinghouse required pursuant to Provision F.4.¶
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4. Regional Clearinghouse

The Copermittees must develop, update, and maintain an internet-based Regional Clearinghouse that is made available to the public no later than 18 months after the effective date of this Order. The Copermittees may elect to develop and maintain the clearinghouse(s) provided by other Copermittees or agencies.

a. The Copermittees, through the Regional Clearinghouse, must make the following documents and data available, organized by Watershed Management Area, which may be linked to other internet-based data portals and databases where the original documents are stored:

(1) Water Quality Improvement Plan for the Watershed Management Area, and all updated versions with date of update;

(2) Annual Reports for the Watershed Management Area;

(3) Jurisdictional Runoff Management Program document for each Copermittee within the Watershed Management Area, and all updated versions with date of update;

(4) BMP Design Manual for each Copermittee within the Watershed Management Area, and all updated versions with date of update;

(5) Reports from special studies (e.g. source identification, BMP effectiveness assessment) conducted in the Watershed Management Area;

(6) Monitoring data collected pursuant to Provision D for each Watershed Management Area must be uploaded to CEDEN,[38] with links to the uploaded data; and

(7) Available GIS data, layers, and/or shapefiles used to develop the maps generated and maintained by the Copermittees for the Water Quality Improvement Plans, Annual Reports, and jurisdictional runoff management program documents.

b. The Copermittees, through the Regional Clearinghouse, must make the following information and documents available:

[38] Data must be uploaded to CEDEN Southern California Regional Data Center (http://www.sccwrp.org/Data/DataSubmission/SouthernCaliforniaRegionalDataCenter.aspx) using the templates provided on the CEDEN website.

(1) Contact information (point of contact, phone number, email address, and mailing address) for each Copermittee;

(2) Public hotline number for reporting non-storm water and illicit discharges for each Copermittee;

(3) Email address for reporting non-storm water and illicit discharges for each Copermittee;

(4) Link to each Copermittee's website, if available, where the public may find additional information about the Copermittee's storm water management program and for requesting records for the implementation of its program;

(5) Information about opportunities for the public to participate in programs and/or activities that can result in the prevention or elimination of non-storm water discharges to the MS4, reduction of pollutants in storm water discharges from the MS4, and the protection of the quality of receiving waters; and

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(6) Reports from regional monitoring programs in which the Copermittees participate (e.g. Southern California Monitoring Coalition, Southern California Coastal Water Research Project Bight Monitoring);

(7) Regional Monitoring and Assessment Reports; and

(8) Any other information, data, and documents the Copermittees determine as appropriate for making available to the public.

5. Report of Waste Discharge

a. The Orange County Copermittees and the Riverside County Copermittees are required to submit a complete Report of Waste Discharge pursuant to the requirements of their current Orders. The San Diego Water Board will review and consider the Reports of Waste Discharge to determine whether modification to this Order, pursuant to the requirements of Provision H, will be required prior the Orange County Copermittees and/or Riverside County Copermittees becoming covered under this Order. The current Orders for the Orange County Copermittees and Riverside County Copermittees are rescinded upon notification of coverage under this Order except for enforcement purposes.

b. The Copermittees subject to the requirements of this Order must submit to the San Diego Water Board a complete Report of Waste Discharge as an application for the re-issuance of this Order and NPDES permit. The Report of Waste Discharge must be submitted no later than 180 days in advance of the expiration date of this Order. The Report of Waste Discharge must contain the following minimum information:

(1) Names and addresses of the Copermittees;

(2) Names and titles of the primary contacts of the Copermittees;

(3) Proposed changes to the Copermittees' Water Quality Improvement Plans and the supporting justification;

(4) Proposed changes to the Copermittees' jurisdictional runoff management programs and the supporting justification;

(5) Any other information necessary for the re-issuance of this Order;

(6) Any information to be included as part of the Report of Waste Discharge pursuant to the requirements of this Order; and

(7) Any other information required by federal regulations for NPDES permit reissuance.

c. The Copermittees must submit a Regional Monitoring and Assessment Report no later than 180 days in advance of the expiration date of this Order. The Copermittees must review the receiving water and MS4 outfall discharge monitoring data collected pursuant to Provisions D.1 and D.2, and findings from the assessments required pursuant to Provision D.4, to assess the following:

(a) The beneficial uses of the receiving waters within the San Diego Region that are protected;

(b) The progress toward protecting the impacted beneficial uses in the receiving waters within the San Diego Region; and

(c) Pollutants or conditions of concern that may impact beneficial uses in the receiving waters within the San Diego Region.

(1) The Regional Monitoring and Assessment Report must include recommendations for improving the implementation and assessment of the Water Quality Improvement Plans and jurisdictional runoff management programs.

(2) Each Copermittee must provide any data or documentation utilized in developing the Regional Monitoring and Assessment Report upon request by the San Diego Water Board. Any monitoring and assessment data utilized in developing the Regional Monitoring and Assessment Report must be provided on the Regional Clearinghouse required pursuant to Provision F.4.

Comment [K7]: This was moved from F.3.c to this section since it is a part of the ROWD.

Deleted: The Regional Monitoring and Assessment Report may be submitted as part of the Report of Waste Discharge required pursuant to Provision F.5.b.

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April 10 and 11, 2013
Item No. 8
Supporting Document No. 5

6. Application for Early Coverage

a. The Orange County Copermittees, collectively, or Riverside County Copermittees, collectively, may apply for early coverage under this Order by submitting a Report of Waste Discharge Form 200, with a written request for early coverage under this Order and identification of the necessary changes to this Order, if any, that the Copermittees are recommending based on the ROWD submittal.

b. The San Diego Water Board will review the application for early coverage and will make any necessary changes to this Order. A notification of coverage under this Order will be issued to the Copermittees in the respective county by the San Diego Water Board upon completion of the early coverage application requirements and consideration of any necessary changes to this Order. The effective coverage date will be specified in the notification of coverage. The Copermittees in the respective county are authorized to have MS4 discharges pursuant to the requirements of this Order starting on the effective coverage date specified in the notification of coverage. The existing Order for the respective county is rescinded upon the effective coverage date specified in the notification of coverage except for enforcement purposes.

c. The timelines specified within this Order will be initiated based on the effective coverage date (as specified within the notification of coverage).

7. Reporting Provisions

Each Copermittee must comply with all the reporting and recordkeeping provisions of the Standard Permit Provisions and General Provisions contained in Attachment B to this Order.

G. PRINCIPAL WATERSHED COPERMITTEE RESPONSIBILITIES

1. The Copermittees within each Watershed Management Area must designate a Principal Watershed Copermittee and notify the San Diego Water Board of the name of the Principal Watershed Copermittee. An individual Copermittee should not be designated a Principal Watershed Copermittee for more than two Watershed Management Areas. The notification may be submitted with the Water Quality Improvement Plan required pursuant to Provision F.1 of this Order.

2. The Principal Watershed Copermittee is responsible for, at a minimum, the following:

- **a.** Serving as liaison between the Copermittees in the Watershed Management Area and the San Diego Water Board on general permit issues, and when necessary and appropriate, representing the Copermittees in the Watershed Management Area before the San Diego Water Board.

- **b.** Facilitating the development of the Water Quality Improvement Plan in accordance with the requirements of Provision B of this Order

- **c.** Coordinating the submittal of the deliverables required by Provisions F.1, F.2, F.3.a, and F.3.b of this Order.

- **d.** Coordinating and developing, with the other Principal Watershed Copermittees, the requirements of Provisions F.3.c, F.4, and F.5.b of this Order.

H. MODIFICATION OF PROGRAMS

1. Modifications of the Order may be initiated by the San Diego Water Board or by the Copermittees. Requests by Copermittees must be made to the San Diego Water Board.

2. Minor modifications to the Order may be made by the San Diego Water Board where the proposed modification complies with all the prohibitions and limitations, and other requirements of this Order.

3. Proposed modifications to the Order that are not minor require amendment of this Order in accordance with this Order's rules, policies, and procedures.

4. The San Diego Water Board may re-open and modify this Order at any time prior to its expiration, after opportunity for public comment and a public hearing, if the State Water Board determines that revisions are warranted to those provisions of the Order addressing compliance with water quality standards in the receiving water and/or those provisions of the Order establishing an iterative process for implementation of management practices to assure compliance with water quality standards in the receiving water.

5. The San Diego Water Board will review any applications received for early coverage under this Order (Provision F.6) as well as any general applications received for coverage under this Order and will consider any necessary changes to this Order based on the newly-obtained information and/or reports received as a part of the application process. Within the applications for coverage under this Order, the Copermittees shall identify the changes that are proposed to this Order.

6. Modifications of the Order shall be initiated to incorporate provisions as a result of future amendments to the Basin Plan, such as a new or revised water quality objectives or the adoption or reconsideration of a TMDL, including the program of implementation. As soon as practicable, but no later than 6 months of the effective date of a revised TMDL where the revisions warrant a change to the provisions of this Order, the Regional Water Board shall modify this Order consistent with the assumptions and requirements of the revised WLA(s), including the program of implementation.

7. Modification to the Order shall be considered 18 months prior to the compliance date for WQBELs where the compliance mechanism is based upon numeric effluent limitations. The intent of the reconsideration is to evaluate the inclusion of provisions or modifications to WQBELs in Attachment E of this Order prior to the final compliance deadlines that would allow an action-based, BMP compliance demonstration approach with regard to final WQBELs.

I. STANDARD PERMIT PROVISIONS AND GENERAL PROVISIONS

Each Copermittee must comply with all the Standard Permit Provisions and General Provisions contained in Attachment B to this Order.

ATTACHMENT A

DISCHARGE PROHIBITIONS AND SPECIAL PROTECTIONS

1. Basin Plan Waste Discharge Prohibitions

California Water Code Section 13243 provides that a Regional Water Board, in a water quality control plan, may specify certain conditions or areas where the discharge of waste or certain types of waste is not permitted. The following waste discharge prohibitions in the Water Quality Control Plan for the San Diego Basin (Basin Plan) are applicable to any person, as defined by Section 13050(c) of the California Water Code, who is a citizen, domiciliary, or political agency or entity of California whose activities in California could affect the quality of waters of the state within the boundaries of the San Diego Region.

1. The discharge of waste to waters of the state in a manner causing, or threatening to cause a condition of pollution, contamination or nuisance as defined in California Water Code Section 13050, is prohibited.

2. The discharge of waste to land, except as authorized by waste discharge requirements or the terms described in California Water Code Section 13264 is prohibited.

3. The discharge of pollutants or dredged or fill material to waters of the United States except as authorized by a National Pollutant Discharge Elimination System (NPDES) permit or a dredged or fill material permit (subject to the exemption described in California Water Code Section 13376) is prohibited.

4. Discharges of recycled water to lakes or reservoirs used for municipal water supply or to inland surface water tributaries thereto are prohibited, unless this San Diego Water Board issues a NPDES permit authorizing such a discharge; the proposed discharge has been approved by the State Department of Health Services (DHS) and the operating agency of the impacted reservoir; and the discharger has an approved fail-safe long-term disposal alternative.

5. The discharge of waste to inland surface waters, except in cases where the quality of the discharge complies with applicable receiving water quality objectives, is prohibited. Allowances for dilution may be made at the discretion of the San Diego Water Board. Consideration would include streamflow data, the degree of treatment provided and safety measures to ensure reliability of facility performance. As an example, discharge of secondary effluent would probably be permitted if streamflow provided 100:1 dilution capability.

6. The discharge of waste in a manner causing flow, ponding, or surfacing on lands not owned or under the control of the discharger is prohibited, unless the discharge is authorized by the San Diego Water Board.

7. The dumping, deposition, or discharge of waste directly into waters of the state, or adjacent to such waters in any manner which may permit its being transported into the waters, is prohibited unless authorized by the San Diego Water Board.

8. Any discharge to a storm water conveyance system that is not composed entirely of "*storm water*" is prohibited unless authorized by the San Diego Water Board. [The federal regulations, 40 CFR 122.26(b)(13), define storm water as storm water runoff, snow melt runoff, and surface runoff and drainage. 40 CFR 122.26(b)(2) defines an illicit discharge as any discharge to a storm water conveyance system that is not composed entirely of storm water except discharges pursuant to a NPDES permit and discharges resulting from fire fighting activities.] [§122.26 amended at 56 FR 56553, November 5, 1991; 57 FR 11412, April 2, 1992].

9. The unauthorized discharge of treated or untreated sewage to waters of the state or to a storm water conveyance system is prohibited.

10. The discharge of industrial wastes to conventional septic tank/subsurface disposal systems, except as authorized by the terms described in California Water Code Section 13264, is prohibited.

11. The discharge of radioactive wastes amenable to alternative methods of disposal into the waters of the state is prohibited.

12. The discharge of any radiological, chemical, or biological warfare agent into waters of the state is prohibited.

13. The discharge of waste into a natural or excavated site below historic water levels is prohibited unless the discharge is authorized by the San Diego Water Board.

14. The discharge of sand, silt, clay, or other earthen materials from any activity, including land grading and construction, in quantities which cause deleterious bottom deposits, turbidity or discoloration in waters of the state or which unreasonably affect, or threaten to affect, beneficial uses of such waters is prohibited.

15. The discharge of treated or untreated sewage from vessels to Mission Bay, Oceanside Harbor, Dana Point Harbor, or other small boat harbors is prohibited.

16. The discharge of untreated sewage from vessels to San Diego Bay is prohibited.

17. The discharge of treated sewage from vessels to portions of San Diego Bay that are less than 30 feet deep at mean lower low water (MLLW) is prohibited.

18. The discharge of treated sewage from vessels, which do not have a properly functioning US Coast Guard certified Type I or Type II marine sanitation device, to portions of San Diego Bay that are greater than 30 feet deep at mean lower low water (MLLW) is prohibited.

2. Attachment B to State Water Board Resolution 2012-0012

Special Protections for Areas of Special Biological Significance, Governing Point Source Discharges of Storm Water and Nonpoint Source Waste Discharges

I. PROVISIONS FOR POINT SOURCE DISCHARGES OF STORM WATER AND NONPOINT SOURCE WASTE DISCHARGES

The following terms, prohibitions, and special conditions (hereafter collectively referred to as special conditions) are established as limitations on point source storm water and nonpoint source discharges. These special conditions provide Special Protections for marine aquatic life and natural water quality in Areas of Special Biological Significance (ASBS), as required for State Water Quality Protection Areas pursuant to California Public Resources Code Sections 36700(f) and 36710(f). These Special Protections are adopted by the State Water Board as part of the California Ocean Plan (Ocean Plan) General Exception.

The special conditions are organized by category of discharge. The State Water Resources Control Board (State Water Board) and Regional Water Quality Control Boards (Regional Water Boards) will determine categories and the means of regulation for those categories [e.g., Point Source Storm Water National Pollutant Discharge Elimination System (NPDES) or Nonpoint Source].

A. PERMITTED POINT SOURCE DISCHARGES OF STORM WATER

1. General Provisions for Permitted Point Source Discharges of Storm Water

    a. Existing storm water discharges into an ASBS are allowed only under the following conditions:

        (1) The discharges are authorized by an NPDES permit issued by the State Water Board or Regional Water Board;

        (2) The discharges comply with all of the applicable terms, prohibitions, and special conditions contained in these Special Protections; and

        (3) The discharges:

            (i) Are essential for flood control or slope stability, including roof, landscape, road, and parking lot drainage;

            (ii) Are designed to prevent soil erosion;

            (iii) Occur only during wet weather;

            (iv) Are composed of only storm water runoff.

    b. Discharges composed of storm water runoff shall not alter natural ocean water quality in an ASBS.

    c. The discharge of trash is prohibited.

d. Only discharges from existing storm water outfalls are allowed. Any proposed or new storm water runoff discharge shall be routed to existing storm water discharge outfalls and shall not result in any new contribution of waste to an ASBS (i.e., no additional pollutant loading). “Existing storm water outfalls” are those that were constructed or under construction prior to January 1, 2005. “New contribution of waste” is defined as any addition of waste beyond what would have occurred as of January 1, 2005. A change to an existing storm water outfall, in terms of re-location or alteration, in order to comply with these special conditions, is allowed and does not constitute a new discharge.

e. Non-storm water discharges are prohibited except as provided below:

(1) The term “non-storm water discharges” means any waste discharges from a municipal separate storm sewer system (MS4) or other NPDES permitted storm drain system to an ASBS that are not composed entirely of storm water.

(2) (i) The following non-storm water discharges are allowed, provided that the discharges are essential for emergency response purposes, structural stability, slope stability or occur naturally:

(a) Discharges associated with emergency fire fighting operations.

(b) Foundation and footing drains.

(c) Water from crawl space or basement pumps.

(d) Hillside dewatering.

(e) Naturally occurring groundwater seepage via a storm drain.

(f) Non-anthropogenic flows from a naturally occurring stream via a culvert or storm drain, as long as there are no contributions of anthropogenic runoff.

(ii) An NPDES permitting authority may authorize non-storm water discharges to an MS4 with a direct discharge to an ASBS only to the extent the NPDES permitting authority finds that the discharge does not alter natural ocean water quality in the ASBS.

(3) Authorized non-storm water discharges shall not cause or contribute to a violation of the water quality objectives in Chapter II of the Ocean Plan nor alter natural ocean water quality in an ASBS.

2. Compliance Plans for Inclusion in Storm Water Management Plans (SWMP) and Storm Water Pollution Prevention Plans (SWPPP).

The discharger shall specifically address the prohibition of non-storm water runoff and the requirement to maintain natural water quality for storm water discharges to an ASBS in an ASBS Compliance Plan to be included in its SWMP or a SWPPP, as appropriate to permit type. If a statewide permit includes a SWMP, then the discharger shall prepare a stand-alone compliance plan for ASBS discharges. The ASBS Compliance Plan is subject to approval by the Executive Director of the State Water Board (statewide permits) or Executive Officer of the Regional Water Board (for permits issued by Regional Water Boards).

a. The Compliance Plan shall include a map of surface drainage of storm water runoff, showing areas of sheet runoff, prioritize discharges, and describe any structural Best Management Practices (BMPs) already employed and/or BMPs to be employed in the future. Priority discharges are those that pose the greatest water quality threat and which are identified to require installation of structural BMPs. The map shall also show the storm water conveyances in relation to other features such as service areas, sewage conveyances and treatment facilities, landslides, areas prone to erosion, and waste and hazardous material storage areas, if applicable. The SWMP or SWPPP shall also include a procedure for updating the map and plan when changes are made to the storm water conveyance facilities.

b. The ASBS Compliance Plan shall describe the measures by which all non-authorized non-storm water runoff (e.g., dry weather flows) has been eliminated, how these measures will be maintained over time, and how these measures are monitored and documented.

c. For Municipal Separate Storm Sewer System (MS4s), the ASBS Compliance Plan shall require minimum inspection frequencies as follows:

    (1) The minimum inspection frequency for construction sites shall be weekly during rainy season;

    (2) The minimum inspection frequency for industrial facilities shall be monthly during the rainy season;

    (3) The minimum inspection frequency for commercial facilities (e.g., restaurants) shall be twice during the rainy season; and

    (4) Storm water outfall drains equal to or greater than 18 inches (457 mm) in diameter or width shall be inspected once prior to the beginning of the rainy season and once during the rainy season and maintained to remove trash and other anthropogenic debris.

d. The ASBS Compliance Plan shall address storm water discharges (wet weather flows) and, in particular, describe how pollutant reductions in storm water runoff, that are necessary to comply with these special conditions, will be achieved through BMPs. Structural BMPs need not be installed if the discharger can document to the satisfaction of the State Water Board Executive Director (statewide permits) or Regional Water Board Executive Officer (Regional Water Board permits) that such installation would pose a threat to health or safety. BMPs to control storm water runoff discharges (at the end-of-pipe) during a design storm shall be designed to achieve on average the following target levels:

    (1) Table B Instantaneous Maximum Water Quality Objectives in Chapter II of the Ocean Plan; or

    (2) A 90% reduction in pollutant loading during storm events, for the applicant’s total discharges. The baseline for the reduction is the effective date of the Exception. The baseline for these determinations is the effective date of the Exception, and the

reductions must be achieved and documented within four (4) years of the effective date.

e. The ASBS Compliance Plan shall address erosion control and the prevention of anthropogenic sedimentation in ASBS. The natural habitat conditions in the ASBS shall not be altered as a result of anthropogenic sedimentation.

f. The ASBS Compliance Plan shall describe the non-structural BMPs currently employed and planned in the future (including those for construction activities), and include an implementation schedule. The ASBS Compliance Plan shall include non-structural BMPs that address public education and outreach. Education and outreach efforts must adequately inform the public that direct discharges of pollutants from private property not entering an MS4 are prohibited. The ASBS Compliance Plan shall also describe the structural BMPs, including any low impact development (LID) measures, currently employed and planned for higher threat discharges and include an implementation schedule. To control storm water runoff discharges (at the end-of-pipe) during a design storm, permittees must first consider using LID practices to infiltrate, use, or evapotranspirate storm water runoff on-site.

g. The BMPs and implementation schedule shall be designed to ensure that natural water quality conditions in the receiving water are achieved and maintained by either reducing flows from impervious surfaces or reducing pollutant loading, or some combination thereof.

h. If the results of the receiving water monitoring described in IV.B. of these special conditions indicate that the storm water runoff is causing or contributing to an alteration of natural ocean water quality in the ASBS, the discharger shall submit a report to the State Water Board and Regional Water Board within 30 days of receiving the results.

(1) The report shall identify the constituents in storm water runoff that alter natural ocean water quality and the sources of these constituents.

(2) The report shall describe BMPs that are currently being implemented, BMPs that are identified in the SWMP or SWPPP for future implementation, and any additional BMPs that may be added to the SWMP or SWPPP to address the alteration of natural water quality. The report shall include a new or modified implementation schedule for the BMPs.

(3) Within 30 days of the approval of the report by the State Water Board Executive Director (statewide permits) or Regional Water Board Executive Officer (Regional Water Board permits), the discharger shall revise its ASBS Compliance Plan to incorporate any new or modified BMPs that have been or will be implemented, the implementation schedule, and any additional monitoring required.

(4) As long as the discharger has complied with the procedures described above and is implementing the revised SWMP or SWPPP, the discharger does not have to repeat the same procedure for continuing or recurring exceedances of natural ocean water quality conditions due to the same constituent.

(5) Compliance with this section does not excuse violations of any term, prohibition, or condition contained in these Special Protections.

3. Compliance Schedule

a. On the effective date of the Exception, all non-authorized non-storm water discharges (e.g., dry weather flow) are effectively prohibited.

b. Within one year from the effective date of the Exception, the discharger shall submit a written ASBS Compliance Plan to the State Water Board Executive Director (statewide permits) or Regional Water Board Executive Officer (Regional Water Board permits) that describes its strategy to comply with these special conditions, including the requirement to maintain natural water quality in the affected ASBS. The ASBS Compliance Plan shall include a time schedule to implement appropriate non-structural and structural controls (implementation schedule) to comply with these special conditions for inclusion in the discharger's SWMP or SWPPP, as appropriate to permit type.

c. Within 18 months of the effective date of the Exception, any non-structural controls that are necessary to comply with these special conditions shall be implemented.

d. Within four (4) years of the effective date of the Exception, any structural controls identified in the ASBS Compliance Plan that are necessary to comply with these special conditions shall be operational.

e. Within four (4) years of the effective date of the Exception, all dischargers must comply with the requirement that their discharges into the affected ASBS maintain natural ocean water quality. If the initial results of post-storm receiving water quality testing indicate levels higher than the 85th percentile threshold of reference water quality data and the pre-storm receiving water levels, then the discharger must re-sample the receiving water, pre- and post-storm. If after re-sampling the post-storm levels are still higher than the 85th percentile threshold of reference water quality data, and the pre-storm receiving water levels, for any constituent, then natural ocean water quality is exceeded. See attached Flowchart.

f. The Executive Director of the State Water Board (statewide permits) or Executive Officer of the Regional Water Board (Regional Water Board permits) may only authorize additional time to comply with the special conditions d. and e., above if good cause exists to do so. Good cause means a physical impossibility or lack of funding.

   If a discharger claims physical impossibility, it shall notify the Board in writing within thirty (30) days of the date that the discharger first knew of the event or circumstance that caused or would cause it to fail to meet the deadline in d. or e. The notice shall describe the reason for the noncompliance or anticipated noncompliance and specifically refer to this Section of this Exception. It shall describe the anticipated length of time the delay in compliance may persist, the cause or causes of the delay as well as measures to minimize the impact of the delay on water quality, the measures taken or to be taken by the discharger to prevent or minimize the delay, the schedule by which the measures will be implemented, and the anticipated date of compliance. The discharger shall adopt all reasonable measures to avoid and minimize such delays and their impact on water quality.

   The discharger may request an extension of time for compliance based on lack of funding. The request for an extension shall require:

(1) for municipalities, a demonstration of significant hardship to discharger ratepayers, by showing the relationship of storm water fees to annual household income for residents within the discharger's jurisdictional area, and the discharger has made timely and complete applications for all available bond and grant funding, and either no bond or grant funding is available, or bond and/or grant funding is inadequate; or
(2) for other governmental agencies, a demonstration and documentation of a good faith effort to acquire funding through that agency's budgetary process.

B. NONPOINT SOURCE DISCHARGES

[NOT INCLUDED]
[PROVISIONS FOR NONPOINT SOURCE DISCHARGES NOT APPLICABLE]

II. ADDITIONAL REQUIREMENTS FOR PARKS AND RECREATION FACILITIES

[NOT INCLUDED]
[ADDITIONAL REQUIREMENTS FOR PARKS AND RECREATION FACILITIES NOT APPLICABLE]

III. ADDITIONAL REQUIREMENTS – WATERFRONT AND MARINE OPERATIONS

[NOT INCLUDED]
[ADDITIONAL REQUIREMENTS FOR WATERFRONT AND MARINE OPERATIONS NOT APPLICABLE]

IV. MONITORING REQUIREMENTS

Monitoring is mandatory for all dischargers to assure compliance with the Ocean Plan. Monitoring requirements include both: (A) core discharge monitoring, and (B) ocean receiving water monitoring. The State and Regional Water Boards must approve sampling site locations and any adjustments to the monitoring programs. All ocean receiving water and reference area monitoring must be comparable with the Water Boards' Surface Water Ambient Monitoring Program (SWAMP).

Safety concerns: Sample locations and sampling periods must be determined considering safety issues. Sampling may be postponed upon notification to the State and Regional Water Boards if hazardous conditions prevail.

Analytical Chemistry Methods: All constituents must be analyzed using the lowest minimum detection limits comparable to the Ocean Plan water quality objectives. For metal analysis, all samples, including storm water effluent, reference samples, and ocean receiving water samples, must be analyzed by the approved analytical method with the lowest minimum detection limits (currently Inductively Coupled Plasma/Mass Spectrometry) described in the Ocean Plan.

A. CORE DISCHARGE MONITORING PROGRAM

1. General sampling requirements for timing and storm size:

   Runoff must be collected during a storm event that is greater than 0.1 inch and generates runoff, and at least 72 hours from the previously measurable storm event. Runoff samples shall be collected when post-storm receiving water is sampled, and analyzed for the same constituents as receiving water and reference site samples (see section IV B) as described below.

2. Runoff flow measurements

   a. For municipal/industrial storm water outfalls in existence as of December 31, 2007, 18 inches (457mm) or greater in diameter/width (including multiple outfall pipes in combination having a width of 18 inches, runoff flows must be measured or calculated, using a method acceptable to and approved by the State and Regional Water Boards.
   b. This will be reported annually for each precipitation season to the State and Regional Water Boards.

3. Runoff samples – storm events

   a. For outfalls equal to or greater than 18 inches (0.46m) in diameter or width:

      (1) samples of storm water runoff shall be analyzed during the same storm as receiving water samples for oil and grease, total suspended solids, and, within the range of the southern sea otter indicator bacteria or some other measure of fecal contamination, ; and

      (2) samples of storm water runoff shall be analyzed for critical life stage chronic toxicity (one invertebrate or algal species) at least once during each storm season when receiving water is sampled in the ASBS

      (3) If an applicant has no outfall greater than 36 inches, then storm water runoff from the applicant's largest outfall shall be further analyzed during the same storm as receiving water samples for Ocean Plan Table B metals for protection of marine life, Ocean Plan polynuclear aromatic hydrocarbons (PAHs), current use pesticides (pyrethroids and OP pesticides), and nutrients (ammonia, nitrate and phosphates).

   b. For outfalls equal to or greater than 36 inches (0.91m) in diameter or width:

      (1) samples of storm water runoff shall be analyzed during the same storm as receiving water samples for oil and grease, total suspended solids, and, within the range of the southern sea otter indicator bacteria or some other measure of fecal contamination; and

      (2) samples of storm water runoff shall be further analyzed during the same storm as receiving water samples for Ocean Plan Table B metals for protection of marine life, Ocean Plan polynuclear aromatic hydrocarbons (PAHs), current use pesticides (pyrethroids and OP pesticides), and nutrients (ammonia, nitrate and phosphates) and

(3) samples of storm water runoff shall be analyzed for critical life stage chronic toxicity (one invertebrate or algal species) at least once during each storm season when receiving water is sampled in the ASBS.

c. For an applicant not participating in a regional monitoring program [see below in Section IV (B)] in addition to (a.) and (b.) above, a minimum of the two largest outfalls or 20 percent of the larger outfalls, whichever is greater, shall be sampled (flow weighted composite samples) at least three times annually during wet weather (storm event) and analyzed for all Ocean Plan Table A constituents, Table B constituents for marine aquatic life protection (except for toxicity, only chronic toxicity for three species shall be required), DDT, PCBs, Ocean Plan PAHs, OP pesticides, pyrethroids, nitrates, phosphates, and Ocean Plan indicator bacteria. For parties discharging to ASBS in more than one Regional Water Board region, at a minimum, one (the largest) such discharge shall be sampled annually in each Region.

4. The Executive Director of the State Water Board (statewide permits) or Executive Officer of the Regional Water Board (Regional Water Board permits) may reduce or suspend core monitoring once the storm runoff is fully characterized. This determination may be made at any point after the discharge is fully characterized, but is best made after the monitoring results from the first permit cycle are assessed.

B. OCEAN RECEIVING WATER AND REFERENCE AREA MONITORING PROGRAM

In addition to performing the Core Discharge Monitoring Program in Section II.A above, all applicants having authorized discharges must perform ocean receiving water monitoring. In order to fulfill the requirements for monitoring the physical, chemical, and biological characteristics of the ocean receiving waters within their ASBS, dischargers may choose either (1) an individual monitoring program, or (2) participation in a regional integrated monitoring program.

1. Individual Monitoring Program: The requirements listed below are for those dischargers who elect to perform an individual monitoring program to fulfill the requirements for monitoring the physical, chemical, and biological characteristics of the ocean receiving waters within the affected ASBS. In addition to Core Discharge Monitoring, the following additional monitoring requirements shall be met:

a. Three times annually, during wet weather (storm events), the receiving water at the point of discharge from the outfalls described in section (IV)(A)(3)(c) above shall be sampled and analyzed for Ocean Plan Table A constituents, Table B constituents for marine aquatic life, DDT, PCBs, Ocean Plan PAHs, OP pesticides, pyrethroids, nitrates, phosphates, salinity, chronic toxicity (three species), and Ocean Plan indicator bacteria.

The sample location for the ocean receiving water shall be in the surf zone at the point of discharges; this must be at the same location where storm water runoff is sampled. Receiving water shall be sampled at approximately the same time prior to (pre-storm) and during (or immediately after) the same storm (post storm). Reference water quality shall also be sampled and analyzed for the same constituents pre-storm and post-storm, during the same storms when receiving water is sampled. Reference stations will be determined by the State Water Board's Division of Water Quality and the applicable Regional Water Board(s).

b. Sediment sampling shall occur at least three times during every five (5) year period. The subtidal sediment (sand or finer, if present) at the discharge shall be sampled and analyzed for Ocean Plan Table B constituents for marine aquatic life, DDT, PCBs, PAHs, pyrethroids, and OP pesticides. For sediment toxicity testing, only an acute toxicity test using the amphipod Eohaustorius estuarius must be performed.

c. A quantitative survey of intertidal benthic marine life shall be performed at the discharge and at a reference site. The survey shall be performed at least once every five (5) year period. The survey design is subject to approval by the Regional Water Board and the State Water Board's Division of Water Quality. The results of the survey shall be completed and submitted to the State Water Board and Regional Water Board at least six months prior to the end of the permit cycle.

d. Once during each five (5) year period, a bioaccumulation study shall be conducted to determine the concentrations of metals and synthetic organic pollutants at representative discharge sites and at representative reference sites. The study design is subject to approval by the Regional Water Board and the State Water Board's Division of Water Quality. The bioaccumulation study may include California mussels (Mytilus californianus) and/or sand crabs (Emerita analoga or Blepharipoda occidentalis). Based on the study results, the Regional Water Board and the State Water Board's Division of Water Quality, may adjust the study design in subsequent permits, or add or modify additional test organisms (such as shore crabs or fish), or modify the study design appropriate for the area and best available sensitive measures of contaminant exposure.

e. Marine Debris: Representative quantitative observations for trash by type and source shall be performed along the coast of the ASBS within the influence of the discharger's outfalls. The design, including locations and frequency, of the marine debris observations is subject to approval by the Regional Water Board and State Water Board's Division of Water Quality.

f. The monitoring requirements of the Individual Monitoring Program in this section are minimum requirements. After a minimum of one (1) year of continuous water quality monitoring of the discharges and ocean receiving waters, the Executive Director of the State Water Board (statewide permits) or Executive officer of the Regional Water Board (Regional Water Board permits) may require additional monitoring, or adjust, reduce or suspend receiving water and reference station monitoring. This determination may be made at any point after the discharge and receiving water is fully characterized, but is best made after the monitoring results from the first permit cycle are assessed.

2. Regional Integrated Monitoring Program: Dischargers may elect to participate in a regional integrated monitoring program, in lieu of an individual monitoring program, to fulfill the requirements for monitoring the physical, chemical, and biological characteristics of the ocean receiving waters within their ASBS. This regional approach shall characterize natural water quality, pre- and post-storm, in ocean reference areas near the mouths of identified open space watersheds and the effects of the discharges on natural water quality (physical, chemical, and toxicity) in the ASBS receiving waters, and should include benthic marine aquatic life and bioaccumulation components. The design of the ASBS stratum of a regional integrated monitoring program may deviate from the otherwise prescribed individual monitoring approach (in Section IV.B.1) if approved by the State Water Board's Division of Water Quality and the Regional Water Boards.

a. Ocean reference areas shall be located at the drainages of flowing watersheds with minimal development (in no instance more than 10% development), and shall not be located in CWA Section 303(d) listed waterbodies or have tributaries that are 303(d) listed. Reference areas shall be free of wastewater discharges and anthropogenic non-storm water runoff. A minimum of low threat storm runoff discharges (e.g. stream highway overpasses and campgrounds) may be allowed on a case-by-case basis. Reference areas shall be located in the same region as the ASBS receiving water monitoring occurs. The reference areas for each Region are subject to approval by the participants in the regional monitoring program and the State Water Board's Division of Water Quality and the applicable Regional Water Board(s). A minimum of three ocean reference water samples must be collected from each station, each from a separate storm. A minimum of one reference location shall be sampled for each ASBS receiving water site sampled per responsible party. For parties discharging to ASBS in more than one Regional Water Board region, at a minimum, one reference station and one receiving water station shall be sampled in each region.

b. ASBS ocean receiving water must be sampled in the surf zone at the location where the runoff makes contact with ocean water (i.e. at "point zero"). Ocean receiving water stations must be representative of worst-case discharge conditions (i.e. co-located at a large drain greater than 36 inches, or if drains greater than 36 inches are not present in the ASBS then the largest drain greater than18 inches.) Ocean receiving water stations are subject to approval by the participants in the regional monitoring program and the State Water Board's Division of Water Quality and the applicable Regional Water Board(s). A minimum of three ocean receiving water samples must be collected during each storm season from each station, each from a separate storm. A minimum of one receiving water location shall be sampled in each ASBS per responsible party in that ASBS. For parties discharging to ASBS in more than one Regional Water Board region, at a minimum, one reference station and one receiving water station shall be sampled in each region.

c. Reference and receiving water sampling shall commence during the first full storm season following the adoption of these special conditions, and post-storm samples shall be collected when annual storm water runoff is sampled. Sampling shall occur in a minimum of two storm seasons. For those ASBS dischargers that have already participated in the Southern California Bight 2008 ASBS regional monitoring effort, sampling may be limited to only one storm season.

d. Receiving water and reference samples shall be analyzed for the same constituents as storm water runoff samples. At a minimum, constituents to be sampled and analyzed in reference and discharge receiving waters must include oil and grease, total suspended solids, Ocean Plan Table B metals for protection of marine life, Ocean Plan PAHs, pyrethroids, OP pesticides, ammonia, nitrate, phosphates, and critical life stage chronic toxicity for three species. In addition, within the range of the southern sea otter, indicator bacteria or some other measure of fecal contamination shall be analyzed.

3. Waterfront and Marine Operations: In addition to the above requirements for ocean receiving water monitoring, additional monitoring must be performed for marinas and boat launch and pier facilities:

a. For all marina or mooring field operators, in mooring fields with 10 or more occupied moorings, the ocean receiving water must be sampled for Ocean Plan indicator bacteria, residual chlorine, copper, zinc, grease and oil, methylene blue active substances (MBAS), and ammonia nitrogen.

(1) For mooring field operators opting for an individual monitoring program (Section IV.B.1 above), this sampling must occur weekly (on the weekend) from May through October.

(2) For mooring field operators opting to participate in a regional integrated monitoring program (Section IV.B.2 above), this sampling must occur monthly from May through October on a high use weekend in each month. The Water Boards may allow a reduction in the frequency of sampling, through the regional monitoring program, after the first year of monitoring.

b. For all mooring field operators, the subtidal sediment (sand or finer, if present) within mooring fields and below piers shall be sampled and analyzed for Ocean Plan Table B metals (for marine aquatic life beneficial use), acute toxicity, PAHs, and tributyltin. For sediment toxicity testing, only an acute toxicity test using the amphipod Eohaustorius estuarius must be performed. This sampling shall occur at least three times during a five (5) year period. For mooring field operators opting to participate in a regional integrated monitoring program, the Water Boards may allow a reduction in the frequency of sampling after the first sampling effort's results are assessed.

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ATTACHMENT B

STANDARD PERMIT PROVISIONS AND GENERAL PROVISIONS

1. Standard Permit Provisions

Code of Federal Regulations Title 40 Section 122.41 (40 CFR 122.41) includes conditions, or provisions, that apply to all National Pollutant Discharge Elimination System (NPDES) permits. Additional provisions applicable to NPDES permits are in 40 CFR 122.42. All applicable provisions in 40 CFR 122.41 and 40 CFR 122.42 must be incorporated into this Order and NPDES permit. The applicable 40 CFR 122.41 and 40 CFR 122.42 provisions are as follows:

a. DUTY TO COMPLY [40 CFR 122.41(a)]

The Copermittee must comply with all of the provisions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act (CWA) and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

(1) The Copermittee must comply with effluent standards or prohibitions established under Section 307(a) of the CWA for toxic pollutants and with standards for sewage sludge use or disposal established under Section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions or standards for sewage sludge use or disposal, even if the permit has not yet been modified to incorporate the requirement. [40 CFR 122.41(a)(1)]

(2) The CWA provides that any person who violates Section 301, 302, 306, 307, 308, 318 or 405 of the CWA, or any permit condition or limitation implementing any such sections in a permit issued under Section 402, or any requirement imposed in a pretreatment program approved under Section 402(a)(3) or 402(b)(8) of the CWA, is subject to a civil penalty not to exceed $25,000 per day for each violation. The CWA provides that any person who *negligently* violates Section 301, 302, 306, 307, 308, 318, or 405 of the CWA, or any condition or limitation implementing any of such sections in a permit issued under Section 402 of the CWA, or any requirement imposed in a pretreatment program approved under Section 402(a)(3) or 402(b)(8) of the CWA, is subject to criminal penalties of $2,500 to $25,000 per day of violation, or imprisonment of not more than 1 year, or both. In the case of a second or subsequent conviction for a negligent violation, a person shall be subject to criminal penalties of not more than $50,000 per day of violation, or by imprisonment of not more than 2 years, or both. Any person who *knowingly* violates such sections, or such conditions or limitations is subject to criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment for not more than 3 years, or both. In the case of a second or subsequent conviction for a knowing violation, a person shall be subject to criminal penalties of not more than $100,000 per day of violation, or imprisonment of not more than 6 years, or both. Any person who knowingly violates Section 301, 302, 303, 306, 307, 308, 318 or 405 of the CWA, or any permit condition or limitation implementing any of such sections in a permit issued under Section 402 of the CWA, and who knows at that time that he thereby places another person in imminent danger of death or serious bodily injury, shall, upon conviction, be subject to a fine of

not more than $250,000 or imprisonment of not more than 15 years, or both. In the case of a second or subsequent conviction for a knowing endangerment violation, a person shall be subject to a fine of not more than $500,000 or by imprisonment of not more than 30 years, or both. An organization, as defined in Section 309(c)(3)(B)(iii) of the CWA, shall, upon conviction of violating the imminent danger provision, be subject to a fine of not more than $1,000,000 and can be fined up to $2,000,000 for second or subsequent convictions.
[40 CFR 122.41(a)(2)]

(3) Any person may be assessed an administrative penalty by the San Diego Regional Water Quality Control Board (San Diego Water Board), State Water Resources Control Board (State Water Board), or United States Environmental Protection Agency (USEPA) for violating Section 301, 302, 306, 307, 308, 318 or 405 of the CWA, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of this Act. Administrative penalties for Class I violations are not to exceed $10,000 per violation, with the maximum amount of any Class I penalty assessed not to exceed $25,000. Penalties for Class II violations are not to exceed $10,000 per day for each day during which the violation continues, with the maximum amount of any Class II penalty not to exceed $125,000.
[40 CFR 122.41(a)(3)]

b. DUTY TO REAPPLY [40 CFR 122.41(b)]

If a Copermittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the Copermittee must apply for and obtain a new permit.

c. NEED TO HALT OR REDUCE ACTIVITY NOT A DEFENSE [40 CFR 122.41(c)]

It shall not be a defense for a Copermittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

d. DUTY TO MITIGATE [40 CFR 122.41(d)]

The Copermittee must take all reasonable steps to minimize or prevent any discharge or prevent any discharge or sludge use or disposal in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

e. PROPER OPERATION AND MAINTENANCE [40 CFR 122.41(e)]

The Copermittee must at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Copermittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems that are installed by a Copermittee only when the operation is necessary to achieve compliance with the conditions of this permit.

f. PERMIT ACTIONS [40 CFR 122.41(f)]

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Copermittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

g. PROPERTY RIGHTS [40 CFR 122.41(g)]

This permit does not convey any property rights of any sort, or any exclusive privilege.

h. DUTY TO PROVIDE INFORMATION [40 CFR 122.41(h)]

The Copermittee must furnish to the San Diego Water Board, State Water Board, or USEPA within a reasonable time, any information which the San Diego Water Board, State Water Board, or USPEA may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The Copermittee must also furnish to the San Diego Water Board, State Water Board, or USPEA upon request, copies of records required to be kept by this permit.

i. INSPECTION AND ENTRY [40 CFR 122.41(i)]

The Copermittee must allow the San Diego Water Board, State Water Board, USEPA, and/or their authorized representative (including an authorized contractor acting as their representative), upon presentation of credentials and other documents as may be required by law, to:

(1) Enter upon the Copermittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit; [40 CFR 122.41(i)(1)]

(2) Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit; [40 CFR 122.41(i)(2)]

(3) Inspect and photograph at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; [40 CFR 122.41(i)(3)] and

(4) Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the CWA, any substances or parameters at any location. [40 CFR 122.41(i)(4)]

j. MONITORING AND RECORDS [40 CFR 122.41(j)]

(1) Samples and measurements taken for the purpose of monitoring must be representative of the monitored activity. [40 CFR 122.41(j)(1)]

(2) Except for records of monitoring information required by this permit related to the Copermittee's sewage sludge use and disposal activities, which shall be retained for a period of at least five (5) years (or longer as required by 40 CFR Part 503), the

Copermittee must retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three (3) years from the date of the sample, measurement, report or application. This period may be extended by request of the San Diego Water Board at any time. [40 CFR 122.41(j)(2)]

(3) Records for monitoring information must include: [40 CFR 122.41(j)(3)]

- (a) The date, exact place, and time of sampling or measurements; [40 CFR 122.41(j)(3)(i)]
- (b) The individual(s) who performed the sampling or measurements; [40 CFR 122.41(j)(3)(ii)]
- (c) The date(s) analyses were performed; [40 CFR 122.41(j)(3)(iii)]
- (d) The individual(s) who performed the analyses; [40 CFR 122.41(j)(3)(iv)]
- (e) The analytical techniques or methods used; [40 CFR 122.41(j)(3)(v)] and
- (f) The results of such analyses. [40 CFR 122.41(j)(3)(vi)]

(4) Monitoring must be conducted according to test procedures under 40 CFR Part 136 unless another method is required under 40 CFR Subchapters N or O. [40 CFR 122.41(j)(4)]

In the case of pollutants for which there are no approved methods under 40 CFR Part 136 or otherwise required under 40 CFR Subchapters N and O, monitoring must be conducted according to a test procedure specified in the permit for such pollutants. [40 CFR 122.44(i)(1)(iv)]

(5) The CWA provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or both. [40 CFR 122.41(j)(5)]

k. SIGNATORY REQUIREMENT [40 CFR 122.41(k)]

(1) All applications, reports, or information submitted to the San Diego Water Board, State Water Board, or USEPA must be signed and certified. (See 40 CFR 122.22) [40 CFR 122.41(k)(1)]

(a) *For a municipality, State, Federal, or other public agency.* [All applications must be signed] [b]y either a principal executive officer or ranking elected official. [40 CFR 122.22(a)(3)]

(b) All reports required by permits, and other information requested by the San Diego Water Board, State Water Board, or USEPA must be signed by a person described in paragraph (a) of this section, or by a duly authorized representative of that person. A person is a duly authorized representative only if: [40 CFR 122.22(b)]

(i) The authorization is made in writing by a person described in paragraph (a) of this section; [40 CFR 122.22(b)(1)]

(ii) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company, (A duly authorized representative may thus be either a named individual or any individual occupying a named position.) [40 CFR 122.22(b)(2)] and,

(iii) The written authorization is submitted to the San Diego Water Board and State Water Board. [40 CFR 122.22(b)(3)]

(c) *Changes to authorization.* If an authorization under paragraph (b) of this section is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph (b) of this section must be submitted to the San Diego Water Board prior to or together with any reports, information, or applications to be signed by an authorized representative. [40 CFR 122.22(c)]

(d) *Certification.* Any person signing a document under paragraph (a) or (b) of this section shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations." [40 CFR 122.22(d)]

(2) The CWA provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or non-compliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both. [40 CFR 122.41(k)(2)]

I. REPORTING REQUIREMENTS [40 CFR 122.41(l)]

(1) *Planned changes.* The Copermittee must give notice to the San Diego Water Board as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when: [40 CFR 122.41(l)(1)]

(a) The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR 122.29(b); [40 CFR 122.41(l)(1)(i)] or

(b) The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which

are subject neither to effluent limitations in the permit, nor to notification requirements under 40 CFR 122.42(a)(1).
[40 CFR 122.41(l)(1)(ii)]

(c) The alteration or addition results in a significant change in the Copermittee's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan. [40 CFR 122.41(l)(1)(iii)]

(2) *Anticipated noncompliance*. The Copermittee must give advance notice to the San Diego Water Board or State Water Board of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.
[40 CFR 122.41(l)(2)]

(3) *Transfers*. This permit is not transferable to any person except after notice to the San Diego Water Board. The San Diego Water Board may require modification or revocation and reissuance of the permit to change the name of the Copermittee and incorporate such other requirements as may be necessary under the CWA.
[40 CFR 122.41(l)(3)]

(4) *Monitoring reports.* Monitoring results must be reported at the intervals specified elsewhere in this permit. [40 CFR 122.41(l)(4)]

(a) Monitoring results must be reported on a Discharge Monitoring Report (DMR) form or forms provided or specified by the San Diego Water Board or State Water Board for reporting results of monitoring of sludge use or disposal practices. [40 CFR 122.41(l)(4)(i)]

(b) If the Copermittee monitors any pollutant more frequently than required by the permit using test procedures approved under 40 CFR Part 136 or another method required for an industry-specific waste stream under 40 CFR Subchapters N or O, the results of this monitoring must be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the San Diego Water Board or State Water Board.
[40 CFR 122.41(l)(4)(ii)]

(c) Calculations for all limitations which require averaging of measurements must utilize an arithmetic mean unless otherwise specified in the permit.
[40 CFR 122.41(l)(4)(iii)]

(5) *Compliance schedules*. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit must be submitted no later than 14 days following each schedule date. [40 CFR 122.41(l)(5)]

(6) *Twenty-four hour reporting.*

(a) The Copermittee must report any noncompliance that may endanger health or the environment. Any information must be provided orally within 24 hours from the time the Copermittee becomes aware of the circumstances. A written submission must also be provided within five (5) days of the time the Copermittee becomes aware of the circumstances. The written submission must contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. [40 CFR 122.41(l)(6)(i)]

(b) The following must be included as information which must be reported within 24 hours under this paragraph: [40 CFR 122.41(l)(6)(ii)]

(i) Any unanticipated bypass that exceeds any effluent limitation in the permit (See 40 CFR 122.41(g)). [40 CFR 122.41(l)(6)(ii)(A)]
(ii) Any upset which exceeds any effluent limitation in the permit. [40 CFR 122.41(l)(6)(ii)(B)] and,
(iii) Violation of a maximum daily discharge limitation for any of the pollutants listed by the San Diego Water Board in the permit to be reported within 24 hours. (See 40 CFR 122.44(g)) [40 CFR 122.41(l)(6)(ii)(C)]

(c) The San Diego Water Board may waive the above-required written report on a case-by-case basis if the oral report has been received within 24 hours. [40 CFR 122.41(l)(6)(iii)]

(7) *Other noncompliance.* The Copermittee must report all instances of noncompliance not reported in accordance with the standard provisions required under 40 CFR 122.41(l)(4), (5), and (6), at the time monitoring reports are submitted. The reports must contain the information listed in the standard provisions required under 40 CFR 122.41(l)(6). [40 CFR 122.41(l)(7))]

(8) *Other information.* When the Copermittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the San Diego Water Board, State Water Board, or USEPA, the Copermittee must promptly submit such facts or information. [40 CFR 122.41(l)(8)]

m. BYPASS [40 CFR 122.41(m)]

(1) *Definitions.*

(a) "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility. [40 CFR 122.41(m)(1)(i)] or

(b) "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be

expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.
[40 CFR 122.41(m)(1)(ii)]

(2) *Bypass not exceeding limitations*. The Copermittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the standard provisions required under 40 CFR 122.41(m)(3) and (4).
[40 CFR 122.41(m)(2)]

(3) *Notice.*

(a) *Anticipated bypass*. If the Copermittee knows in advance of the need for a bypass, it must submit a notice, if possible at least ten days before the date of the bypass. [40 CFR 122.41(m)(3)(i)] or

(b) *Unanticipated bypass*. The Copermittee must submit notice of an unanticipated bypass in accordance with the standard provisions required under 40 CFR 122.41(l)(6) (24-hour notice).
[40 CFR 122.41(m)(3)(ii)]

(4) *Prohibition of Bypass.*

(a) Bypass is prohibited, and the San Diego Water Board may take enforcement action against a Copermittee for bypass, unless:
[40 CFR 122.41(m)(4)(i)]

(i) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage; [40 CFR 122.41(m)(4)(i)(A)]
(ii) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance;
[40 CFR 122.41(m)(4)(i)(B)] and,
(iii) The Copermittee submitted notice in accordance with the standard provisions required under 40 CFR 122.41(m)(3).
[40 CFR 122.41(m)(4)(i)(C)]

(b) The San Diego Water Board may approve an anticipated bypass, after considering its adverse effects, if the San Diego Water Board determines that it will meet the three conditions listed above.
[40 CFR 122.41(m)(4)(ii)]

n. UPSET [40 CFR 122.41(n)]

(1) *Definition.* “Upset” means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the Copermittee. An upset does not

include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation. [40 CFR 122.41(n)(1)]

(2) *Effect of an upset*. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the standard provisions required under 40 CFR 122.41(n)(3) are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review. [40 CFR 122.41(n)(2)]

(3) *Conditions necessary for a demonstration of upset*. A Copermittee who wishes to establish the affirmative defense of upset must demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that: [40 CFR 122.41(n)(3)]

(a) An upset occurred and that the Copermittee can identify the cause(s) of the upset; [40 CFR 122.41(n)(3)(i)]
(b) The permitted facility was at the time being properly operated; [40 CFR 122.41(n)(3)(ii)] and
(c) The Copermittee submitted notice of the upset in accordance with the standard provisions required under 40 CFR 122.41(l)(6)(ii)(B) (24-hour notice). [40 CFR 122.41(n)(3)(iii)]
(d) The Copermittee complied with any remedial measures pursuant to the standard provisions required under 40 CFR 122.41(d). [40 CFR 122.41(n)(3)(iii)]

(4) *Burden of proof*. In any enforcement proceeding, the Copermittee seeking to establish the occurrence of an upset has the burden of proof. [40 CFR 122.41(n)(4)]

o. STANDARD PERMIT PROVISIONS FOR MUNICIPAL SEPARATE STORM SEWER SYSTEMS
[40 CFR 122.42(c)]

The operator of a large or medium municipal separate storm sewer system or a municipal separate storm sewer that has been designated by the San Diego Water Board or State Water Board under 40 CFR 122.26(a)(1)(v) must submit an annual report by the anniversary of the date of the issuance of the permit for such system. The report must include:

(1) The status of implementing the components of the storm water management program that are established as permit conditions; [40 CFR 122.42(c)(1)]

(2) Proposed changes to the storm water management programs that are established as permit conditions. Such proposed changes must be consistent with 40 CFR 122.26(d)(2)(iii); [40 CFR 122.42(c)(2)] and

(3) Revisions, if necessary, to the assessment of controls and the fiscal analysis reported in the permit application under 40 CFR 122.26(d)(2)(iv) and (v); [40 CFR 122.42(c)(3)]

(4) A summary of data, including monitoring data, that is accumulated throughout the reporting year; [40 CFR 122.42(c)(4)]

(5) Annual expenditures and budget for year following each annual report; [40 CFR 122.42(c)(5)]

(6) A summary describing the number and nature of enforcement actions, inspections, and public education programs; [40 CFR 122.42(c)(6)]

(7) Identification of water quality improvements or degradation. [40 CFR 122.42(c)(7)]

p. STANDARD PERMIT PROVISIONS FOR STORM WATER DISCHARGES [40 CFR 122.42(d)]

The initial permits for discharges composed entirely of storm water issued pursuant to 40 CFR 122.26(e)(7) must require compliance with the conditions of the permit as expeditiously as practicable, but in no event later than three years after the date of issuance of the permit.

2. General Provisions

In addition to the standard provisions required to be incorporated into the Order and NPDES permit pursuant to 40 CFR 122.41 and 40 CFR 122.42, several other general provisions apply to this Order. The general provisions applicable to this Order and NPDES permit are as follows:

a. DISCHARGE OF WASTE IS A PRIVILEGE

No discharge of waste into the waters of the State, whether or not such discharge is made pursuant to waste discharge requirements, shall create a vested right to continue such discharge. All discharges of waste into waters of the State are privileges, not rights. [CWC Section 13263(g)]

b. DURATION OF ORDER AND NPDES PERMIT

(1) *Effective date*. This Order and NPDES permit becomes effective on the 50th day after its adoption provided the USEPA has no objection. If the USEPA objects to its issuance, this Order shall not become effective until such objection is withdrawn. This Order supersedes Order No. R9-2007-0001 upon the effective date of this Order, and supersedes Order Nos. R9-2009-0002 and R9-2010-0016 upon their expiration or earlier notice of coverage.

(2) *Expiration*. This Order and NPDES permit expires five years after its effective date. [40 CFR 122.46(a)]

(3) *Continuation of expired order*. After this Order and NPDES permit expires, the terms and conditions of this Order and NPDES permit are automatically continued pending issuance of a new permit if all requirements of the federal NPDES regulations on the continuation of expired permits (40 CFR 122.6) are complied with.

c. AVAILABILITY

A copy of this Order must be kept at a readily accessible location and must be available to on-site personnel at all times.

d. CONFIDENTIALITY OF INFORMATION

Except as provided for in 40 CFR 122.7, no information or documents submitted in accordance with or in application for this Order will be considered confidential, and all such information and documents shall be available for review by the public at the San Diego Water Board office.

Claims of confidentiality for the following information will be denied:
[40 CFR 122.7(b)]

(1) The name and address of any permit applicant or Copermittee;
[40 CFR 122.7(b)(1)] and

(2) Permit applications and attachments, permits, and effluent data.
[40 CFR 122.7(b)(2)]

e. EFFLUENT LIMITATIONS

(1) *Interim effluent limitations*. The Copermittee must comply with any interim effluent limitations as established by addendum, enforcement action, or revised waste discharge requirements which have been, or may be, adopted by the San Diego Water Board.

(2) *Other effluent limitations and standards*. If any applicable toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is promulgated under Section 307(a) of the CWA for a toxic pollutant and that standard or prohibition is more stringent than any limitation on the pollutant in the permit, the San Diego Water Board shall institute proceedings under these regulations to modify or revoke and reissue the permit to conform to the toxic effluent standard or prohibition. [40 CFR 122.44(b)(1)]

f. DUTY TO MINIMIZE OR CORRECT ADVERSE IMPACTS

The Copermittee must take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with this Order, including such accelerated or additional monitoring as may be necessary to determine the nature and impact of the noncompliance.

g. PERMIT ACTIONS

The filing of a request by the Copermittee for modification, revocation and reissuance, or termination of this Order, or a notification of planned change in or anticipated noncompliance with this Order does not stay any condition of this Order. (See 40 CFR 122.41(f)) In addition, the following provisions apply to this Order:

(1) Upon application by any affected person, or on its own motion, the San Diego Water Board may review and revise the requirements in this Order. All requirements must be reviewed periodically. [CWC Section 13263(e)]

(2) This Order may be terminated or modified for cause, including, but not limited to, all of the following: [CWC Section 13381]

   (a) Violation of any condition contained in the requirements of this Order. [CWC Section 13381(a)]

   (b) Obtaining the requirements in this Order by misrepresentation, or failure to disclose fully all relevant facts. [CWC Section 13381(b)]

   (c) A change in any condition that requires either a temporary or permanent reduction or elimination of the permitted discharge. [CWC Section 13381(c)]

(3) When this Order is transferred to a new owner or operator, such requirements as may be necessary under the CWC may be incorporated into this Order.

h. NPDES PERMITTED NON-STORM WATER DISCHARGES

The San Diego Water Board has, in prior years, issued a limited number of individual NPDES permits for non-storm water discharges to MS4s. The San Diego Water Board or State Water Board may in the future, upon prior notice to the Copermittee(s), issue an NPDES permit for any non-storm water discharge (or class of non-storm water discharges) to an MS4.

i. MONITORING

In addition to the standard provisions required under 40 CFR 122.41(j) and (l)(4), the following general monitoring provisions apply to this Order:

(1) Where procedures are not otherwise specified in Order, sampling, analysis and quality assurance/quality control must be conducted in accordance with the Quality Assurance Management Plan (QAMP) for the State of California's Surface Water Ambient Monitoring Program (SWAMP), adopted by the State Water Resources Control Board (State Water Board).

(2) Pursuant to 40 CFR 122.41(j)(2) and CWC Section 13383(a), each Copermittee must retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least five (5) years from the date of the sample, measurement, report or application. This period may be extended by request of the San Diego Water Board at any time.

(3) All chemical, bacteriological, and toxicity analyses must be conducted at a laboratory certified for such analyses by the California Department of Public Health or a laboratory approved by the San Diego Water Board.

(4) For priority toxic pollutants that are identified in the California Toxics Rule (CTR) (65 Fed. Reg. 31682), the Copermittees must instruct their laboratories to establish calibration standards that are equivalent to or lower than the Minimum Levels (MLs) published in Appendix 4 of the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SIP). If a Copermittee can demonstrate that a particular ML is not attainable, in accordance with procedures set forth in 40 CFR Part 136, the lowest quantifiable concentration of the lowest calibration standard analyzed by a specific analytical procedure (assuming that all the method specified sample weights, volumes, and processing steps have been followed) may be used instead of the ML listed in Appendix 4 of the SIP. The Copermittee must submit documentation from the laboratory to the San Diego Water Board for approval prior to raising the ML for any priority toxic pollutant.

j. ENFORCEMENT

(1) The San Diego Water Board is authorized to enforce the terms of this Order under several provisions of the CWC, including, but not limited to, CWC Sections 13385, 13386, and 13387.

(2) Nothing in this Order shall be construed to protect the Copermittee from its liabilities under federal, state, or local laws.

(3) The CWC provides for civil and criminal penalties comparable to, and in some cases greater than, those provided for under the CWA.

(4) Except as provided in the standard conditions required under 40 CFR 122.41(m) and (n), nothing in this Order shall be construed to relieve the Copermittee from civil or criminal penalties for noncompliance.

(5) Nothing in this Order shall be construed to preclude the institution of any legal action or relieve the Copermittee from any responsibilities, liabilities, or penalties to which the Copermittee is or may be subject to under Section 311 of the CWA.

(6) Nothing in this Order shall be construed to preclude institution of any legal action or relieve the Copermittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authoring preserved by Section 510 of the CWA.

k. SEVERABILITY

The provisions of this Order are severable, and if any provision of this Order, or the application of any provisions of this Order to any circumstance, is held invalid, the application of such provision to other circumstances and the remainder of this Order shall not be affected thereby.

l. APPLICATIONS

Any application submitted by a Copermittee for reissuance or modification of this Order must satisfy all applicable requirements specified in federal regulations as well as any additional requirements for submittal of a Report of Waste Discharge specified in the CWC and the California Code of Regulations.

m. IMPLEMENTATION

All plans, reports and subsequent amendments submitted in compliance with this Order must be implemented immediately (or as otherwise specified). All submittals by Copermittees must be adequate to implement the requirements of this Order.

n. REPORT SUBMITTALS

(1) All report submittals must include an executive summary, introduction, conclusion, recommendations, and signed certified statement.

(2) Each Copermittee must submit a signed certified statement covering its responsibilities for each applicable submittal.

(3) The Principal Watershed Copermittee(s) must submit a signed certified statement covering its responsibilities for each applicable submittal and the sections of the submittals for which it is responsible.

(4) Unless otherwise directed, the Copermittees must submit one hard copy and one electronic copy of each report required under this Order to the San Diego Water Board, and one electronic copy to the USEPA.

(5) The Copermittees must submit reports and provide notifications as required by this Order to the following:

EXECUTIVE OFFICER
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION
9174 SKY PARK COURT, SUITE 100
SAN DIEGO CA 92123-4340
Telephone: (858) 467-2952 Fax: (858) 571-6972

EUGENE BROMLEY
US ENVIRONMENTAL PROTECTION AGENCY
REGION IX
PERMITS ISSUANCE SECTION (W-5-1)
75 HAWTHORNE STREET
SAN FRANCISCO CA 94105

ATTACHMENT C

ACRONYMS AND ABBREVIATIONS

AMAL	Average Monthly Action Level
ASBS	Area(s) of Special Biological Significance
BMP	Best Management Practice
Basin Plan	Water Quality Control Plan for the San Diego Basin
CEQA	California Environmental Quality Act
CCR	California Code of Regulations
CFR	Code of Federal Regulations
CWA	Clean Water Act
CWC	California Water Code
CZARA	Coastal Zone Act Reauthorization Amendments of 1990
ESAs	Environmentally Sensitive Areas
GIS	Geographic Information System
IBI	Index of Biological Integrity
LID	Low Impact Development
MDAL	Maximum Daily Action Level
MEP	Maximum Extent Practicable
MS4	Municipal Separate Storm Sewer System
NAL	Non-Storm Water Action Level
NAICS	North American Industry Classification System
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
ROWD	Report of Waste Discharge (application for NPDES reissuance)
SAL	Storm Water Action Level
San Diego Water Board	California Regional Water Quality Control Board, San Diego Region
SIC	Standard Industrial Classification Code
State Water Board	State Water Resources Control Board
TMDL	Total Maximum Daily Load
USEPA	United States Environmental Protection Agency
WDID	Waste Discharge Identification Number
WLA	Waste Load Allocation
WQBEL	Water Quality Based Effluent Limitation

DEFINITIONS

Active/Passive Sediment Treatment - Using mechanical, electrical or chemical means to flocculate or coagulate suspended sediment for removal from runoff from construction sites prior to discharge.

Anthropogenic Litter – Trash generated from human activities, not including sediment.

Average Monthly Action Level – The highest allowable average of daily discharges over a calendar month.

Beneficial Uses - The uses of water necessary for the survival or wellbeing of man, plants, and wildlife. These uses of water serve to promote tangible and intangible economic, social, and environmental goals. "Beneficial Uses" of the waters of the State that may be protected include, but are not limited to, domestic, municipal, agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves. Existing beneficial uses are uses that were attained in the surface or ground water on or after November 28, 1975; and potential beneficial uses are uses that would probably develop in future years through the implementation of various control measures. "Beneficial Uses" are equivalent to "Designated Uses" under federal law. [California Water Code Section 13050(f)].

Best Management Practices (BMPs) - Defined in 40 CFR 122.2 as schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs also include treatment requirements, operating procedures and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Bioassessment - The use of biological community information to evaluate the biological integrity of a water body and its watershed. With respect to aquatic ecosystems, bioassessment is the collection and analysis of samples of the benthic macroinvertebrate community together with physical/habitat quality measurements associated with the sampling site and the watershed to evaluate the biological condition (i.e. biotic integrity) of a water body.

Biofiltration - Practices that use vegetation and amended soils to detain and treat runoff from impervious areas. Treatment is through filtration, infiltration, adsorption, ion exchange, and biological uptake of pollutants.

Biological Integrity - Defined in Karr J.R. and D.R. Dudley. 1981. Ecological perspective on water quality goals. *Environmental Management* 5:55-68 as: "A balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of natural habitat of the region." Also referred to as ecosystem health.

BMP Design Manual – A plan developed to eliminate, reduce, or mitigate the impacts of runoff from development projects, including Priority Development Projects.

Channel Rehabilitation and Improvement – Remedial measures or activities for the purpose of improving the environmental health of streams, channels, or river systems. Techniques may vary from in-stream restoration techniques to off-line stormwater management practices installed in the system corridor or upland areas. Rehabilitation techniques may include, but are not limited to the following: riparian zone restoration, constructed wetlands, bank stabilization, channel modifications, and daylighting of drainage systems. Effectiveness may be measured in various manners, including: assessments of habitat, reduced streambank erosion, and/or restoration of water and sediment transport balance.

Clean Water Act Section 303(d) Water Body - An impaired water body in which water quality does not meet applicable water quality standards and/or is not expected to meet water quality standards, even after the application of technology based pollution controls required by the CWA. The discharge of runoff to these water bodies by the Copermittees is significant because these discharges can cause or contribute to violations of applicable water quality standards.

Construction Site – Any project, including projects requiring coverage under the Construction General Permit, that involves soil disturbing activities including, but not limited to, clearing, grading, disturbances to ground such as stockpiling, and excavation.

Contamination - As defined in the Porter-Cologne Water Quality Control Act, contamination is "an impairment of the quality of waters of the State by waste to a degree which creates a hazard to the public health through poisoning or through the spread of disease. 'Contamination' includes any equivalent effect resulting from the disposal of waste whether or not waters of the State are affected."

Copermittee – A permittee to a NPDES permit that is only responsible for permit conditions relating to the discharge for which it is operator [40 CFR 122.26(b)(1)]. For the purposes of this Order, a Copermittee may include the following jurisdictions: an incorporated city within the County of Orange, County of Riverside, or County of San Diego in the San Diego Region, the County of Orange, the County of Riverside, the County of San Diego, the Orange County Flood Control District, the Riverside County Water Conservation and Flood Control District, the San Diego Regional Airport Authority, or the San Diego Unified Port District.

Deleted: A

Copermittees – All of the individual Copermittees, collectively.

Critical Channel Flow (Qc) – The channel flow that produces the critical shear stress that initiates bed movement or that erodes the toe of channel banks. When measuring Qc, it should be based on the weakest boundary material – either bed or bank.

Daily Discharge – Defined as either: (1) the total mass of the constituent discharged over the calendar day or any 24 hour period that reasonably represents a calendar day for purposes of sampling (as specified in the permit), for a constituent with limitations expressed in units of mass or; (2) the unweighted arithmetic mean measurement of the constituent over the day for a constituent with limitations expressed in other units of measurement (e.g. concentration.)

The Daily Discharge may be determined by the analytical results of a composite sample taken over the course of one day (a calendar day, or other 24 hour period other than a day), or by the arithmetic mean of analytical results from one or more grab samples taken over the course of a day.

Development Projects - Construction, rehabilitation, redevelopment, or reconstruction of any public or private residential project, industrial, commercial, or any other projects.

Dry Season –May 1 to September 30.

Dry Weather – Weather is considered dry if the preceding 72 hours has been without measurable precipitation (>0.1 inch).

Enclosed Bays – Enclosed bays are indentations along the coast that enclose an area of oceanic water within distinct headlands or harbor works. Enclosed bays include all bays where the narrowest distance between the headlands or outermost bay works is less than 75 percent of the greatest dimension of the enclosed portion of the bay. Enclosed bays do not include inland surface waters or ocean waters.

Erosion – When land is diminished or worn away due to wind, water, or glacial ice. Often the eroded debris (silt or sediment) becomes a pollutant via storm water runoff. Erosion occurs naturally but can be intensified by land clearing activities such as farming, development, road building, and timber harvesting.

Environmentally Sensitive Areas (ESAs) - Areas that include but are not limited to all Clean Water Act Section 303(d) impaired water bodies; areas designated as Areas of Special Biological Significance by the State Water Board and San Diego Water Board; State Water Quality Protected Areas; water bodies designated with the RARE beneficial use by the State Water Board and San Diego Water Board; areas designated as preserves or their equivalent under the Natural Communities Conservation Program within the Cities and County of Orange; and any other equivalent environmentally sensitive areas which have been identified by the Copermittees.

Estuaries – Waters, including coastal lagoons, located at the mouth of streams that serve as areas of mixing fresh and ocean waters. Coastal lagoons and mouths of streams that are temporarily separated from the ocean by sandbars shall be considered estuaries. Estuarine waters shall be considered to extend from a bay or the open ocean to a point upstream where there is no significant mixing of fresh water and ocean water. Estuaries do not include inland surface waters or ocean waters.

Existing Development – Any area that has been developed and exists for municipal, commercial, industrial, or residential purposes, uses, or activities. May include areas that are not actively used for its originally developed purpose, but may be re-purposed or redeveloped for another use or activity.

Flow Duration – The long-term period of time that flows occur above a threshold that causes significant sediment transport and may cause excessive erosion damage to creeks and streams (not a single storm event duration). The simplest way to visualize this is to consider a histogram of pre- and post-project flows using long-term records of hourly data. To maintain pre-development flow duration means that the total number of hours (counts) within each range of flows in a flow-duration histogram cannot increase between the pre- and post-development condition. Flow duration within the range of geomorphologically significant flows is important for managing erosion.

Grading - The cutting and/or filling of the land surface to a desired slope or elevation.

Hazardous Material – Any substance that poses a threat to human health or the environment due to its toxicity, corrosiveness, ignitability, explosive nature or chemical reactivity. These also include materials named by the USEPA in 40 CFR 116 to be reported if a designated quantity of the material is spilled into the waters of the U.S. or emitted into the environment.

Hazardous Waste - Hazardous waste is defined as "any waste which, under Section 600 of Title 22 of this code, is required to be managed according to Chapter 30 of Division 4.5 of Title 22 of this code" [CCR Title 22, Division 4.5, Chapter 11, Article 1].

Household Hazardous Waste – Paints, cleaning products, and other wastes generated during home improvement or maintenance activities.

Hydromodification – The change in the natural watershed hydrologic processes and runoff characteristics (i.e., interception, infiltration, overland flow, and groundwater flow) caused by urbanization or other land use changes that result in increased stream flows and sediment transport. In addition, alteration of stream and river channels, such as stream channelization, concrete lining, installation of dams and water impoundments, and excessive streambank and shoreline erosion are also considered hydromodification, due to their disruption of natural watershed hydrologic processes.

Illicit Connection – Any man-made conveyance or drainage system through which the discharge of any pollutant to the stormwater drainage system occurs or may occur.

Deleted: Any connection to the MS4 that conveys an illicit discharge.

Illicit Discharge - Any discharge to a MS4 that is not composed entirely of storm water except discharges pursuant to a NPDES permit (other than the NPDES permit for discharges from the municipal separate storm sewer) and discharges resulting from fire fighting activities [40 CFR 122.26(b)(2)].

Deleted: the

Inactive Areas – Areas of construction activity that are not active and those that have been active and are not scheduled to be re-disturbed for at least 14 days.

Infiltration – Water other than wastewater that enters a sewer system (including sewer service connections and foundation drains) from the ground through such means as defective pipes, pipe joints, connections, or manholes. Infiltration does not include, and is distinguished from, inflow [40 CFR 35.2005(20)]. In the context of low impact development, infiltration may also be defined as the percolation of water into the ground. Infiltration is often expressed as a rate (inches per hour), which is determined through an infiltration test.

Inland Surface Waters – Includes all surface waters of the State that do not include the ocean, enclosed bays, or estuaries.

Jurisdictional Runoff Management Program Document – A written description of the specific jurisdictional runoff management measures and programs that each Copermittee will implement to comply with this Order and ensure that storm water pollutant discharges in runoff are reduced to the MEP and do not cause or contribute to a violation of water quality standards.

Low Impact Development (LID) – A storm water management and land development strategy that emphasizes conservation and the use of on-site natural features integrated with engineered, small-scale hydrologic controls to more closely reflect pre-development hydrologic functions.

Low Impact Development Best Management Practices (LID BMPs) – LID BMPs include schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States through storm water management and land development strategies that emphasize conservation sand the use of on-site natural features integrated with engineered, small-scale hydrologic controls to more closely reflect pre-development hydrologic functions. LID BMPs include retention practices that do not allow runoff, such as infiltration, rain water harvesting and reuse, and evapotranspiration. LID BMPs also include flow-through practices such as biofiltration that may have some discharge of storm water following pollutant reduction.

Major Outfall – As defined in the Code of Federal Regulations, a major outfall is a MS4 outfall that discharges from a single pipe with an inside diameter of 36 inches or more or its equivalent (i.e. discharge from a single conveyance other than a circular pipe which is associated with a drainage are of more than 50 acres); or, for MS4s that receive storm water from lands zoned for industrial activity (based on comprehensive zoning plans or equivalent), a MS4 outfall that discharges from a single pipe with an inside diameter of 12 inches or more or from its equivalent (i.e. discharge from other than a circular pipe associated with a drainage area of 2 acres or more).

Maximum Daily Action Level (MDAL) –The highest allowable daily discharge of a pollutant, over a calendar day (or 24 hour period). For pollutants with action levels expressed in units of mass, the daily discharge is calculated as the total mass of the pollutant discharged over the day. For pollutants with action levels expressed in other units of measurement, the daily discharge is calculated as the arithmetic mean measurement of the pollutant over the day.

Maximum Extent Practicable (MEP) – The technology-based standard established by Congress in CWA section 402(p)(3)(B)(iii) for storm water that operators of MS4s must meet. Technology-based standards establish the level of pollutant reductions that dischargers must achieve, typically by treatment or by a combination of source control and treatment control BMPs. MEP generally emphasizes pollution prevention and source control BMPs primarily (as the first line of defense) in combination with treatment methods serving as a backup (additional line of defense). MEP considers economics and is generally, but not necessarily, less stringent than BAT. A definition for MEP is not provided either in the statute or in the regulations. Instead the definition of MEP is dynamic and will be defined by the following process over time: municipalities propose their definition of MEP by way of their runoff management programs. Their total collective and individual activities conducted pursuant to the runoff management programs becomes their proposal for MEP as it applies both to their overall effort, as well as to specific activities (e.g., MEP for street sweeping, or MEP for MS4 maintenance). In the absence of a proposal acceptable to the San Diego Water Board, the San Diego Water Board defines MEP.

In a memo dated February 11, 1993, entitled "Definition of Maximum Extent Practicable," Elizabeth Jennings, Senior Staff Counsel, SWRCB addressed the achievement of the MEP standard as follows:

> "*To achieve the MEP standard, municipalities must employ whatever Best Management Practices (BMPs) are technically feasible (i.e., are likely to be effective) and are not cost prohibitive. The major emphasis is on technical feasibility. Reducing pollutants to the MEP means choosing effective BMPs, and rejecting applicable BMPs only where other effective BMPs will serve the same purpose, or the BMPs would not be technically feasible, or the cost would be prohibitive. In selecting BMPs to achieve the MEP standard, the following factors may be useful to consider:*
>
> *a. Effectiveness: Will the BMPs address a pollutant (or pollutant source) of concern?*
> *b. Regulatory Compliance: Is the BMP in compliance with storm water regulations as well as other environmental regulations?*
> *c. Public Acceptance: Does the BMP have public support?*

d. Cost: Will the cost of implementing the BMP have a reasonable relationship to the pollution control benefits to be achieved?
e. Technical Feasibility: Is the BMP technically feasible considering soils, geography, water resources, etc.?

The final determination regarding whether a municipality has reduced pollutants to the maximum extent practicable can only be made by the Regional or State Water Boards, and not by the municipal discharger. If a municipality reviews a lengthy menu of BMPs and chooses to select only a few of the least expensive, it is likely that MEP has not been met. On the other hand, if a municipal discharger employs all applicable BMPs except those where it can show that they are not technically feasible in the locality, or whose cost would exceed any benefit derived, it would have met the standard. Where a choice may be made between two BMPs that should provide generally comparable effectiveness, the discharger may choose the least expensive alternative and exclude the more expensive BMP. However, it would not be acceptable either to reject all BMPs that would address a pollutant source, or to pick a BMP based solely on cost, which would be clearly less effective. In selecting BMPs the municipality must make a serious attempt to comply and practical solutions may not be lightly rejected. In any case, the burden would be on the municipal discharger to show compliance with its permit. After selecting a menu of BMPs, it is the responsibility of the discharger to ensure that all BMPs are implemented."

Monitoring Year – October 1 to September 30

Municipal Separate Storm Sewer System (MS4) – A conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains): (i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or designated and approved management agency under section 208 of the CWA that discharges to waters of the United States; (ii) Designated or used for collecting or conveying storm water; (iii) Which is not a combined sewer; (iv) Which is not part of the Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.26.

National Pollutant Discharge Elimination System (NPDES) - The national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under Sections 307, 318, 402, and 405 of the CWA.

Non-Storm Water - All discharges to and from a MS4 that do not originate from precipitation events (i.e., all discharges from a MS4 other than storm water). Non-storm water includes illicit discharges and NPDES permitted discharges.

Nuisance - As defined in the Porter-Cologne Water Quality Control Act, a nuisance is "anything which meets all of the following requirements: 1) Is injurious to health, or is indecent, or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property. 2) Affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal. 3) Occurs during, or as a result of, the treatment or disposal of wastes."

Ocean Waters – the territorial marine waters of the State as defined by California law to the extent these waters are outside of enclosed bays, estuaries, and coastal lagoons. Discharges to ocean waters are regulated in accordance with the State Board's California Ocean Plan.

Order – Unless otherwise specified, refers to this Order, Order No. R9-2013-0001 (NPDES No. CAS0109266)

Persistent Flow - Persistent flow is defined as the presence of flowing, pooled, or ponded water more than 72 hours after a measureable rainfall event of 0.1 inch or greater during three consecutive monitoring and/or inspection events. All other flowing, pooled, or ponded water is considered transient.

Person - A person is defined as an individual, association, partnership, corporation, municipality, State or Federal agency, or an agent or employee thereof [40 CFR 122.2].

Point Source - Any discernible, confined, and discrete conveyance, including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operations, landfill leachate collection systems, vessel, or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.

Pollutant - Any agent that may cause or contribute to the degradation of water quality such that a condition of pollution or contamination is created or aggravated.

Pollution - As defined in the Porter-Cologne Water Quality Control Act, pollution is "the alteration of the quality of the waters of the State by waste, to a degree that unreasonably affects the either of the following: 1) The waters for beneficial uses; or 2) Facilities that serve these beneficial uses." Pollution may include contamination.

Pollution Prevention - Pollution prevention is defined as practices and processes that reduce or eliminate the generation of pollutants, in contrast to source control BMPs, treatment control BMPs, or disposal.

Pre-Development Runoff Conditions – Runoff conditions that existed onsite before the existing development was constructed, or exists onsite before planned development activities occur.

Priority Development Projects - New development and redevelopment projects defined under Provision E.3.b of Order No. R9-2012-0011.

Progressive Enforcement -. A series of enforcement actions that increase in severity commensurate with the violation. Such enforcement actions may include verbal and written notices of violation, fines, stop work orders, administrative penalties, criminal penalties, etc.

Rainy Season (aka Wet Season) –October 1 to April 30

Receiving Waters – Waters of the United States.

Receiving Water Limitations - Waste discharge requirements issued by the San Diego Water Board typically include both: (1) "Effluent Limitations" (or "Discharge Limitations") that specify the technology-based or water-quality-based effluent limitations; and (2) "Receiving Water

Limitations" that specify the water quality objectives in the Basin Plan as well as any other limitations necessary to attain those objectives. In summary, the "Receiving Water Limitations" provision is the provision used to implement the requirements of CWA section 402(p)(3)(B).

Redevelopment - The creation, addition, and or replacement of impervious surface on an already developed site. Examples include the expansion of a building footprint, road widening, the addition to or replacement of a structure, and creation or addition of impervious surfaces. Replacement of impervious surfaces includes any activity that is not part of a routine maintenance activity where impervious material(s) are removed, exposing underlying soil during construction. Redevelopment does not include trenching and resurfacing associated with utility work; parking lots, resurfacing existing roadways; cutting and reconfiguring of surface parking lots; new sidewalk construction, pedestrian ramps, or bike lane on existing roads; and routine replacement of damaged pavement, such as pothole repair.

Regional Clearinghouse – A central location for the collection, classification, and distribution of information including, but not limited to, plans, reports, manuals, data, contact information, and/or links to such documents and information. The clearinghouse(s) may be organized by the following regions: Watershed Management Areas, County jurisdictions, and/or the San Diego Regional Water Quality Control Board jurisdiction.

Reporting Period – The period of information that is reported in the Annual Report. The reporting period consists of two components: 1) July 1 to June 30, consistent with the fiscal year, for the implementation of the jurisdictional runoff management programs, and 2) October 1 to September 30, consistent with the monitoring year for the monitoring and assessment programs. Together, these two time periods constitute the reporting year for the Annual Report due January 31 following the end of the monitoring year.

Retain –Keep or hold in a particular place, condition, or position without discharge to surface waters.

Retrofitting – Storm water management practice put into place after development has occurred in watersheds where the practices previously did not exist. Retrofitting of developed areas is intended to improve water quality, protect downstream channels, reduce flooding, or meet other specific objectives. Retrofitting developed areas may include, but is not limited to replacing roofs with green roofs, disconnecting downspouts or impervious surfaces to drain to pervious surfaces, replacing impervious surfaces with pervious surfaces, installing rain barrels, installing rain gardens, and trash area enclosures.

Runoff - All flows in a storm water conveyance system that consists of the following components: (1) storm water (wet weather flows) and (2) non-storm water including dry weather flows.

San Diego Water Board – As used in this document the term "San Diego Water Board" is synonymous with the term "Regional Board" as defined in Water Code section 13050(b) and is intended to refer to the California Regional Water Quality Control Board for the San Diego Region as specified in Water Code Section 13200.

Sediment - Soil, sand, and minerals washed from land into water. Sediment resulting from anthropogenic sources (i.e. human induced land disturbance activities) is considered a pollutant. This Order regulates only the discharges of sediment from anthropogenic sources and does not regulate naturally occurring sources of sediment. Sediment can destroy fish-nesting areas, clog animal habitats, and cloud waters so that sunlight does not reach aquatic plants.

Source Control BMP – Land use or site planning practices, or structural or nonstructural measures that aim to prevent runoff pollution by reducing the potential for contamination at the source of pollution. Source control BMPs minimize the contact between pollutants and runoff.

Storm Water – Per 40 CFR 122.26(b)(13), means storm water runoff, snowmelt runoff and surface runoff and drainage.

Deleted: Surface runoff and drainage pertains to runoff and drainage resulting from precipitation events.

Stream, Channel, or Habitat Rehabilitation – Measures or activities for the purpose of improving or restoring the environmental health (i.e. physical, chemical and biological integrity) of streams, channels, or river systems. Rehabilitation techniques may include, but are not limited to, riparian zone restoration, constructed wetlands, bank stabilization, channel reconfiguration, and daylighting drainage systems.

Structural BMPs - A subset of BMPs which detains, retains, filters, removes, or prevents the release of pollutants to surface waters from development projects in perpetuity, after construction of a project is completed.

Total Maximum Daily Load (TMDL) - The maximum amount of a pollutant that can be discharged into a water body from all sources (point and non-point) and still maintain water quality standards. Under CWA section 303(d), TMDLs must be developed for all water bodies that do not meet water quality standards after application of technology-based controls.

Toxicity - Adverse responses of organisms to chemicals or physical agents ranging from mortality to physiological responses such as impaired reproduction or growth anomalies). The water quality objectives for toxicity provided in the Basin Plan, state in part…"All waters shall be free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life….The survival of aquatic life in surface waters subjected to a waste discharge or other controllable water quality factors, shall not be less than that for the same water body in areas unaffected by the waste discharge".

Treatment Control BMP – Any engineered system designed to remove pollutants by simple gravity settling of particulate pollutants, filtration, biological uptake, media absorption or any other physical, biological, or chemical process.

Unpaved Road – Any long, narrow stretch without pavement used for traveling by motor passenger vehicles between two or more points. Unpaved roads are generally constructed of dirt, gravel, aggregate or macadam and may be improved or unimproved.

Waste - As defined in CWC Section 13050(d), "waste includes sewage and any and all other waste substances, liquid, solid, gaseous, or radioactive, associated with human habitation, or of human or animal origin, or from any producing, manufacturing, or processing operation, including waste placed within containers of whatever nature prior to, and for purposes of, disposal."

Article 2 of CCR Title 23, Chapter 15 (Chapter 15) contains a waste classification system that applies to solid and semi-solid waste, which cannot be discharged directly or indirectly to water of the state and which therefore must be discharged to land for treatment, storage, or disposal in accordance with Chapter 15. There are four classifications of waste (listed in order of highest to lowest threat to water quality): hazardous waste, designated waste, non-hazardous solid waste, and inert waste.

Water Quality Objective - Numerical or narrative limits on constituents or characteristics of water designated to protect designated beneficial uses of the water. [California Water Code Section 13050 (h)]. California's water quality objectives are established by the State and Regional Water Boards in the Water Quality Control Plans. Numeric or narrative limits for pollutants or characteristics of water designed to protect the beneficial uses of the water. In other words, a water quality objective is the maximum concentration of a pollutant that can exist in a receiving water and still generally ensure that the beneficial uses of the receiving water remain protected (i.e., not impaired). Since water quality objectives are designed specifically to protect the beneficial uses, when the objectives are violated the beneficial uses are, by definition, no longer protected and become impaired. This is a fundamental concept under the Porter Cologne Act. Equally fundamental is Porter Cologne's definition of pollution. A condition of pollution exists when the water quality needed to support designated beneficial uses has become unreasonably affected or impaired; in other words, when the water quality objectives have been violated. These underlying definitions (regarding beneficial use protection) are the reason why all waste discharge requirements implementing the federal NPDES regulations require compliance with water quality objectives. (Water quality objectives are also called water quality criteria in the CWA.)

Water Quality Standards - Water quality standards, as defined in Clean Water Act section 303(c) consist of the beneficial uses (e.g., swimming, fishing, municipal drinking water supply, etc.,) of a water body and criteria (referred to as water quality objectives in the California Water Code) necessary to protect those uses. Under the Water Code, the water boards establish beneficial uses and water quality objectives in water quality control or basin plans. Together with an anti-degradation policy, these beneficial uses and water quality objectives serve as water quality standards under the Clean Water Act. In Clean Water Act parlance, state beneficial uses are called "designated uses" and state water quality objectives are called "criteria." Throughout this Order, the relevant term is used depending on the statutory scheme.

Waters of the State - Any surface water or groundwater, including saline waters, within the boundaries of the State [CWC section 13050 (e)]. The definition of the Waters of the State is broader than that for the Waters of the United States in that all water in the State is considered to be a Waters of the State.

Deleted: water,

Deleted: underground

Deleted: regardless of circumstances or condition

Waters of the United States - As defined in the 40 CFR 122.2, the Waters of the U.S. are defined as: "(a) All waters, which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; (b) All interstate waters, including interstate "wetlands;" (c) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, "wetlands," sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation or destruction of which would affect or could affect interstate or foreign commerce including any such waters: (1) Which are or could be used by interstate or foreign travelers for recreational or other purposes; (2) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or (3) Which are used or could be used for industrial purposes by industries in interstate commerce; (d) All impoundments of waters otherwise defined as waters of the United States under this definition: (e) Tributaries of waters identified in paragraphs (a) through (d) of this definition; (f) The territorial seas; and (g) "Wetlands" adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) through (f) of this definition. Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with the EPA."

Watershed - That geographical area which drains to a specified point on a water course, usually a confluence of streams or rivers (also known as drainage area, catchment, or river basin).

Wet Season (aka Rainy Season) –October 1 to April 30

Wet Weather – Weather is considered wet if there is a storm event of 0.1 inches and greater preceded by 72 hours of dry weather, unless otherwise defined by another regulatory mechanism, such as a TMDL.

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ATTACHMENT D

JURISDICTIONAL RUNOFF MANAGEMENT PROGRAM ANNUAL REPORT FORM

Comment [K8]: It is recommended that this form be deleted and that the Copermittees use their existing reporting format and structure until the WQIPs and corresponding JRMPs are developed and/or updated.

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FY ________________

I. COPERMITTEE INFORMATION		
Copermittee Name:		
Copermittee Primary Contact Name:		
Copermittee Primary Contact Information: Address: City: County: State: Zip: Telephone: Fax: Email:		
II. LEGAL AUTHORITY		
Has the Copermittee established adequate legal authority within its jurisdiction to control pollutant discharges into and from its MS4 that complies with Order No. R9-2013-0001?	YES NO	☐ ☐
A Principal Executive Officer, Ranking Elected Official, or Duly Authorized Representative has certified that the Copermittee obtained and maintains adequate legal authority?	YES NO	☐ ☐
III. JURISDICTIONAL RUNOFF MANAGEMENT PROGRAM DOCUMENT UPDATE		
Was an update of the jurisdictional runoff management program document required or recommended by the San Diego Water Board?	YES NO	☐ ☐
If YES to the question above, did the Copermittee update its jurisdictional runoff management program document and make it available on the Regional Clearinghouse?	YES NO	☐ ☐
IV. ILLICIT DISCHARGE DETECTION AND ELIMINATION PROGRAM		
Has the Copermittee implemented a program to actively detect and eliminate illicit discharges and connections to its MS4 that complies with Order No. R9-2013-0001?	YES NO	☐ ☐
Number of non-storm water discharges reported by the public		
Number of non-storm water discharges detected by Copermittee staff or contractors		
Number of non-storm water discharges investigated by the Copermittee		
Number of sources of non-storm water discharges identified		
Number of non-storm water discharges eliminated		
Number of sources of illicit discharges or connections identified		
Number of illicit discharges or connections eliminated		
Number of enforcement actions issued		
Number of escalated enforcement actions issued		
V. DEVELOPMENT PLANNING PROGRAM		
Has the Copermittee implemented a development planning program that complies with Order No. R9-2013-0001?	YES NO	☐ ☐
Was an update to the BMP Design Manual required or recommended by the San Diego Water Board?	YES NO	☐ ☐
If YES to the question above, did the Copermittee update its BMP Design Manual and make it available on the Regional Clearinghouse?	YES NO	☐ ☐
Number of proposed development projects in review		
Number of Priority Development Projects in review		
Number of Priority Development Projects approved		
Number of approved Priority Development Projects exempt from any BMP requirements		
Number of approved Priority Development Projects allowed alternative compliance		
Number of Priority Development Projects granted occupancy		
Number of completed Priority Development Projects in inventory		
Number of high priority Priority Development Project structural BMP inspections		
Number of Priority Development Project structural BMP violations		
Number of enforcement actions issued		
Number of escalated enforcement actions issued		

FY ________________

VI. CONSTRUCTION MANAGEMENT PROGRAM	
Has the Copermittee implemented a construction management program that complies with Order No. R9-2013-0001?	YES ☐ NO ☐
Number of construction sites in inventory	
Number of active construction sites in inventory	
Number of inactive construction sites in inventory	
Number of construction sites closed/completed during reporting period	
Number of construction site inspections	
Number of construction site violations	
Number of enforcement actions issued	
Number of escalated enforcement actions issued	

VII. EXISTING DEVELOPMENT MANAGEMENT PROGRAM				
Has the Copermittee implemented an existing development management program that complies with Order No. R9-2013-0001?				YES ☐ NO ☐
	Municipal	Commercial	Industrial	Residential
Number of facilities or areas in inventory				
Number of existing development inspections				
Number of follow-up inspections				
Number of violations				
Number of enforcement actions issued				
Number of escalated enforcement actions issued				

VIII. PUBLIC EDUCATION AND PARTICIPATION	
Has the Copermittee implemented a public education program component that complies with Order No. R9-2013-0001?	YES ☐ NO ☐
Has the Copermittee implemented a public participation program component that complies with Order No. R9-2013-0001?	YES ☐ NO ☐

IX. FISCAL ANALYSIS	
Has the Copermittee attached to this form a summary of its fiscal analysis that complies with Order No. R9-2013-0001?	YES ☐ NO ☐

X. CERTIFICATION

I [☐ Principal Executive Officer ☐ Ranking Elected Official ☐ Duly Authorized Representative] certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature	Date
Print Name	Title
Telephone Number	Email

ATTACHMENT E

SPECIFIC PROVISIONS FOR TOTAL MAXIMUM DAILY LOADS APPLICABLE TO ORDER NO. R9-2013-0001

These provisions implement Total Maximum Daily Loads (TMDLs), adopted by the San Diego Water Board and approved by USEPA under Clean Water Act section 303(c), which are applicable to discharges regulated under this Order. The provisions and schedules for implementation of the TMDLs described below must be incorporated into the Water Quality Improvement Plans, required pursuant to Provision B of this Order, for the specified Watershed Management Areas.

1. Total Maximum Daily Load for Diazinon in Chollas Creek Watershed
2. Total Maximum Daily Loads for Dissolved Copper in Shelter Island Yacht Basin
3. Total Maximum Daily Loads for Total Nitrogen and Total Phosphorus in Rainbow Creek Watershed
4. Total Maximum Daily Loads for Dissolved Copper, Lead, and Zinc in Chollas Creek
5. Total Maximum Daily Loads for Indicator Bacteria, Baby Beach in Dana Point Harbor and Shelter Island Shoreline Park in San Diego Bay
6. Revised Total Maximum Daily Loads for Indicator Bacteria, Project I – Twenty Beaches and Creeks in the San Diego Region (Including Tecolote Creek)

1. Total Maximum Daily Load for Diazinon in Chollas Creek Watershed

a. Applicability

(1) TMDL Basin Plan Amendment: Resolution No. R9-2002-0123

(2) TMDL Adoption and Approval Dates:

San Diego Water Board Adoption Date:	August 14, 2002
State Water Board Approval Date:	July 16, 2003
Office of Administrative Law Approval Date:	September 11, 2003
US EPA Approval Date:	November 3, 2003

(3) TMDL Effective Date: September 11, 2003

(4) Watershed Management Area: San Diego Bay

(5) Water Body: Chollas Creek

(6) Responsible Copermittees: City of La Mesa, City of Lemon Grove, City of San Diego, County of San Diego, San Diego Unified Port District

b. Water Quality Based Effluent Limitations

The WQBELs for Chollas Creek consist of the following:

(1) Receiving Water Limitations

Discharges from the MS4s must not cause or contribute to the violation of the following receiving water limitations by the end of the compliance schedule under Specific Provision 1.c:

Table 1.1
Receiving Water Limitations as Concentrations in Chollas Creek

Constituent	Exposure Duration	Receiving Water Limitation	Averaging Period
Diazinon	Acute	0.08 µg/L	1 hour
	Chronic	0.05 µg/L	4 days

(2) Effluent Limitations

Discharges from the MS4s must not contain concentrations that exceed the following effluent limitations by the end of the compliance schedule under Specific Provision 1.c:

Table 1.2
Effluent Limitations as Concentrations in MS4 Discharges to Chollas Creek

Constituent	Exposure Duration	Effluent Limitation	Averaging Period
Diazinon	Acute	0.072 µg/L	1 hour
	Chronic	0.045 µg/L	4 days

(3) Best Management Practices

The following BMPs for Chollas Creek must be incorporated into the Water Quality Improvement Plan for the San Diego Bay Watershed Management Area and implemented by the Responsible Copermittees:

(a) The Responsible Copermittees must implement BMPs to support the achievement of the WQBELs under Specific Provision 1.b for Chollas Creek.

(b) The Responsible Copermittees must implement the Diazinon Toxicity Control Plan and Diazinon Public Outreach/Education Program as described in the report titled, *Technical Report for Total Maximum Daily Load for Diazinon in Chollas Creek Watershed, San Diego County*, dated August 14, 2002, including subsequent modifications, in order to achieve the WQBELs under Specific Provision 1.b.

(c) The Responsible Copermittees should coordinate any BMPs implemented to address this TMDL with Caltrans as possible.

c. COMPLIANCE SCHEDULE

The Responsible Copermittees are required to achieve their respective WLAs by December 31, 2010. The Responsible Copermittees must be in compliance with the WQBELs under Specific Provision 1.b.

d. SPECIFIC MONITORING AND ASSESSMENT REQUIREMENTS

(1) The Responsible Copermittees must implement the monitoring and assessment requirements issued under Investigation Order No. R9-2004-0277, *California Department of Transportation and San Diego Municipal Separate Storm Sewer System Copermittees Responsible for the Discharge of Diazinon into the Chollas Creek Watershed*. The monitoring reports required under Investigation Order No. R9-2004-0277 must be submitted as part of the Annual Reports required under Provision F.3.b of this Order.

(2) The Responsible Copermittees must monitor the effluent of the MS4 outfalls for diazinon within the Chollas Creek watershed, and calculate or estimate the annual diazinon loads, in accordance with the requirements of Provisions D.2, D.4.b.(1), and D.4.b.(2) of this Order. The monitoring and assessment results must be submitted as part of the Annual Reports required under Provision F.3.b of this Order.

e. COMPLIANCE DETERMINATION

Compliance with WQBELs of Specific Provision 1.b may be demonstrated via one of the following methods:

(1) There is no direct or indirect discharge from the Responsible Copermittees' MS4s to the receiving water;

(2) There are no exceedances of the applicable receiving water limitations under Specific Provision 1.b.(1) in the receiving water at, or downstream of the Responsible Copermittees' MS4 outfalls; OR

(3) There are no violations of the applicable effluent limitations under Specific Provision 1.b.(2) at the Responsible Copermittees' MS4 outfalls.

2. Total Maximum Daily Loads for Dissolved Copper in Shelter Island Yacht Basin

a. APPLICABILITY

(1) TMDL Basin Plan Amendment: Resolution No. R9-2005-0019

(2) TMDL Adoption and Approval Dates:

San Diego Water Board Adoption Date:	February 9, 2005
State Water Board Approval Date:	September 22, 2005
Office of Administrative Law Approval Date:	December 2, 2005
US EPA Approval Date:	February 8, 2006

(3) TMDL Effective Date: December 2, 2005

(4) Watershed Management Area: San Diego Bay

(5) Water Body: Shelter Island Yacht Basin

(6) Responsible Copermittee: City of San Diegot

b. WATER QUALITY BASED EFFLUENT LIMITATIONS

The WQBELs for Shelter Island Yacht Basin consist of the following:

(1) Receiving Water Limitations

Discharges from the MS4s must not cause or contribute to the violation of the following receiving water limitations by the end of the compliance schedule under Specific Provision 2.c:

Table 2.1
Receiving Water Limitations as Concentrations in Shelter Island Yacht Basin

Constituent	Exposure Duration	Receiving Water Limitation	Averaging Period
Dissolved Copper	Acute	4.8 µg/L	1 hour
	Chronic	3.1 µg/L	4 days

(2) Effluent Limitations

Discharges from the MS4s must not contain pollutant loads that exceed the following effluent limitations by the end of the compliance schedule under Specific Provision 2.c:

Table 2.2
Effluent Limitations as Annual Loads in MS4 Discharges to Shelter Island Yacht Basin

Constituent	Effluent Limitation
Dissolved Copper	30 kg/yr

(3) Best Management Practices

The Responsible Copermittee must implement BMPs to support the achievement of the WQBELs under Specific Provision 2.b for Shelter Island Yacht Basin

c. Compliance Schedule

The Responsible Copermittee is required to achieve the MS4 WLA by December 2, 2005. The Responsible Copermittee must be in compliance with the WQBELs under Specific Provision 2.b.

d. Specific Monitoring and Assessment Requirements

The Responsible Copermittee must monitor the effluent of its MS4 outfalls for dissolved copper, and calculate or estimate the monthly and annual dissolved copper loads, in accordance with the requirements of Provisions D.2, D.4.b.(1), and D.4.(b)(2)of this Order. The monitoring and assessment results must be submitted as part of the Annual Reports required under Provision F.3.b of this Order.

e. Compliance Determination

Compliance with WQBELs of Specific Provision 2.b may be demonstrated via one of the following methods:

(1) There is no direct or indirect discharge from the Responsible Copermittee's MS4s to the receiving water;

(2) There are no exceedances of the applicable receiving water limitations under Specific Provision 2.b.(1) in the receiving water at, or downstream of the Responsible Copermittee's MS4 outfalls; OR

(3) There are no violations of the applicable effluent limitations under Specific Provision 2.b.(2) at the Responsible Copermittee's MS4 outfalls.

3. Total Maximum Daily Loads for Total Nitrogen and Total Phosphorus in Rainbow Creek Watershed

a. Applicability

(1) TMDL Basin Plan Amendment: Resolution No. R9-2005-0036

(2) TMDL Adoption and Approval Dates:

San Diego Water Board Adoption Date:	February 9, 2005
State Water Board Approval Date:	November 16, 2005
Office of Administrative Law Approval Date:	February 1, 2006
US EPA Approval Date:	March 22, 2006

(3) TMDL Effective Date: February 1, 2006

(4) Watershed Management Area: Santa Margarita River

(5) Water Body: Rainbow Creek

(6) Responsible Copermittee: County of San Diego

b. Water Quality Based Effluent Limitations

The WQBELs for Rainbow Creek consist of the following

(1) Receiving Water Limitations

Discharges from the MS4s must not cause or contribute to the violation of the following receiving water limitations by the end of the compliance schedule under Specific Provision 3.c.(1):

Table 3.1
Receiving Water Limitations as Concentrations in Rainbow Creek

Constituent	Receiving Water Limitation
Nitrate (as N)	10 mg/L
Total Nitrogen	1 mg/L
Total Phosphorus	0.1 mg/L

(2) Effluent Limitations

(a) Discharges from the MS4s must not contain concentrations that exceed the following effluent limitations by the end of the compliance schedule under Specific Provision 3.c.(1):

Table 3.2
Effluent Limitations as Concentrations in MS4 Discharges to Rainbow Creek

Constituent	Effluent Limitation
Nitrate (as N)	10 mg/L
Total Nitrogen	1 mg/L
Total Phosphorus	0.1 mg/L

(b) Pollutant loads from given land uses discharging to and from the MS4s must not exceed the following effluent limitations by the end of the compliance schedule under Specific Provision 3.c.(1):

Table 3.3
Effluent Limitations as Annual Loads in MS4 Discharges to Rainbow Creek

Land Use	Total N	Total P
Commercial nurseries	116 kg/yr	3 kg/yr
Park	3 kg/yr	0.1 kg/yr
Residential areas	149 kg/yr	12 kg/yr
Urban areas	27 kg/yr	6 kg/yr

Interim effluent limitations expressed as pollutant loads are given in the compliance schedule under Specific Provision 3.0.

(3) Best Management Practices

(a) The Responsible Copermittee must implement BMPs to support the achievement of the WQBELs under Specific Provision 3.b for Rainbow Creek.

(b) The Responsible Copermittee should coordinate any BMPs implemented to address this TMDL with Caltrans and other sources as possible.

c. COMPLIANCE SCHEDULE

(1) Compliance Date

The Responsible Copermittee must be in compliance with the WQBELs under Specific Provision 3.b, by December 31, 2021.

(2) Interim Compliance Requirements

Table 3.4
Interim Effluent Limitations as Annual Loads in MS4 Discharges from Specific Land Uses to Rainbow Creek

	Total N Interim Effluent Limitations (kg/yr)			Total P Interim Effluent Limitations (kg/yr)		
	Interim Compliance Date			Interim Compliance Date		
Land Use	**2009**	**2013**	**2017**	**2009**	**2013**	**2017**
Commercial nurseries	390	299	196	20	16	10
Park	5	3	3	0.15	0.10	0.10
Residential areas	507	390	260	99	74	47
Urban areas	40	27	27	9	6	6

d. SPECIFIC MONITORING AND ASSESSMENT REQUIREMENTS

The Responsible Copermittee must implement the Sampling and Analysis Plan for Rainbow Creek Nutrient Reduction TMDL Implementation Water Quality Monitoring, dated January 2010. The results of any monitoring conducted during the reporting period, and assessment of whether the interim and final WQBELs have been achieved must be submitted as part of the Annual Reports required under Provision F.3.b of this Order.

e. COMPLIANCE DETERMINATION

(1) Compliance with interim compliance requirements of Specific Provision 3.c.(2) may be demonstrated via one of the following methods:

(a) There is no direct or indirect discharge from the Responsible Copermittee's MS4s to the receiving water;

(b) There are no exceedances of the applicable receiving water limitations under Specific Provision 3.b.(1) in the receiving water at, or downstream of the Responsible Copermittee's MS4 outfalls;

(c) There are no violations of the applicable effluent limitations under Specific Provision 3.b.(2)(a) at the Responsible Copermittee's MS4 outfalls;

(d) The pollutant loads from given land uses discharging to and from the MS4s do not exceed the applicable effluent limitations under Specific Provision 3.b.(2)(b); OR

(e) The Responsible Copermittee has submitted and is fully implementing a Water Quality Improvement Plan, accepted by the San Diego Water Board, which provides reasonable assurance that the interim compliance requirements will be achieved by the interim compliance dates.

(2) Compliance with WQBELs of Specific Provision 3.b may be demonstrated via one of the following methods:

(a) There is no direct or indirect discharge from the Responsible Copermittee's MS4s to the receiving water;

(b) There are no exceedances of the applicable receiving water limitations under Specific Provision 3.b.(1) in the receiving water at, or downstream of the Responsible Copermittee's MS4 outfalls;

(c) There are no violations of the applicable effluent limitations under Specific Provision 3.b.(2)(a) at the Responsible Copermittee's MS4 outfalls; OR

(d) The pollutant loads from given land uses discharging to and from the MS4s do not exceed the applicable effluent limitations under Specific Provision 3.b.(2)(b).

4. Total Maximum Daily Loads for Dissolved Copper, Lead, and Zinc in Chollas Creek

a. Applicability

(1) TMDL Basin Plan Amendment: Resolution No. R9-2007-0043

(2) TMDL Adoption and Approval Dates:

San Diego Water Board Adoption Date:	June 13, 2007
State Water Board Approval Date:	July 15, 2008
Office of Administrative Law Approval Date:	October 22, 2008
US EPA Approval Date:	December 18, 2008

(3) TMDL Effective Date: October 22, 2008

(4) Watershed Management Area: San Diego Bay

(5) Water Body: Chollas Creek

(6) Responsible Copermittees: City of La Mesa, City of Lemon Grove, City of San Diego, County of San Diego, San Diego Unified Port District

b. Water Quality Based Effluent Limitations

The WQBELs for Chollas Creek consist of the following:

(1) Receiving Water Limitations

Discharges from the MS4s must not cause or contribute to the violation of the following receiving water limitations by the end of the compliance schedule under Specific Provision 4.c.(1):

Table 4.1
Receiving Water Limitations as Concentrations in Chollas Creek

Constituent	Exposure Duration	Receiving Water Limitation (µg/L)	Averaging Period
Dissolved Copper	Acute	$(0.96) \times e^{[0.9422 \times \ln(\text{hardness}) - 1.700]} \times \text{WER*}$	1 hour
	Chronic	$(0.96) \times e^{[0.8545 \times \ln(\text{hardness}) - 1.702]} \times \text{WER*}$	4 days
Dissolved Lead	Acute	$[1.46203 - 0.145712 \times \ln(\text{hardness})] \times e^{[1.273 \times \ln(\text{hardness}) - 1.460]} \times \text{WER*}$	1 hour
	Chronic	$[1.46203 - 0.145712 \times \ln(\text{hardness})] \times e^{[1.273 \times \ln(\text{hardness}) - 4.705]} \times \text{WER*}$	4 days
Dissolved Zinc	Acute	$(0.978) \times e^{[0.8473 \times \ln(\text{hardness}) + 0.884]} \times \text{WER*}$	1 hour
	Chronic	$(0.986) \times e^{[0.8473 \times \ln(\text{hardness}) + 0.884]} \times \text{WER*}$	4 days

Notes:
* The Water Effect Ratio (WER) is assumed to be 1.0 unless there is a site-specific and chemical-specific WER.

(2) Effluent Limitations

Discharges from the MS4s must not contain pollutant loads that exceed the following effluent limitations by the end of the compliance schedule under Specific Provision 4.c.(1):

Table 4.2
Effluent Limitations as Concentrations in MS4 Discharges to Chollas Creek

Constituent	Exposure Duration	Effluent Limitation (µg/L)	Averaging Period
Dissolved Copper	Acute	$90\% \times (0.96) \times e^{[0.9422 \times \ln(\text{hardness}) - 1.700]} \times$ WER*	1 hour
	Chronic	$90\% \times (0.96) \times e^{[0.8545 \times \ln(\text{hardness}) - 1.702]} \times$ WER*	4 days
Dissolved Lead	Acute	$90\% \times [1.46203 - 0.145712 \times \ln(\text{hardness})] \times e^{[1.273 \times \ln(\text{hardness}) - 1.460]} \times$ WER*	1 hour
	Chronic	$90\% \times [1.46203 - 0.145712 \times \ln(\text{hardness})] \times e^{[1.273 \times \ln(\text{hardness}) - 4.705]} \times$ WER*	4 days
Dissolved Zinc	Acute	$90\% \times (0.978) \times e^{[0.8473 \times \ln(\text{hardness}) + 0.884]} \times$ WER*	1 hour
	Chronic	$90\% \times (0.986) \times e^{[0.8473 \times \ln(\text{hardness}) + 0.884]} \times$ WER*	4 days

Notes:
* The Water Effect Ratio (WER) is assumed to be 1.0 unless there is a site-specific and chemical-specific WER.

(3) Best Management Practices

(a) The Responsible Copermittees must implement BMPs to support the achievement of the WQBELs under Specific Provision 4.b for Chollas Creek.

(b) The Responsible Copermittees should coordinate any BMPs implemented to address this TMDL with Caltrans and the U.S. Navy as possible.

c. COMPLIANCE SCHEDULE

(1) WLA Compliance Date

The Responsible Copermittees are required to achieve the WLA, thus must be in compliance with the WQBELs under Specific Provision 4.b, by October 22, 2028.

(2) Interim Compliance Requirements

The Responsible Copermittee must comply with the following interim WQBELs by the interim compliance date:

Table 4.3
Interim Effluent Limitations as Concentrations in MS4 Discharges to Chollas Creek

Interim Compliance Date	Constituent	Exposure Duration	Effluent Limitation (µg/L)	Averaging Period
October 22, 2018	Dissolved Copper	Acute	1.2 x 90% x (0.96) x $e^{[0.9422 \times \ln(\text{hardness}) - 1.700]}$ x WER*	1 hour
		Chronic	1.2 x 90% x (0.96) x $e^{[0.8545 \times \ln(\text{hardness}) - 1.702]}$ x WER*	4 days
	Dissolved Lead	Acute	1.2 x 90% x [1.46203 – 0.145712 x ln(hardness)] x $e^{[1.273 \times \ln(\text{hardness}) - 1.460]}$ x WER*	1 hour
		Chronic	1.2 x 90% x [1.46203 – 0.145712 x ln(hardness)] x $e^{[1.273 \times \ln(\text{hardness}) - 4.705]}$ x WER*	4 days
	Dissolved Zinc	Acute	1.2 x 90% x (0.978) x $e^{[0.8473 \times \ln(\text{hardness}) + 0.884]}$ x WER*	1 hour
		Chronic	1.2 x 90% x (0.986) x $e^{[0.8473 \times \ln (\text{hardness}) + 0.884]}$ x WER*	4 days

Notes:
* The Water Effect Ratio (WER) is assumed to be 1.0 unless there is a site-specific and chemical-specific WER.

d. SPECIFIC MONITORING AND ASSESSMENT REQUIREMENTS

(1) The Responsible Copermittees must implement the monitoring and assessment requirements issued under Investigation Order No. R9-2004-0277, *California Department of Transportation and San Diego Municipal Separate Storm Sewer System Copermittees Responsible for the Discharge of Diazinon into the Chollas Creek Watershed*, when it is amended to include monitoring requirements for the Total Maximum Daily Loads for Dissolved Copper, Lead, and Zinc in Chollas Creek. The monitoring reports required under Investigation Order No. R9-2004-0277 must be submitted as part of the Annual Reports required under Provision F.3.b of this Order.

(2) The Responsible Copermittees must monitor the effluent of the MS4 outfalls discharging to Chollas Creek for dissolved copper, lead, and zinc, and calculate or estimate the monthly and annual dissolved copper, lead, and zinc loads, in accordance with the requirements of Provisions D.2, D.4.b.(1), and D.4.b.(2)of this Order. The monitoring and assessment results must be submitted as part of the Annual Reports required under Provision F.3.b of this Order.

e. Compliance Determination

(1) Compliance with interim compliance requirements of Specific Provision 4.c.(2) may be demonstrated via one of the following methods:

(a) There is no direct or indirect discharge from the Responsible Copermittees' MS4s to the receiving water;

(b) There are no exceedances of the applicable receiving water limitations under Specific Provision 4.b.(1) in the receiving water at, or downstream of the Responsible Copermittees' MS4 outfalls;

(c) There are no violations of the applicable effluent limitations under Specific Provision 4.b.(2) at the Responsible Copermittees' MS4 outfalls; OR

(d) The Responsible Copermittees have submitted and is fully implementing a Water Quality Improvement Plan, accepted by the San Diego Water Board, which provides reasonable assurance that the interim compliance requirements will be achieved by the interim compliance dates.

(2) Compliance with WQBELs of Specific Provision 4.b may be demonstrated via one of the following methods:

(a) There is no direct or indirect discharge from the Responsible Copermittees' MS4s to the receiving water;

(b) There are no exceedances of the applicable receiving water limitations under Specific Provision 4.b.(1) in the receiving water at, or downstream of the Responsible Copermittees' MS4 outfalls; OR

(c) There are no violations of the applicable effluent limitations under Specific Provision 4.b.(2) at the Responsible Copermittees' MS4 outfalls.

5. Total Maximum Daily Loads for Indicator Bacteria, Baby Beach in Dana Point Harbor and Shelter Island Shoreline Park in San Diego Bay

a. APPLICABILITY

(1) TMDL Basin Plan Amendment: Resolution No. R9-2008-0027

(2) TMDL Adoption and Approval Dates:

San Diego Water Board Adoption Date:	June 11, 2008
State Water Board Approval Date:	June 16, 2009
Office of Administrative Law Approval Date:	September 15, 2009
US EPA Approval Date:	October 26, 2009

(3) TMDL Effective Date: September 15, 2009

(4) Watershed Management Areas: See Table 5.0

(5) Water Bodies: See Table 5.0

(6) Responsible Copermittees: See Table 5.0

Table 5.0
Applicability of Total Maximum Daily Loads for Indicator Bacteria
Baby Beach in Dana Point Harbor and Shelter Island Shoreline Park in San Diego Bay

Watershed Management Area	Water Body	Segment or Area	Responsible Copermittees
South Orange County	Dana Point Harbor	Baby Beach	-City of Dana Point -County of Orange
San Diego Bay	San Diego Bay	Shelter Island Shoreline Park	- San Diego Unified Port District

b. WATER QUALITY BASED EFFLUENT LIMITATIONS

The WQBELs for segments or areas of the water bodies listed in Table 5.0[39] consist of the following:

(1) Interim WQBELs – Effluent Limitations

The Responsible Copermittees for MS4 discharges to Baby Beach must comply with the following interim WQBELs by the interim compliance dates identified in Provision 5.d.(1)(b):

Table 5.1
Interim Effluent Limitations as Loads in MS4 Discharges to Baby Beach

Constituent	Effluent Limitation: Dry Weather Interim Effluent Limitation (Billion MPN/day)	Effluent Limitation: Wet Weather Interim Effluent Limitation (Billion MPN/30 days)
Total Coliform	4.50	NA
Fecal Coliform	0.50	NA
Enterococcus	0.40	
		150.5

(2) Final WQBELs - Effluent Limitations

(a) Discharges from the MS4s must not exceed the following mass-based effluent limitations by the end of the compliance schedules under Specific Provision 5.d.(1)(a) to demonstrate the discharge is not causing or contributing to a violation of receiving water quality standards:

Table 5.2
Effluent Limitations as Mass-Based limits in MS4 Discharges to the Water Body

Constituent	Effluent Limit: Dry Weather Billion MPN/Day	Effluent Limit: Wet Weather Billon MPN/30 days
Total Coliform	0.86	3,254
Fecal Coliform	0.17	112
Enterococcus	0.03	114

(b) If the final WQBELs are not met in the MS4 discharges, the Responsible Copermittees must demonstrate that the discharges from the MS4s are

[39] Per Resolution R9-2008-0027, the interim and final WQBELs only apply to waterbodies that remain on the 303(d) list for REC-1 water quality objectives due to impacts from controllable sources of bacteria. If waterbodies are put back on the list or delisted in subsequent iterations, the San Diego Water Board will revise the current NPDES requirements and/or issue additional waste discharge requirements to be consistent with these TMDLs.

Deleted: <#>Receiving Water Limitations
<#>Discharges from the MS4s must not cause or contribute to the violation of the following receiving water limitations by the end of the compliance schedules under Specific Provisions 5.c.(1)(a) and 5.c.(2):
Table 5.1
Receiving Water Limitations as Bacteria Densities in the Water Body

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not causing or contributing to the exceedance of receiving water limitations. Such demonstration may be achieved by (1) demonstrating the attainment of the Receiving Water Limitations in Provision 5.c.(1), or (2) demonstrating that the natural and background sources appear to be the sole source of the continued impairment. The natural sources exclusion approach (NSEA) may be applied. The Municipal Dischargers are responsible for collection of the data to support the application of the NSEA to recalculate the TMDL.

(3) Best Management Practices

(a) The Water Quality Improvement Plans for the applicable Watershed Management Areas in Table 5.0 must incorporate the Bacteria Load Reduction Plan (BLRP) required to be developed pursuant to Resolution No. R9-2008-0027.

(b) The Responsible Copermittee must implement BMPs to support the achievement of the WQBELs under Specific Provision 5.b for the segments or areas of the water bodies listed in Table 5.0

Deleted: Interim effluent limitations expressed as pollutant loads are given in the compliance schedule under Specific Provision 5.c.

c. RECEIVING WATER LIMITATIONS

The Receiving Water Limitations for segments or areas of the water bodies listed in Table 5.0[40] consist of the following:

(1) Discharges from the MS4s must not cause or contribute to the violation of the following receiving water limitations by the end of the compliance schedules under Specific Provisions 5.d.(1)(a):

Table 5.3
Receiving Water Limitations as Bacteria Densities in the Water Body

Constituent	Receiving Water Limitations: Single Sample Maximum[1,2]	Receiving Water Limitations: 30-Day Geometric Mean[2]
Total Coliform	10,000 MPN/100mL	1,000 MPN/100mL
Fecal Coliform	400 MPN/100mL	200 MPN/100mL
Enterococcus	104 MPN/100mL	35 MPN/100mL

Notes:
1. During wet weather days, only the single sample maximum receiving water limitations are required to be achieved.
2. During dry weather days, the single sample maximum and 30-day geometric mean receiving water limitations are required to be achieved.

(2) If the above receiving water limitations are not met in the receiving water, the Responsible Copermittees must demonstrate that the discharges from the MS4s are not causing or contributing to the exceedance of receiving water

[40] Per Resolution R9-2008-0027, the Receiving Water Limitations only apply to waterbodies that remain on the 303(d) list for REC-1 water quality objectives due to impacts from controllable sources of bacteria. If waterbodies are put back on the list or delisted in subsequent iterations, the San Diego Water Board will revise the current NPDES requirements and/or issue additional waste discharge requirements to be consistent with these TMDLs.

limitations. Such demonstration may be achieved by demonstrating the attainment of the final WQBELs in Provision 5.b.(2).

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(3) Best Management Practices

(c) The Water Quality Improvement Plans for the applicable Watershed Management Areas in Table 5.0 must incorporate the Bacteria Load Reduction Plan (BLRP) required to be developed pursuant to Resolution No. R9-2008-0027.

(d) The Responsible Copermittee must implement BMPs to support the achievement of the Receiving Water Limitations under Specific Provision 5.0 for the segments or areas of the water bodies listed in Table 5.0

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d. COMPLIANCE SCHEDULE

(1) Baby Beach in Dana Point Harbor

(a) Final Compliance Dates

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The Responsible Copermittees for MS4 discharges to Baby Beach are required to achieve the WLA, thus must be in compliance with the WQBELs under Specific Provision 5.0, according to the following compliance schedule:

Table 5.4
Compliance Schedule Dates to Achieve Baby Beach WLAs

Constituent	Dry Weather WLA Compliance Date	Wet Weather WLA Compliance Date
Total Coliform		September 15, 2009
Fecal Coliform	September 15, 2014	September 15, 2009
Enterococcus		September 15, 2019

(b) Interim Compliance Dates

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The Responsible Copermittees for MS4 discharges to Baby Beach must comply with the following interim WQBELs by the interim compliance date:

Table 5.5
Compliance Schedule Dates to Achieve Interim WQBELs

Constituent	Interim Dry Weather Compliance Date	Interim Wet Weather Compliance Date
Total Coliform		NA
Fecal Coliform	September 15, 2012	NA
Enterococcus		September 15, 2016

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September 15, 2012¶
September 15, 2012

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¶
Table 5.4¶
Interim Effluent Limitations as Loads in MS4 Discharges to Baby Beach¶
Constituent ...

(2) Shelter Island Shoreline Park in San Diego Bay

The Responsible Copermittee for MS4 discharges to Shelter Island Shoreline Park is required to achieve the WLA, thus must be in compliance with the

WQBELs under Specific Provision 5.0, by December 31, 2012.

e. SPECIFIC MONITORING AND ASSESSMENT REQUIREMENTS

The BLRPs to be submitted by the Responsible Copermittees and approved by the Regional Board Executive Officer contain monitoring programs. Implementation of those Regional Board-approved monitoring programs constitutes compliance with the Monitoring Station and Monitoring Procedure requirements described below.

(1) Monitoring Stations

(a) Monitoring locations should consist of, at a minimum, the same locations used to collect data required pursuant to Order Nos. R9-2007-0001 and R9-2009-0002, and beach monitoring for Health and Safety Code section 115880.[41] If sources of bacteria from the MS4 persist at levels that exceed the applicable receiving water limitations, additional monitoring locations and/or other source identification methods shall be implemented to identify the controllable sources causing the chronic contamination.

(b) If natural and background sources appear to be the sole source of the impairment, Responsible Copermittees may select collect and provide additional data and the application of the NSEA to revise the TMDLs may be appropriate. Such revisions would be made to the TMDL via a Basin Plan Amendment and then subsequently incorporated into this Order consistent with Provision H.5.

(2) Monitoring Procedures

(a) The Responsible Copermittees must conduct the dry and wet weather monitoring consistent with the monitoring and reporting program developed as part of the BLRP. Dry weather samples collected from additional monitoring stations established to support application of the NSEA must be collected at an appropriate frequency to demonstrate bacteria loads from the identified controllable anthropogenic sources have been addressed and do not indicate a health risk.

(b) The Responsible Copermittees must collect wet weather monitoring samples within the first 24 hours of a storm event[42] of the rainy season (i.e. October 1 through April 30). Wet weather samples collected from receiving water stations and any additional monitoring stations established to support the application of the NSEA must be collected at an appropriate frequency to demonstrate bacteria loads from the identified sources have

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[41] Commonly referred to as AB 411 monitoring
[42] Wet weather days are defined by the TMDL as storm events of 0.2 inches or greater and the following 72 hours. The Responsible Copermittees may choose to limit their wet weather sampling requirements to storm events of 0.2 inches or greater, or also include storm events of 0.1 inches or greater as defined by the federal regulations [40CFR122.26(d)(2)(iii)(A)(2)].

been addressed and do not indicate a health risk.

(c) Samples must be analyzed for total coliform, fecal coliform, and *Enterococcus* indicator bacteria.

(3) Assessment and Reporting Requirements

(a) The Responsible Copermittees must analyze the dry weather and wet weather monitoring data to assess whether the interim and final WQBELs have been achieved.

(b) The monitoring and assessment results must be submitted as part of the Annual Reports required under Provision F.3.b of this Order.

f. COMPLIANCE DETERMINATION

(1) Compliance with interim compliance requirements of Specific Provision 5.(b)(1) may be demonstrated via one of the following methods:

(a) There is no discharge from the Responsible Copermittees' MS4s to the receiving water; OR

(b) There are no exceedances of the applicable receiving water limitations under Specific Provision 5.c in the receiving water at, or downstream of the Responsible Copermittees' MS4 outfalls; OR

(c) There are no violations of the applicable effluent limitations under Specific Provision 5.b.(2) at the Responsible Copermittees' MS4 outfalls; OR

(d) The pollutant loads discharging from the Responsible Copermittees' MS4 outfalls do not exceed the applicable effluent limitations under Specific Provision 5.b.(2); OR

(e) The Responsible Copermittees can demonstrate that exceedances of the applicable receiving water limitations under Specific Provision 5.c. in the receiving water are due to loads from natural sources, AND pollutant loads from the Copermittees' MS4 are not causing or contributing to the exceedances; OR

(f) The Responsible Copermittees have submitted and are fully implementing a Water Quality Improvement Plan, accepted by the San Diego Water Board, which provides reasonable assurance that the interim compliance requirements will be achieved by the interim compliance dates.

(g) Upon the effective date of this Order, a Copermittee's full compliance with all of the following requirements shall constitute a Copermittee's compliance with provisions pertaining to interim WQBELs with compliance

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deadlines occurring prior to approval of a WQIP.

(i) Meets all interim and final deadlines for development of a WQIP,

(ii) Targets implementation of watershed control measures in its existing storm water management program, including watershed control measures to eliminate non-storm water discharges of pollutants through the MS4 to receiving waters, to address known contributions of pollutants from MS4 discharges that cause or contribute to the impairment(s) addressed by the TMDL(s), and

(iii) Receives final approval of its WQIP from the Regional Board.

(2) Compliance with final WQBELs of Specific Provision 5.b.(2) may be demonstrated via one of the following methods:

(a) There is no discharge from the Responsible Copermittees' MS4s to the receiving water;

(b) There are no exceedances of the applicable receiving water limitations under Specific Provision 5.c. in the receiving water at, or downstream of the Responsible Copermittees' MS4 outfalls;

(c) There are no violations of the applicable effluent limitations under Specific Provision 5.b.(2) at the Responsible Copermittees' MS4 outfalls;

(d) The pollutant loads discharging from the Responsible Copermittees' MS4 outfalls do not exceed the applicable effluent limitations under Specific Provision 5.b.(2); OR

(e) The Responsible Copermittees can demonstrate that exceedances of the applicable receiving water limitations under Specific Provision 5.c in the receiving water are due to loads from natural sources, AND pollutant loads from the Copermittees' MS4 are not causing or contributing to the exceedances.

(f) The Responsible Copermittees have submitted and are fully implementing a Water Quality Improvement Plan, accepted by the San Diego Water Board, which provides reasonable assurance that the final compliance requirements will be achieved by the final compliance dates. A Responsible Copermittee that does not implement its WQIP in accordance with the milestones and compliance schedules shall demonstrate compliance with the final WQBELs pursuant to Provision 5.f(2)(a – e).

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6. Revised Total Maximum Daily Loads for Indicator Bacteria, Project I – Twenty Beaches and Creeks in the San Diego Region (Including Tecolote Creek)

a. Applicability

(1) <u>TMDL Basin Plan Amendment</u>: Resolution No. R9-2010-0001

(2) <u>TMDL Adoption and Approval Dates</u>:

San Diego Water Board Adoption Date:	February 10, 2010
State Water Board Approval Date:	December 14, 2010
Office of Administrative Law Approval Date:	April 4, 2011
US EPA Approval Date:	June 22, 2011

(3) <u>TMDL Effective Date</u>: April 4, 2011

(4) <u>Watershed Management Areas</u>: See Table 6.0

(5) <u>Water Bodies</u>: See Table 6.0

(6) <u>Responsible Copermittees</u>: See Table 6.0

Table 6.0
Applicability of Total Maximum Daily Loads for Indicator Bacteria
Project I - Twenty Beaches and Creeks in the San Diego Region (including Tecolote Creek)

Watershed Management Area	Water Body[1]	Segment or Area	Responsible Copermittees
South Orange County	Pacific Ocean Shoreline	Cameo Cove at Irvine Cove Drive – Riviera Way	-City of Laguna Beach -County of Orange -Orange County Flood Control District
		at Heisler Park - North	
	Pacific Ocean Shoreline	at Main Laguna Beach	-City of Aliso Viejo -City of Laguna Beach -City of Laguna Woods -County of Orange -Orange County Flood Control District
		Laguna Beach at Ocean Avenue	
		Laguna Beach at Cleo Street	
		Arch Cove at Bluebird Canyon Road	
		Laguna Beach at Dumond Drive	
	Pacific Ocean Shoreline	Laguna Beach at Lagunita Place / Blue Lagoon Place at Aliso Beach	-City of Aliso Viejo -City of Laguna Beach -City of Laguna Hills -City of Laguna Niguel -City of Laguna Woods -City of Lake Forest -City of Mission Viejo -County of Orange -Orange County Flood Control District
	Aliso Creek	Entire reach (7.2 miles) and associated tributaries: - Aliso Hills Channel - English Canyon Creek - Dairy Fork Creek - Sulfur Creek - Wood Canyon Creek	

	Aliso Creek Mouth	at mouth	

Table 6.0 (Cont'd)
Applicability of Total Maximum Daily Loads for Indicator Bacteria
Project I - Twenty Beaches and Creeks in the San Diego Region (including Tecolote Creek)

Watershed Management Area	Water Body	Segment or Area	Responsible Copermittees
South Orange County (cont'd)	Pacific Ocean Shoreline	Aliso Beach at West Street	-City of Dana Point -City of Laguna Beach -City of Laguna Niguel -County of Orange -Orange County Flood Control District
		Aliso Beach at Table Rock Drive	
		100 Steps Beach at Pacific Coast Hwy at hospital (9th Avenue)	
		at Salt Creek (large outlet)	
		Salt Creek Beach at Salt Creek service road	
		Salt Creek Beach at Strand Road	
	Pacific Ocean Shoreline	at San Juan Creek	-City of Dana Point -City of Laguna Hills -City of Laguna Niguel -City of Mission Viejo -City of Rancho Santa Margarita -City of San Juan Capistrano -County of Orange -Orange County Flood Control District
	San Juan Creek	lower 1 mile	
	San Juan Creek Mouth	at mouth	
	Pacific Ocean Shoreline	at Poche Beach	-City of Dana Point -City of San Clemente -County of Orange -Orange County Flood Control District
		Ole Hanson Beach Club Beach at Pico Drain	
		San Clemente City Beach at El Portal Street Stairs	
		San Clemente City Beach at Mariposa Street	
		San Clemente City Beach at Linda Lane	
		San Clemente City Beach at South Linda Lane	
		San Clemente City Beach at Lifeguard Headquarters	
		under San Clemente Municipal Pier	
		San Clemente City Beach at Trafalgar Canyon (Trafalgar Lane)	
		San Clemente State Beach at Riviera Beach	
		Can Clemente State Beach at Cypress Shores	

San Luis Rey River	Pacific Ocean Shoreline	at San Luis Rey River mouth	-City of Oceanside -City of Vista -County of San Diego

Table 6.0 (Cont'd)
Applicability of Total Maximum Daily Loads for Indicator Bacteria
Project I - Twenty Beaches and Creeks in the San Diego Region (including Tecolote Creek)

Watershed Management Area	Water Body	Segment or Area	Responsible Copermittees
Carlsbad	Pacific Ocean Shoreline	at Moonlight State Beach	-City of Carlsbad -City of Encinitas -City of Escondido -City of San Marcos -County of San Diego
San Dieguito River	Pacific Ocean Shoreline	at San Dieguito Lagoon mouth	-City of Del Mar -City of Escondido -City of Poway -City of San Diego -City of Solana Beach -County of San Diego
Penasquitos	Pacific Ocean Shoreline	Torrey Pines State Beach at Del Mar (Anderson Canyon)	-City of Del Mar -City of Poway -City of San Diego -County of San Diego
Mission Bay	Pacific Ocean Shoreline	La Jolla Shores Beach at El Paseo Grande	-City of San Diego
		La Jolla Shores Beach at Caminito del Oro	
		La Jolla Shores Beach at Vallecitos	
		La Jolla Shores Beach at Avenida de la Playa	
		at Casa Beach, Children's Pool	
		South Casa Beach at Coast Boulevard	
		Whispering Sands Beach at Ravina Street	
		Windansea Beach at Vista de la Playa	
		Windansea Beach at Bonair Street	
		Windansea Beach at Playa del Norte	
		Windansea Beach at Palomar Avenue	
		at Tourmaline Surf Park	
		Pacific Beach at Grand Avenue	
	Tecolote Creek	Entire reach and tributaries	

Table 6.0 (Cont'd)
Applicability of Total Maximum Daily Loads for Indicator Bacteria
Project I- Twenty Beaches and Creeks in the San Diego Region (including Tecolote Creek)

Watershed Management Area	Water Body	Segment or Area	Responsible Copermittees
San Diego River	Forrester Creek	lower 1 mile	-City of El Cajon -City of Santee -County of San Diego
	San Diego River	lower 6 miles	-City of El Cajon -City of La Mesa -City of San Diego -City of Santee -County of San Diego
	Pacific Ocean Shoreline	at San Diego River mouth at Dog Beach	
San Diego Bay	Chollas Creek	lower 1.2 miles	-City of La Mesa -City of Lemon Grove -City of San Diego -County of San Diego - San Diego Unified Port District

1 These TMDL provisions do not apply to waterbodies, segments, or areas removed from the 303(d) list for REC-1 indicator bacteria numeric objectives, consistent with the assumptions and requirements of the Basin Plan Amendment. If the waterbodies are subsequently placed back on the 303(d) list for exceedances of the REC-1 indicator bacteria numeric objectives, all TMDL provisions will apply to those waterbodies and the Responsible Copermittees for those waterbodies.

b. WATER QUALITY BASED EFFLUENT LIMITATIONS[43]

The WQBELs for segments or areas of the water bodies listed in Table 6.0 consist of the following:

(1) Final Dry Weather WQBELs – Effluent Limitations

Table 6.1
Final Dry Weather WQBELs Expressed as Mass-Based Limits

Waterbody	Effluent Limitation		
	Total Coliform Billion MPN/month	Fecal Coliform Billion MPN/month	Enterococcus Billion MPN/month
San Joaquin Hills/ Laguna Hills HSAs (901.11 and 901.12)	1,134	227	40
Aliso HSA (901.13)	1,208	242	40
Dana Point HSA (901.14)	462	92	16

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[43] The Water Quality Based Effluent Limitations, both interim and final, do not apply to the waterbodies and the associated Responsible Copermittees for that waterbody if the waterbody segment in Table 6.0 is not on the 303(d) list for exceedances of the REC-1 numeric objectives for indicator bacteria. If the waterbody is subsequently placed back on the 303(d) for exceedances of the REC-1 numeric objectives for indicator bacteria, the WQBELs, both interim and final, will apply to the associated Responsible Copermittees for that waterbody.

Lower San Juan HSA (901.27)	8,342	1,665	275
San Clemente HA (901.30)		192	

(2) Final Wet Weather WQBELs – Effluent Limitations

Table 6.2
Final Wet Weather WQBELs Expressed as Mass-Based Limits

	Effluent Limitation		
Waterbody	Total Coliform Billion MPN/year	Fecal Coliform Billion MPN/year	Enterococcus Billion MPN/year
San Joaquin Hills/ Laguna Hills HSAs (901.11 and 901.12)	880,652	37,167	66,417
Aliso HSA (901.13)	8,923,264	477,069	735,490
Dana Point HSA (901.14)	3,404,008	152,446	219,528
Lower San Juan HSA (901.27)	16,093,160	1,156,419	1,385,094
San Clemente HA (901.30)	3,477,739	192,653	295,668

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(3) Best Management Practices

(a) The Water Quality Improvement Plans for the applicable Watershed Management Areas in Table 6.0 must incorporate the Bacteria Load Reduction Plans (BLRPs) or Comprehensive Load Reduction Plans (CLRPs) required to be developed pursuant to Resolution No. R9-2010-0001. For segments or areas in Table 6.0 that have been delisted from the Clean Water Act Section 303(d) List of Water Quality Limited Segments, a BLRP and/or CLRP is not required.

(b) The Responsible Copermittee must implement BMPs to support the achievement of the WQBELs under Specific Provision 6. for the segments or areas of the water bodies listed in Table 6.0.

(c) The Responsible Copermittees should coordinate any BMPs implemented to address this TMDL with Caltrans and owners/operators of small MS4s as possible.

c. **RECEIVING WATER LIMITATIONS**

(1) Interim Dry Weather Receiving Water Limitations

The Responsible Copermittee must calculate the "existing" exceedance frequencies of the 30-day geometric mean water quality objectives for each of the indicator bacteria by analyzing the available monitoring data collected between January 1, 1996 and December 31, 2002. "Existing" exceedance frequencies may be calculated by segment or area of a water body, or by water body, and/or by Watershed Management Area listed in Table 6.0. Separate "existing" exceedance frequencies must be calculated for beaches and creeks/creek mouths.

The Responsible Copermittees must achieve a 50 percent reduction in the "existing" exceedance frequency of the 30-day geometric mean Receiving Water Limitation for the segments or areas of the water bodies listed in Table 6.0[44]. A 50 percent reduction in the "existing" exceedance frequency is equivalent to half of the "existing" exceedance frequency of the 30-day geometric mean final Receiving Water Limitations.

The "existing" exceedance frequencies and the interim dry weather allowable exceedance frequencies (i.e. interim dry weather Receiving Water Limitations) calculated by the Responsible Copermittees must be included in the Water Quality Improvement Plans for the applicable Watershed Management Areas. Consistent with the assumptions and requirements of the Basin Plan Amendment, the Responsible Copermittees may provide evidence that indicates another controllable or uncontrollable source is responsible for the exceedances in the receiving waters. Responsible Copermittees may therefore include such demonstrations (including but not limited to reference system exceedance frequencies, natural source exclusion approach) as part of the "existing" exceedance frequency calculation.

The schedule for attaining the interim Receiving Water Limitations is specified in Provision 6.d.(3).

(2) Interim Wet Weather Receiving Water Limitations

The Responsible Copermittees must achieve a 50 percent reduction in the "existing" exceedance frequency of the applicable wet weather Receiving Water Limitation for the segments or areas of the water bodies listed in Table 6.0**Error! Bookmark not defined.**. A 50 percent reduction in the "existing" exceedance frequency is equivalent to half of the "existing" exceedance frequency of the applicable final Receiving Water Limitations. The exceedance frequency estimated to be equivalent to a 50 percent reduction in the "existing" exceedance frequency is shown in Table 6.4. Unless the Responsible Copermittees calculate a revised "existing" exceedance frequency that is part of an approved WQIP, the allowable existing exceedance frequencies in Table 6.3 shall apply.

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[44] The interim Receiving Water Limitations requirements do not apply to waterbodies that are not on the 303(d) list for exceedances of the REC-1 indicator bacteria numeric objectives. Consistent with the assumptions and requirements of the Basin Plan Amendment, no further action is required for these waterbodies. If the waterbodies are subsequently placed back on the 303(d) list for exceedances of the REC-1 indicator bacteria numeric objectives, all TMDL provisions will apply to these waterbodies and the Responsible Copermittees for those waterbodies.

As the wet weather Receiving Water Limitations include an allowable exceedance frequency, the 50 percent reduction shall not require Responsible Permittees to attain an exceedance frequency less than the final allowable exceedance frequency.

Where Responsible Copermittees elect to calculate a revised "existing" exceedance frequency, the "existing" exceedance frequencies and the interim wet weather allowable exceedance frequencies (i.e. interim wet weather Receiving Water Limitations) calculated by the Responsible Copermittees must be included in the Water Quality Improvement Plans for the applicable Watershed Management Areas. Consistent with the assumptions and requirements of the Basin Plan Amendment, the Responsible Copermittees may provide evidence that indicates another controllable or uncontrollable source is responsible for the exceedances in the receiving waters. Responsible Copermittees may therefore include such demonstrations (including but not limited to reference system antidegradation approach or natural source exclusion approach) as part of the "existing" exceedance frequency calculation.

The schedule for attaining the interim Receiving Water Limitations is specified in Provision 6.d(3).

Table 6.3

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Interim Wet Weather Receiving Water Limitations Expressed as Interim Wet Weather Allowable Exceedance Frequencies[45]

Watershed Management Area	Water Body	Segment or Area	Interim Wet Weather Allowable Exceedance Frequencies: Total Coliform	Fecal Coliform	*Enterococcus*
South Orange County	Pacific Ocean Shoreline	Cameo Cove at Irvine Cove Drive – Riviera Way	38%	37%	39%
		at Heisler Park - North			
	Pacific Ocean Shoreline	at Main Laguna Beach			
		Laguna Beach at Ocean Avenue			
		Laguna Beach at Cleo Street			
		Arch Cove at Bluebird Canyon Road			
		Laguna Beach at Dumond Drive			

[45] Responsible Copermittees may submit interim wet weather allowable exceedance frequencies as part of the WQIP. Upon approval of the WQIP, the interim allowable exceedance frequencies shall supersede the applicable exceedance frequencies in Table 6.3.

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	Pacific Ocean Shoreline	Laguna Beach at Lagunita Place / Blue Lagoon Place at Aliso Beach	41%	41%	42%
	Aliso Creek	Entire reach (7.2 miles) and associated tributaries: - Aliso Hills Channel - English Canyon Creek - Dairy Fork Creek - Sulfur Creek - Wood Canyon Creek	41%	41%	42%
	Aliso Creek Mouth	at mouth	41%	41%	42%
	Pacific Ocean Shoreline	Aliso Beach at West Street Aliso Beach at Table Rock Drive 100 Steps Beach at Pacific Coast Hwy at hospital (9th Avenue) at Salt Creek (large outlet) Salt Creek Beach at Salt Creek service road Salt Creek Beach at Strand Road	36%	36%	36%

Table 6.3 (Cont'd)
Interim Wet Weather Receiving Water Limitations Expressed as Interim Wet Weather Allowable Exceedance Frequencies

Watershed Management Area	**Water Body**	**Segment or Area**	**Interim Wet Weather Allowable Exceedance Frequencies** Total Coliform	Fecal Coliform	*Entero-coccus*
South Orange County (cont'd)	Pacific Ocean Shoreline	at San Juan Creek	44%	44%	48%
	San Juan Creek	lower 1 mile	44%	44%	47%
	San Juan Creek Mouth	at mouth	44%	44%	47%
	Pacific	at Poche Beach	35%	35%	36%

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	Ocean Shoreline	Ole Hanson Beach Club Beach at Pico Drain			
		San Clemente City Beach at El Portal Street Stairs			
		San Clemente City Beach at Mariposa Street			
		San Clemente City Beach at Linda Lane			
		San Clemente City Beach at South Linda Lane			
		San Clemente City Beach at Lifeguard Headquarters			
		under San Clemente Municipal Pier			
		San Clemente City Beach at Trafalgar Canyon (Trafalgar Lane)			
		San Clemente State Beach at Riviera Beach			
		Can Clemente State Beach at Cypress Shores			
San Luis Rey River	Pacific Ocean Shoreline	at San Luis Rey River mouth	45%	44%	47%
Carlsbad	Pacific Ocean Shoreline	at Moonlight State Beach	40%	40%	41%
San Dieguito River	Pacific Ocean Shoreline	at San Dieguito Lagoon mouth	33%	33%	36%

(3) Final Receiving Water Limitations[46]

(a) Discharges from the MS4s must not cause or contribute to the violation of the receiving water limitations in Table 6.4 by the end of the compliance schedules under Specific Provision 6.d.(2), unless the Responsible Copermittees provide evidence that indicates another controllable or

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[46] The Final Receiving Water Limitations requirements do not apply to waterbodies that are not on the 303(d) list for exceedances of the REC-1 indicator bacteria numeric objectives. Consistent with the assumptions and requirements of the Basin Plan Amendment, no further action is required for these waterbodies. If the waterbodies are subsequently placed back on the 303(d) list for exceedances of the REC-1 indicator bacteria numeric objectives, all TMDL provisions will apply to these waterbodies and the Responsible Copermittees for those waterbodies.

uncontrollable source is responsible for the exceedances in the receiving waters (a described in E.6.(3)(b)).

Table 6.4

Final Receiving Water Limitations as Bacteria Densities and Allowable Exceedance Frequencies in the Water Body

Receiving Water Limitations					
Constituent	Single Sample Maximum[1,2] (MPN/100mL)	Single Sample Maximum Allowable Exceedance Frequency[3]	30-Day Geometric Mean[2] (MPN/100mL)	30-Day Geometric Mean Allowable Exceedance Frequency	
Total Coliform[7]	10,000	22% / 0%	1,000	0%	
Fecal Coliform	400	22% / 0%	200	0%	
Enterococcus	104[4, 6] / 61[5]	22% / 0%	35[4] / 33[5]	0%	

Notes:
1. During wet weather days, only the single sample maximum receiving water limitations are required to be achieved. (the geometric mean does not apply to wet weather days)
2. During dry weather days, only the 30-day geometric mean receiving water limitations are required to be achieved (the single sample maximum does not apply to dry weather days)..
3. The 22% single sample maximum allowable exceedance frequency only applies to wet weather days. The 0% single sample maximum allowable exceedance frequency applies to dry weather days.
4. This *Enterococcus* receiving water limitation applies to segments of areas of Pacific Ocean Shoreline listed in Table 6.0.
5. This *Enterococcus* receiving water limitations applies to segments or areas of creeks or creek mouths listed in Table 6.0.
6. A wet weather receiving water limitation for Enterococcus of 104 MPN/100mL may be applied as a receiving water limitation for creeks, instead of 61 MPN/100mL, if one or more of the creeks addressed by these TMDLs (San Juan Creek, Aliso Creek, Tecolote Creek, Forrester Creek, San Diego River, and/or Chollas Creek) is designated with a "moderately to lightly used area" or less frequent usage frequency in the Basin Plan. Otherwise, the wet weather receiving water limitation of 61 MPN/100mL for Enterococcus will be used to assess compliance with the wet weather allowable exceedance frequency.
7. Total Coliform Receiving Water Limitations only apply to the Pacific Ocean Shoreline segments listed in Table 6.0 and do not apply to the creeks or creek mouths listed in Table 6.0.

(b) If the above receiving water limitations are not met in the receiving water, the Responsible Copermittees must demonstrate that the discharges from the MS4s are not causing or contributing to the violation of receiving water limitations. Such demonstration may be achieved by (1) demonstrating that the discharges from the MS4s are meeting the effluent limitations under Specific Provision 6.b.(1) for dry weather discharges and Specific Provision 6.b.(2) for wet weather discharges, (2) through the attainment of the final WQBELs in Specific Provision 6.b.(1) for dry weather discharges and Specific Provision 6.b.(2) for wet weather discharges, (3) by providing data from their discharge points to the receiving waters, (4) by providing data collected at jurisdictional boundaries, and/or (5) by using other methods accepted by the San Diego Water Board, which may include but are not limited to the reference system antidegradation approach (RSAA) or natural sources exclusion approach (NSEA)[47]..

(4) Best Management Practices

[47] Resolution R9-2008-0028

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Discharges from the MS4s must not contain densities that exceed the following effluent limitations by the end of the compliance schedules under Specific Provision 6.c.(1) to demonstrate the discharge is not causing or contributing to a violation of receiving water quality standards:¶
¶
Table 6.2¶
Effluent Limitations as Bacteria Densities and Allowable Exceedance Frequencies ¶
in MS4 Discharges to the Water Body¶
...

(a) The Water Quality Improvement Plans for the applicable Watershed Management Areas in Table 6.0 must incorporate the Bacteria Load Reduction Plans (BLRP) or Comprehensive Load Reduction Plans (CLRPs) required to be developed pursuant to Resolution No. R9-2010-0001. For segments or areas in Table 6.0 that have been delisted from the Clean Water Act Section 303(d) List of Water Quality Limited Segments, a BLRP and/or CLRP is not required.

(b) The Responsible Copermittee must implement BMPs to support the achievement of the Receiving Water Limitations under Specific Provision 6.c for the segments or areas of the water bodies listed in Table 6.0.

(c) The Responsible Copermittees should coordinate any BMPs implemented to address this TMDL with Caltrans and owners/operators of small MS4s as possible.

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d. COMPLIANCE SCHEDULE

(1) WQBELs Compliance Dates

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The Responsible Copermittees for MS4 discharges to a segment or area of the water bodies listed in Table 6.0[48] are required to achieve the Wasteload Allocations (WLAs) defined as the WQBELs under Specific Provision 6.b, according to the following compliance schedule:

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Table 6.5

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Compliance Schedule Dates to Achieve Indicator Bacteria WLAs

Constituent	Dry Weather WLA Compliance Date	Wet Weather WLA Compliance Date
Total Coliform*	April 4, 2021	April 4, 2031
Fecal Coliform		
Enterococcus		

* Total coliform receiving water limitations only apply to segments or areas of Pacific Ocean Shoreline listed in Table 6.0.

(2) Final Receiving Water Limitations Compliance Requirements

The Responsible Copermittees for MS4 discharges to a segment or area of the water bodies listed in Table 6.0[49] are required to achieve the Final

[48] The WQBELs (WLAs) do not apply to waterbodies that are not on the 303(d) list for exceedances of the REC-1 indicator bacteria numeric objectives. Consistent with the assumptions and requirements of the Basin Plan Amendment, no further action is required for these waterbodies. If the waterbodies are subsequently placed back on the 303(d) list or delisted in subsequent iterations, the San Diego Water Board will revise the current NPDES requirements and/or issue additional waste discharge requirements to be consistent with these TMDLs.

[49] The WQBELs (WLAs) do not apply to waterbodies that are not on the 303(d) list for exceedances of the REC-1 indicator bacteria numeric objectives. Consistent with the assumptions and requirements of the Basin Plan Amendment, no further action is required for these waterbodies. If the waterbodies are subsequently placed back on the 303(d) list for exceedances of the REC-1 indicator bacteria numeric

Receiving Water Limitations according to the following compliance schedule:

Table 6.6
Compliance Schedule Dates to Achieve Indicator Bacteria WLAs

Constituent	Dry Weather WLA Compliance Date	Wet Weather WLA Compliance Date
Total Coliform*	April 4, 2021	April 4, 2031
Fecal Coliform	April 4, 2021	April 4, 2031
Enterococcus	April 4, 2021	April 4, 2031

* Total coliform receiving water limitations only apply to segments or areas of Pacific Ocean Shoreline listed in Table 6.0.

(3) Interim Receiving Water Limitations Compliance Requirements

The Responsible Copermittees must comply with the Interim Receiving Water Limitations by the interim compliance dates specified within the Regional Board approved CLRPs or BLRPs.

(4) Submittals to Support TMDL Basin Plan Amendment

The Responsible Copermittees are encouraged to submit data to support the TMDL reopener scheduled for April 2016 including but not limited to data related to implementation of the reference system antidegradation approach (RSAA), the natural sources exclusion approach (NSEA), reference watershed monitoring and beneficial use usage frequency.

e. SPECIFIC MONITORING AND ASSESSMENT REQUIREMENTS

(1) Monitoring and Assessment Requirements for Beaches
The BLRPs and CLRPs to be submitted by the Copermittees and approved by the Regional Board Executive Officer contain monitoring programs. Implementation of those Regional Board-approved monitoring programs constitutes compliance with the Monitoring Station and Monitoring Procedure requirements, described below.

Waterbodies that have been delisted are not required to develop and/or implement a BLRP or CLRP, including additional monitoring. Therefore, the monitoring requirements of this provision do not apply to delisted waterbodies. Delisted waterbodies shall continue monitoring consistent with Provision D.

(a) Monitoring Stations

For beaches addressed by the TMDL, monitoring locations should consist

objectives, all TMDL provisions will apply to these waterbodies and the Responsible Copermittees for those waterbodies.

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<#>Interim Dry Weather Receiving Water Limitations¶
¶
The Responsible Copermittee must calculate the "existing" exceedance frequencies of the 30-day geometric mean water quality objectives for each of the indicator bacteria by analyzing the available monitoring data collected between January 1, 1996 and December 31, 2002. "Existing" exceedance frequencies may be calculated by segment or area of a water body, or by water body, and/or by Watershed Management Area listed in Table 6.0. Separate "existing" exceedance frequencies must be calculated for beaches and creeks/creek mouths. ¶
¶
The Responsible Copermittees must achieve a 50 percent reduction in the "existing" exceedance frequency of the 30-day geometric mean WQBELs for the segments or areas of the water bodies listed in Table 6.0 by the interim compliance dates for achieving the interim dry weather WQBELs given in Table 6.5. A 50 percent reduction in the "existing" exceedance frequency is equivalent to half of the "existing" exceedance frequency of the 30-day geometric mean WQBELs.¶
¶
The "existing" exceedance frequencies and the interim dry weather allowable exceedance frequencies (i.e. interim dry weather WQBELs) calculated by the Responsible Copermittees must be included in the Water Quality Improvement Plans for the applicable Watershed Management Areas.¶
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<#>Interim Wet Weather Receiving Water Limitations¶
¶
The Responsible Copermittees must achieve the interim wet weather receiving water limitations in Table 6.4, expressed as interim allowable exceedance frequencies, by the interim compliance dates for achieving the interim wet weather WQBELs given in Table 6.5.¶
¶
Table 6.4¶
Interim Wet Weather Receiving Water Limitations Expressed as ¶
Interim Wet Weather Allowable Exceedance Frequencies¶
Watershed ...

of, at a minimum, the same locations used to collect data required pursuant to Order Nos. R9-2007-0001 and R9-2009-0002, and beach monitoring for Health and Safety Code section 115880.[50] If exceedances of the applicable interim or final receiving water limitations are observed in the monitoring data, additional monitoring locations and/or other source identification methods must be implemented to identify the sources causing the exceedances. The additional monitoring locations must also be used to demonstrate that the bacteria loads from the identified anthropogenic sources have been addressed and are no longer causing exceedances in the receiving waters.

(b) Monitoring Procedures

(i) The Responsible Copermittees must collect dry weather monitoring samples from the receiving water monitoring stations at least monthly. Dry weather samples collected from additional monitoring stations established to identify sources must be collected at an appropriate frequency to demonstrate bacteria loads from the identified sources have been addressed and are no longer causing exceedances in the receiving waters.

(ii) The Responsible Copermittees must collect wet weather monitoring samples from the receiving water monitoring stations at least once within the first 24 hours of the end of a storm event[51] of the rainy season (i.e. October 1 through April 30). Wet weather samples collected from receiving water stations and any additional monitoring stations established to identify sources must be collected at an appropriate frequency to demonstrate bacteria loads from the identified sources have been addressed and are no longer in exceedance of the allowable exceedance frequencies in the receiving waters.

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(iii) Samples must be analyzed for total coliform, fecal coliform, and *Enterococcus* indicator bacteria.

(c) Assessment and Reporting Requirements

(i) The Responsible Copermittees must analyze the dry weather and wet weather monitoring data to assess whether the interim and final WQBELs for the Pacific Ocean Shoreline segments or areas listed in

[50] Commonly referred to as AB 411 monitoring

[51] Wet weather days are defined by the TMDL as storm events of 0.2 inches or greater and the following 72 hours. The Responsible Copermittees may choose to limit their wet weather sampling requirements to storm events of 0.2 inches or greater, or also include storm events of 0.1 inches or greater as defined by the federal regulations [40CFR122.26(d)(2)(iii)(A)(2)].

Table 6.0 have been achieved.

(ii) The monitoring and assessment results must be submitted as part of the Annual Reports required under Provision F.3.b of this Order.

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(2) Monitoring and Assessment Requirements for Creeks and Creek Mouths

The BLRPs and CLRPs to be submitted by the Copermittees and approved by the Regional Board Executive Officer contain monitoring programs. Implementation of those Regional Board-approved monitoring programs constitutes compliance with the Monitoring Station and Monitoring Procedure requirements, described below.

Waterbodies that have been delisted are not required to develop and/or implement a BLRP or CLRP, including additional monitoring. Therefore, the monitoring requirements of this provision do not apply to delisted waterbodies. Delisted waterbodies shall continue monitoring consistent with Provision D.

(a) Monitoring Stations

For creeks addressed by the TMDL, monitoring locations should consist of, at a minimum, a location at or near the mouth of the creek (e.g. Mass Loading Station or Mass Emission Station) and one or more locations upstream of the mouth (e.g. Watershed Assessment Station). If exceedances of the applicable interim or final receiving water limitations are observed in the monitoring data, additional monitoring locations and/or other source identification methods must be implemented to identify the sources causing the exceedances. The additional monitoring locations must also be used to demonstrate that the bacteria loads from the identified sources have been addressed and are no longer causing exceedances in the receiving waters.

(b) Monitoring Procedures

(i) The Responsible Copermittees must collect dry weather monitoring samples from the receiving water monitoring stations in accordance with the requirements of Provision D.

(ii) The Responsible Copermittees must collect wet weather monitoring samples from the receiving water monitoring stations within 24 hours of the end of a storm event[52] of the rainy season (i.e. October 1 through April 30).

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[52] Wet weather days are defined by the TMDL as storm events of 0.2 inches or greater and the following 72 hours. The Responsible Copermittees may choose to limit their wet weather sampling requirements to storm events of 0.2 inches or greater, or also include storm events of 0.1 inches or greater as defined by the federal regulations [40CFR122.26(d)(2)(iii)(A)(2)].

(iii) Samples collected from receiving water monitoring stations must be analyzed for fecal coliform and *Enterococcus* indicator bacteria.

(c) Assessment and Reporting Requirements

(i) The Responsible Copermittees must analyze the receiving water monitoring data to assess whether the interim and final receiving water WQBELs for the creeks and creek mouths listed in Table 6.0 have been achieved.

(ii) The Responsible Copermittee must identify and incorporate additional MS4 outfall and receiving water monitoring stations and/or adjust monitoring frequencies to identify sources causing exceedances of the receiving water WQBELs.

(iii) The monitoring and assessment results must be submitted as part of the Annual Reports required under Provision F.3.b of this Order.

f. COMPLIANCE DETERMINATION

(1) Compliance with interim compliance requirements of Specific Provision 6.c.(1) and Provision 6.c.(2) may be demonstrated via one of the following methods:

(a) There is no direct or indirect discharge from the Responsible Copermittees' MS4s to the receiving water; OR

(b) There are no exceedances of the applicable receiving water limitations under Specific Provision 6.c.(1) or Provision 6.c.(2) in the receiving water at, or downstream of the Responsible Copermittees' MS4 outfalls; OR

(c) There are no violations of the applicable effluent limitations under Specific Provision 6.b.(1) or Provision 6.b.(2) at the Responsible Copermittees' MS4 outfalls; OR

(d) There are no exceedances of the applicable interim receiving water limitations under Specific Provision 6.c.(1) or Provision 6.c.(2) in the receiving water at, or downstream of the Responsible Copermittees' MS4 outfalls; OR

(e) The Responsible Copermittees can demonstrate that exceedances of the applicable interim or final receiving water limitations under Specific Provision 6.c. in the receiving water are due to loads from natural sources, AND pollutant loads from the Copermittees' MS4 are not causing or contributing to the exceedances; OR

(f) The Responsible Copermittees have submitted and are fully implementing a Water Quality Improvement Plan, accepted by the San Diego Water Board, which provides reasonable assurance that the interim compliance requirements will be achieved by the interim compliance dates. OR

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(g) Upon the effective date of this Order, a Copermittee's full compliance with all of the following requirements shall constitute a Copermittee's compliance with provisions pertaining to interim WQBELs with compliance deadlines occurring prior to approval of a WQIP.

(i) Meets all interim and final deadlines for development of a WQIP,

(ii) Targets implementation of watershed control measures in its existing storm water management program, including watershed control measures to eliminate non-storm water discharges of pollutants through the MS4 to receiving waters, to address known contributions of pollutants from MS4 discharges that cause or contribute to the impairment(s) addressed by the TMDL(s), and

(iii) Receives final approval of its WQIP from the Regional Board.

(2) Compliance with WQBELs of Specific Provision 6.b may be demonstrated via one of the following methods:

(a) There is no direct or indirect discharge from the Responsible Copermittees' MS4s to the receiving water; OR

(b) There are no exceedances of the applicable receiving water limitations under Specific Provision 6.c.(3) in the receiving water at, or downstream of the Responsible Copermittees' MS4 outfalls; OR

(c) There are no violations of the applicable effluent limitations under Specific Provision 6.b.(1) at the Responsible Copermittees' MS4 outfalls; OR

(d) The Responsible Copermittees can demonstrate that exceedances of the applicable final receiving water limitations under Specific Provision 6.c.(3) in the receiving water are due to loads from natural sources, AND pollutant loads from the Copermittees' MS4 are not causing or contributing to the exceedances, OR

(e) The Responsible Copermittees have submitted and are fully implementing a Water Quality Improvement Plan, accepted by the San Diego Water Board, which provides reasonable assurance that the final compliance requirements will be achieved by the final compliance dates. A Responsible Copermittee that does not implement its WQIP in accordance with the milestones and compliance schedules shall demonstrate compliance with the final WQBELs pursuant to Provisions 6.f(2)(a-d).

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OMPOA

Otay Mesa Property Owners Association

January 11, 2013

Mr. Wayne Chiu, P.E.
California Regional Water Quality Control Board, San Diego Region
9174 Sky Park Court, Suite 100
San Diego California 92123-4340

SUBJECT: Comment – Tentative Order No.R9-2013-0001, Regional MS4 Permit, Place ID: 786088Wchiu

Dear Mr. Chui:

Everyone, from every edge of the political and economic spectrum, supports improved water quality and environmentally healthy watersheds. The Otay Mesa Property Owners Association ("OMPOA"), who represents the major landowners within the City portion of Otay Mesa, support the California Regional Water Quality Control Board's ("Board") goal of clean water for all users in the region.

However, after listening to public testimony at recent board workshops, and being briefed by co-permittees on the proposed Tentative Order No. R9-2013-0001, Regional MS4 Permit ("Tentative Order"), we are writing to express our significant reservations on the Tentative Order. In brief, our concerns fall into these broad categories:

1. **Existing Tentative Order No. R9-2007-0001**-- Over the last several years, local governments in San Diego have worked together with your staff and a host of technical experts to develop a Hydromodification Management Plan with reasonable and scientifically based standards. Your Board recently approved that Plan in July 2010. This draft permit ignores all of the good work invested in that Plan, which was developed at a significant cost to the public. The existing Plan has only been in effect for 2 years, with 3 years remaining prior to its expiration. Given the short timeframe that the existing Plan has been in practice, we do not yet have adequate data to determine if the measures within the existing Plan are sufficient. Pursuing a new tentative order at this time has not been scientifically validated and is premature.

2. **Legal Issues**--The attempt by Board staff to mandate a proposed in lieu fee for watershed and hydrologic unit improvements to projects that have no impacts and therefore, no nexus to the watershed or unit improvements is a direct violation of CEQA, according to multiple city attorneys who spoke to the issue at the December 12, 2012 public hearing. On such a key issue as a CEQA violation, why didn't Board counsel catch this error in advance in the draft permit?

3. **Clarity on Pre-Development vs. Pre-Project Conditions--**We are at a loss to find a definition of the term pre-development conditions in the Tentative Order. For such a significant determination and impact, the lack of clarity on this matter is concerning. In the most current public workshop on December 12, 2012, when a Board member

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San Diego, CA 92108

OMPOA

Otay Mesa Property Owners Association

pressed staff on this issue, the staff member was unable to clearly define what the term meant, how far back was a reasonable gauge of pre-development conditions and finally, when pressed about the source of a soils database found on the internet that would be used as a key determinant of compliance, staff was unable to describe the accuracy or source documents for the website's database.

4. **Hydromodification**--We disagree with the proposed deletion of the current exemption in the hydromodification permit approved by the Board in July of 2010 for projects that discharge stormwater into lined or engineered channels. Speaker after speaker in the public comment period of the December 12th workshop representing co-permittees and other stakeholders, gave numerous examples of the conflict they had with Board staff on this issue. Further, the potential waste of public and private dollars and man-hours spent on already approved permits under the current hydromod scheme would be shocking. And this leads to our next point.

5. **Fiscal Impact**--Why is there no credible economic analysis on the potential cost to the co-permittees and the public for the implementation of the Tentative Order? For a regulator, or staff, to propose such broad and sweeping changes to public policy, without any consequence to the cost of their grand ideal, is irresponsible.

6. **Coordination with neighboring regional boards and publication of previous similar experiences**--According to public testimony at the December 12th workshop, the neighboring regional water boards in North Orange County and the Inland Empire have already dealt with several of the issues contemplated in the San Diego Board's Tentative Order. Specific examples include pre-development vs. pre-project conditions. Why hasn't the experience of the neighboring boards on these critical issues been shared with the public so our decision could benefit from their experience?

When the total cost of environmental compliance from local, state and federal agencies is placed upon the backs of landowners in Otay Mesa and other parts of our region with other habitat and environmental mandates, the financial return on economic development will simply not pencil out. Proposed projects will not develop, jobs will not be created, economies will not grow and the dream of an emerging economy will die hard. The cost of doing business in California has already pushed many businesses and developers out of the state and disincentive developers further would be a catastrophic loss to California.

If implemented as written, this Tentative Order, and the actions of the Board, will further degrade San Diego's economy. We will have an economy based on sand and suntan oil, with a lower income workforce to match, instead of a healthy and diverse economic base with well-paying jobs for all San Diegans.

We urge the Board to delay implementation of the Proposed Order and revisit the untimely, unfunded mandate, poorly drafted terminology, the lack of key definitions, the apparent CEQA violations and unjust burden on industry and the economy. The Tentative Order is not ready for implementation and should not be considered until data from the existing 2010 Plan is fully understood. It would be a public travesty and irresponsible act by the Board to enact the Tentative Order in its current form at this premature stage.

OMPOA

Otay Mesa Property Owners Association

Sincerely,

Rob Hixson, Chairman
OMPOA

cc: Mayor Bob Filner
Mr. Allen Jones
Councilmember David Alvarez

3111 Camino del Rio North, Ste. 100
San Diego, CA 92108

From: Peter M. Hekman, Jr.
To: Chiu, Wayne@Waterboards
Subject: Comment - Tentative Order No. R9-2013-001, Regional MS$ Permit, Place ID: 786088Wchiu
Date: Friday, January 11, 2013 3:55:56 PM

This message is for Vice Chairman Strawn of the San Diego Regional Water Quality Control Board, and is submitted as a Citizen's Comment.
Please forward promptly. Thank you.

For:

Mr. Gary Strawn
Vice Chairman
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

RE: Comment – Tentative Order No. R9-2013-001, Regional MS4 Permit,

Place ID: 786088Wchiu

Dear Vice Chairman Strawn,

I am a private businessman, a sole proprietor, a 40 year military veteran, and an Engineer with a history of years of experience in environmental matters, both in industry as a company president involved almost totally in environmental matters and as a senior executive (Vice Admiral)in both the Navy and the Department of Energy (Senior Executive Corps ES-6) involved in major environmental issues. I presently serve as a volunteer on the SD Chamber of Commerce Military Affairs Committee, and work as a consultant in the field of environmental remediation and contaminant prevention.

I have reviewed the Tentative Order and find it very over-reaching in almost every instance. Moreover, it pits one citizen against another in a manner similar to the tactics utilized by totalitarian governments. Both the costs and the turmoil that will be brought about through your proposed enforcement mechanisms will prove to be extremely deleterious to the competitive viability of the business community of San Diego, and to its ordinary citizens, who will actually bear the costs, for nearly un-measurably small benefit.

I fully believe in, and support initiatives, to ensure clean, safe water in our region, and endorse attempts to do so both effectively and affordably. But this ill-thought out one-size-fits-all plan does neither. You need to go back to the drawing boards on this one that is "evidence-based" rather than "ideologically-based", and one that has the support of the entire community. Its time to start over. Yours is a bad plan whose time has not come.

Respectfully,

Peter M. Hekman, Jr., Consultant
5021 Via Papel, San Diego, CA 92122
858-546-1155 (O); 858-204-5744 (cel)
Phekman1@san.rr.com

PROJECT DESIGN CONSULTANTS | 701 B Street, Suite 800 San Diego, CA 92101 | 619.235.6471 tel 619.234.0349 fax | www.projectdesign.com

January 11, 2013

Mr. Wayne Chiu, P.E.
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD, SAN DIEGO REGION
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

SUBJECT: Comment-Tentative Order No. R9-2013-0001, Regional MS4 Permit, Place ID: 786088Wchiu

Dear Wayne Chiu:

Project Design Consultants (PDC) appreciates the opportunity to provide comments on the subject of the Draft Regional MS4 Permit Tentative Order No. R9-2013-0001 (Draft MS4 permit). PDC is a multidisciplinary planning and engineering design firm with extensive technical experience designing stormwater controls for a wide variety of new development and redevelopment projects throughout San Diego and Riverside Counties. We are committed to the Regional Board's goal of improving water quality through cost-effective and innovative strategies.

We would like to acknowledge and thank Regional Board staff for conducting additional meetings for this Draft MS4 permit, and we are optimistic that Regional Board staff will make significant changes and improvements to the draft permit after receiving comments from the technical experts in the development community through the public comment process. We hope that Regional Board staff will rely heavily on the permit revisions suggested by the technical experts within this region in order to optimize the chance of success for water quality improvement.

Our overarching comments on the Draft MS4 permit are summarized below.

Comment #1 [Draft MS4 Permit Provision E.3.]: Overall, we would like to see permit language that appropriately prioritizes projects according to stormwater quality risk, instead of applying the same requirements to very small and very large projects. If almost every construction project is a priority project, then nothing is really prioritized. Small and medium sized projects should be subject to less restrictive treatment and hydromodification requirements than larger projects. Further, more distinctions and more flexibility should be made to accommodate alternative compliance mechanisms for different types of development (urban infill redevelopment, roadways, rail and transit projects, utility projects, etc.).

Comment #2 [Draft MS4 Permit Provision E.3.]: Overall, many of the permit provisions discourage redevelopment, and this is discouraging because redevelopment is preferred from an environmental perspective compared to new greenfield development.

Comment #3 [Draft MS4 Permit Provision E.3.b.(1).b]: In order to eliminate onerous requirements for redevelopment projects that propose very minor increases to existing levels of site imperviousness, revise the trigger for redevelopment priority development projects to be "<u>at least a net increase</u> of <u>x</u> square feet of impervious surfaces <u>above pre-project conditions</u>" instead of the creation, addition, or replacement of at least x square feet of impervious surfaces.

Comment #4 [Draft MS4 Permit Provision E.3.b.(2).a]: If priority development requirements are triggered for the threshold of 10,000 square feet of impervious area for *new* development, this threshold should be the same for redevelopment projects per Provision E.3.b.(2).b, and restaurant projects per Provision E.3.b.(2).c, and hillside projects per Provision E.3.b.(2).d, and parking lots and street projects per Provisions E.3.b.(2).f and E.3.b.(2).g. We recommend changing 5,000 square feet throughout the permit to 10,000 square feet or larger.

Comment #5 [Draft MS4 Permit Provision E.3.b.(2).i]: Since stormwater pollution is highly correlated with high levels of imperviousness, the project category of "one acre of disturbance or more" should be removed as a priority project category so that projects that add extremely low amounts of impervious surfaces would not be required to comply with priority project requirements.

Comment #6 [Draft MS4 Permit Provision E.3.b.(3).a]: This section should be removed or revised. The current (R9-2007-0001 permit) version of the exemption for sidewalk and bicycle lane improvements should remain for the new permit. Particularly for redevelopment and retrofit projects, most sidewalk and bike lane improvement projects cannot be constructed to be hydraulically disconnected from adjacent streets and still be in compliance with public standards. Additionally, implementing hydromodification controls for these projects in urban areas is often times infeasible.

Comment #7 [Draft MS4 Permit Provision E.3.b.(3).b]: This exemption needs to be re-worded to allow more flexibility. Reconfiguring existing streets for the goal of increasing traffic safety should not trigger priority project requirements just because the project slightly increases the imperviousness above pre-project conditions. Due to the linear nature of roadways, hydromodification and treatment controls are much more difficult due to the large amount of run-on and limited spatial constraints. It would be more cost-effective to focus treatment efforts on other types of projects with larger stormwater quality impacts.

Comment #8 [Draft MS4 Permit Provision E.3.c.(1).a]: Most LID best management practices (BMPs) (for example, bioretention areas) are sized by rate instead of by volume. Therefore, a requirement of retention of the 24-hour 85th percentile water quality volume is not applicable to all LID BMPs.

Comment #9 [Draft MS4 Permit Provision E.3.c]: Given our region's predominance of clay and silt soils, retention should not be the default method of compliance. We propose that the designation of the menu of appropriate BMPs be determined by the Water Quality Improvement Plan (WQIP) process rather than a "one size fits all" strategy currently being proposed in the Draft MS4 permit.

Comment #10 [Draft MS4 Permit Provision E.3.c]: The draft language for all of the various compliance options (and alternative options including offsite options) should be revised to clarify the regulatory intent to reduce the confusion throughout the entire section.

Comment #11 [Draft MS4 Permit Provision E.3.c.(2).a]: Hydromodification requirements should reference *pre-project* instead of *pre-development* conditions. This distinction is crucial and the draft MS4 permit language requiring redevelopment sites to mimic pre-development conditions is an unrealistic standard without technical basis.

Comment #12 [Draft MS4 Permit Provision E.3.c.(2).a.ii]: Remove this impractical requirement for artificially hardened channels.

Comment #13 [Draft MS4 Permit Provision E.3.c.(2).b]: Remove this impractical requirement for sediment supply matching.

Comment #14 [Draft MS4 Permit Provision E.3.c.(2).d]: The current exemptions outlined in the current County of San Diego's Hydromodification Management Plan (HMP) should not be removed.

PROJECT DESIGN CONSULTANTS

Rather, they should be expanded and added to in order to increase the flexibility of the program. The current HMP needs to be revised to make the requirements workable for real world projects. In addition, the low-flow thresholds need to be revised. The schedule for development of the HMP was extremely rushed and we felt that input from the technical experts was ignored during the development and approval of the HMP. We would like to see this plan be revised and then incorporated into the new permit in order for it to be reasonably applied to real-world development projects. Most designers agree that the final hydromodification requirements of the current HMP are unreasonable and/or infeasible to implement for most priority development projects. The climate, rainfall patterns, and soil conditions within Southern California are significantly different from other areas in the United States. Therefore, the stormwater regulations for treatment control BMPs and hydromodification controls need to be tailored to the local conditions and cannot be based on "one size fits all" approaches developed for other areas with different climates.

Comment #15 [Draft MS4 Permit Provision E.3.c.(3).b.i.c]: LID bioretention areas are sized by rate instead of volume. Therefore, a requirement of 1.5 times the design capture volume is erroneous and is not scientifically based.

Comment #16 [Draft MS4 Permit Provision E.3.c.(3).b.iv.a]: Revise condition to state that the regional BMP may treat the runoff, either by a volume-based or a flow-based BMP. The requirement of 1.1 times the design capture volume is confusing and is not scientifically based.

We appreciate the opportunity to comment on the Draft MS4 permit. We would welcome the opportunity to answer any questions or discuss the above or other issues.

Sincerely,

PROJECT DESIGN CONSULTANTS

Debby Reece

Debby Reece, MS, PE, LEED AP, QSD
Vice President - Engineering

Chelisa A. Pack

Chelisa A. Pack, MS, PE, QSD
Project Engineer

Cc: file

SAN DIEGO CANYONLANDS

San Diego Canyonlands

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◆www.sdcanyonlands.org◆

January 11, 2013

Via e-mail to Wayne Chiu wchiu@waterboards.ca.gov
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

RE: Comments on Tentative Order Number: R9-2013-0001

Dear Mr. Chiu:

San Diego Canyonlands respectfully submits the following comments on the draft San Diego Regional Municipal Separate Storm Sewer System permit. Urban runoff is the San Diego region's most urgent pollution problem. In a region known for its beaches and strong tourism economy, polluted runoff makes our beaches and waterways unsafe for swimming, fishing and other recreation for at least 72 hours after every rain event. Even in dry weather, our "urban drool" from residents and businesses becomes a major pollution source.

By working together as a community, we can solve this challenging public health problem. The Water Quality Improvement Plans proposed in the draft permit have the potential to become powerful tools to help us improve water quality within our watersheds. However, the Copermittees cannot be tasked with creating these plans alone. Specifically:

- The Permit should require formation of a stakeholder advisory group for each watershed that includes representatives of environmental groups with knowledge of the watershed.
- This stakeholder advisory group should work closely with the Copermittees and a regional board staff member while the Water Quality Improvement Plans are being developed to ensure these plans aggressively pursue water quality gains.
- The stakeholder advisory process should include accountability and measureable milestones to ensure the goals of the Permit are being met.

By taking advantage of the knowledge and resources of diverse stakeholders like municipalities, businesses, non-profits and residents, our region can be on the cutting-edge of addressing urban runoff and creating healthier communities and watersheds. But this can only be achieved if these diverse voices are impacting the planning process in a meaningful way.

San Diego Canyonlands recognizes the challenge urban runoff presents to our region and we want to do our part to solve the problem. San Diego Canyonlands is interested in participating in a Water Quality Improvement Plan development process for all City of San Diego watersheds. San Diego Canyonlands urges the Regional Board to enhance the stakeholder participation opportunities during Water Quality Improvement Plan development and then approve the permit.

Respectfully Submitted,

Eric Bowlby

Eric Bowlby
Executive Director
San Diego Canyonlands
eric@sdcanyonlands.org

San Diego County Taxpayers Association

Targeting Waste • Promoting Efficiency

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January 11, 2013

Mr. Wayne Chiu, P.E.
California Regional Water Quality Control Board, San Diego Region
9174 Sky Park Court, # 100
San Diego, CA 92123

Re: Comment - Draft Regional MS4 Permit - Tentative Order No.R9-2013-0001

Dear Mr. Chiu:

The San Diego County Taxpayers Association urges you and the San Diego Regional Water Quality Control Board to amend Tentative Order No.R9-2013-0001, the Draft Regional MS4 Permit, so that it encompasses reasonable, cost effective and scientifically based water quality improvement standards.

While we recognize the importance of clean and safe beaches and creeks, and place significant value in protecting water quality, it is critical that taxpayer investments be made based on demonstrated scientific methods. Appropriate thresholds of bacteria should be supported with well documented scientific evidence.

Currently, approximately $120 million of public money is spent annually to comply with the current Municipal Storm Water Permit. County of San Diego staff estimates the costs of attempting to comply with the proposed Bacteria TMDL requirements at between $2.6 billion and $4.9 billion over the next 18 years which raises serious concerns regarding the feasibility of achieving the draft compliance requirements. Requiring exorbitant spending to chase goals that may be unattainable is irresponsible. Until it can be stated with reasonable certainty that the Bacteria TMDL requirement can be met, it should not be incorporated into the MS4 Permit. In this time of fiscal challenge, the cost of complying with new unfunded mandates will no doubt come at the expense of core government services.

If you have any questions, please feel free to contact me at (619) 234-6423 or lani@sdcta.org.

Sincerely,

Lani Lutar
President and CEO

LL/sdk

CC: Members, California Regional Water Quality Control Board, San Diego Region
David Gibson, CA Regional Water Quality Control Board, San Diego Region Executive Officer

April 10 and 11, 2013
Item No. 8
Supporting Document No. 5

SDG&E
A Sempra Energy utility®

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January 11, 2013

Mr. Wayne Chiu, P.E.
California Regional Water Quality Control Board
San Diego Region
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

VIA E-Mail: wchiu@waterboards.ca.gov

Re: Comment – Tentative Order No. R9-2013-0001, Regional MS4 Permit, Place ID: 786088Wchiu

Dear Mr. Chiu and Board Members:

The San Diego Gas & Electric Company (SDG&E) provides transmission and distribution of natural gas and electricity throughout San Diego County and southern Orange County. Delivery of these essential public services requires routine and emergency construction, operation and maintenance of its linear utility infrastructure. A primary mandate to utilities and other entities with linear facilities regulated by the California Public Utilities Commission and/ or other state and federal regulatory agencies is to provide safe and reliable service. The above-referenced draft MS4 permit (draft Permit) would impact SDG&E facilities in our service territory, which is located primarily within Region 9.

Our comments and recommended revisions to specific issues in the draft Permit are provided below.

<u>Non-Storm Water Discharges</u>
There is still confusion in the draft Permit regarding which non-storm water discharges are effectively prohibited and must be eliminated and those that are authorized. The draft Permit both states that it authorizes and prohibits non-storm water discharges but it is not always clear which are authorized and which are prohibited. In multiple locations (e.g. Finding 15), the draft Permit states that non-stormwater discharges into the MS4s must be "effectively prohibited" or eliminated. These sections conflict with other sections (Section II.A.1.b., for example), which state, consistent with EPA's regulations, that non-stormwater discharges authorized by a NPDES permit are authorized to be discharged to the MS4 system. One change that would help to clarify this issue would be to revise Finding 15 as follows:

> **Non-Storm Water and Storm Water Discharges.** Non-storm water discharges from the MS4s are not considered storm water discharges and therefore are not subject to the MEP standard of CWA section 402(p)(3)(B)(iii), which is explicitly for "Municipal ... *Stormwater Discharges* (emphasis added)" from the MS4s. Pursuant to CWA 402(p)(3)(B)(ii), non-storm water discharges into the MS4s must be effectively prohibited. ***However, consistent with EPA's regulations, the draft Permit authorizes discharges of non-storm water to MS4s that are either authorized by a separate NPDES permit, or the discharge is a category of non-storm water discharges or flows that must be addressed pursuant to Provisions <u>E.2.a.(1)-(5)</u> of this Order.***

Prohibition of Non-Storm Waters

Section E.2.a.6. would prohibit any category of non-stormwater under Section E.2.a.1-4. if it is found by the co-permittee or the Regional Board to be a source of pollutants to receiving waters. We recommend that this section be revised to also allow the co-permittees to designate different and/ or additional BMPs to be implemented as opposed to prohibiting the category of non-stormwater and suggest the following language:

> If the Copermittee or San Diego Water Board identifies any category of non-storm water discharges listed under Provisions E.2.a.(1)-(4) as a source of pollutants to receiving waters, the category must be prohibited through ordinance, order, or similar means and addressed as an illicit discharge. ***Alternately, the Copermittee can designate different and/ or additional BMPs to be implemented as opposed to prohibiting the category of non-stormwater.***

Building Fire Suppression System Maintenance Discharges

Section E.2.a.5.a.1. would require the co-permittees to treat building fire suppression system maintenance discharges (e.g., sprinkler line testing and flushing) as an illicit discharge. These discharges have historically been allowed under existing MS4 permits and municipal ordinances with the use of appropriate BMPs. These activities are mandated by code and insurance companies and are essential to maintain a safe and reliable fire water delivery system. Changing existing systems to discharge to the sewer may not be feasible and/ or be expensive due to the existing plumbing configurations. These discharges should continue to be authorized with the implementation of appropriate BMPs as determined by the MS4. If existing BMPs are found to be inadequate, different and/ or additional BMPs could be required to be implemented by the MS4.

Discharges to Areas of Special Biological Significance

The draft Permit should clarify that non-storm water discharges (e.g., potable hydrotest dewatering, groundwater dewatering discharges, etc.) made pursuant to NPDES permits to MS4 systems that discharge to Areas of Special Biological Significance (ASBS) are authorized. These types of discharges are critical to on-going infrastructure development, maintenance and operation and the State Water Board's March 2012 "Exceptions to the Ocean Plan for Discharges to Areas of Biological Significance" provides that the NPDES permitting authority can authorize these discharges to ASBS by making an appropriate finding in the applicable MS4 permit. **We urge the RWQCB to include the following language as part of Finding 32:**

> ***"The ASBS exception authorizes the discharge of non-stormwater to a MS4 when an NPDES permitting authority finds that the discharge does not alter natural ocean water quality in the ASBS. Accordingly, the RWQCB finds that since NPDES permits for non-stormwater discharges contain conditions and requirements to protect water quality and many of these permits are for short-term and/ or intermittent discharges (e.g., discharges from utility vaults and underground structures, construction groundwater dewatering, hydrostatic test water discharges, potable water discharges), these discharges will not alter natural ocean water quality and herein authorizes their discharge to MS4 systems that discharge to ASBS."***

Further, the following Sections need to be revised to ensure consistency and support the above finding:

- Section II.A.1.d.:

  "Storm water discharges ***and non-stormwater discharges made pursuant to NPDES permits*** from the City of San Diego's MS4 to the San Diego Marine Life Refuge in La Jolla, and the City of Laguna Beach's MS4 to the Heisler Park ASBS are authorized under this Order subject to the Special Protections contained in Attachment B to State Water Board Resolution No. 2012-0012 applicable to these discharges, included in Attachment A to this Order. All other discharges from the Copermittees' MS4s to ASBS are prohibited."

- Section 2.I.A.1.e.2.ii. in Attachment A needs to be revised to reference the above finding:

  "An NPDES permitting authority may authorize non-storm water discharges to an MS4 with a direct discharge to an ASBS only to the extent the NPDES permitting authority finds that the discharge does not alter natural ocean water quality in the ASBS ***(see Permit Finding 32)***."

Non-stormwater Action Levels

The draft Permit should not subject non-stormwater discharges made pursuant to NPDES permits to action levels. Section II.C.1. would subject non-stormwater discharges to action levels. However, non-stormwater discharges that have NPDES permits are subject to their own discharge requirements. Setting additional, perhaps conflicting, requirements on these discharges is unnecessary and will lead to confusion. **We therefore urge the RWQCB to revise the draft Permit to clarify that the proposed non-stormwater action levels are not applicable to non-stormwater discharges that have NPDES permits.**

Development Planning

The draft Permit should not subject linear underground/ overhead (utility) projects (or LUPs) to permanent post-construction requirements. Section E.3. requires permanent BMPs for all development projects. LUP construction projects are regulated pursuant to the State Water Board's Stormwater Construction General Permit (CGP). Finding 76 in the CGP specifically excludes LUPs from permanent post-construction requirements due the nature of their construction. For consistency with the CGP, the draft Permit needs to clarify that Section E.3. is not applicable to LUPs as defined in the CGP. **We urge the RWQCB to make the following revisions:**

- Finding 10

  Pollutants Generated by Land Development. Land development has created and continues to create new sources of non-storm water discharges and pollutants in storm water discharges as human population density increases. This brings higher levels of car emissions, car maintenance wastes, municipal sewage, pesticides, household hazardous wastes, pet wastes, and trash. Pollutants from these sources are dumped or washed off the surface by non-storm water or storm water flows into and from the MS4s. When development converts natural vegetated pervious ground cover to impervious surfaces such as paved highways, streets, rooftops, and parking lots, the natural absorption and infiltration abilities of the land are lost. Therefore, runoff leaving a developed area without BMPs that can maintain pre-development conditions will contain greater pollutant loads and have significantly greater runoff volume, velocity, and peak flow rate than pre-development runoff from the same area. ***The nature of linear underground/ overhead projects (LUPs) is to return project sites to pre-construction conditions. Therefore, consistent with Finding 76 in the SWRCB's Storm Water Construction General Permit[1], LUPs are not subject to post-construction requirements.***

  [1] Order 2009-0009-DWQ, as amended by Orders 2010-0014-DWQ and 2012-0006-DWQ, contains the definition of Linear Underground/ Overhead Projects.

- Definition of "Development Project"

  "**Development Projects** - Construction, rehabilitation, redevelopment, or reconstruction of any public or private residential project, industrial, commercial, or any other projects. ***Development Projects do not include linear underground/ overhead projects as defined in the SWRCB Storm Water Construction General Permit (Order 2009-0009-DWQ, as amended by Orders 2010-0014-DWQ and 2012-0006-DWQ).***

The enclosed comments are in reference to the actual draft Permit language. We request that revisions consistent with these comments also be made to the draft Permit's Fact Sheet/ Technical Report.

Please call Fred Jacobsen at 858-637-3723 if you have any questions regarding our comments.

Thank you for this opportunity to provide you with our comments.

Sincerely,

Susan M Hect

Susan M. Hector
Environmental Programs Manager

SAN DIEGO GREEN BUILDING COUNCIL

January 11, 2013

Via e-mail to wchiu@waterboards.ca.gov
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

RE: Comments from the San Diego Green Building Council on Tentative Order Number: R9-2013-0001

Dear Mr. Wayne Chiu,

San Diego Green Building Council[1] respectfully submits[2] the following comments on the Revised Tentative Order No. R9-2013-0001: The San Diego Regional Municipal Separate Storm Sewer System permit.

BACKGROUND

The San Diego Green Building Council is a 501(c)(3) California non-profit corporation with the mission *to inspire, educate and collaborate within our communities to transform our built environment toward true sustainability*. Our support comes from the development, design, construction, facility management and other professional industries related to the built environment. We advocate for development that has reduced environmental impact, which is economically viable and socially responsible.

Support for these comments includes the San Diego chapter of the Association of Landscape Architects (ASLA). The ASLA is the national professional association representing landscape architects, promoting the profession, and advancing the practice through advocacy, education, communication, and fellowship. In addition, stewardship of the land has been a critical part of the mission of ASLA since its founding.

Water quality is critical to regional sustainability. Stormwater runoff is widely considered to be one of the world's most significant environmental problems. In the San Diego Region, storm drains discharge stormwater directly to our beaches without any treatment. Pollutants in runoff discharges impair receiving waters, threaten or harm the health of humans or aquatic organisms, and impair designated beneficial uses such as swimming at our local beaches. We encourage a science-based 'all-in' approach that incorporates site-based Low Impact Development (LID) strategies, urban infrastructure LID strategies and effective hydromodification management strategies. Our overall response to stormwater strategies in the administrative draft MS-4 can be summarized as: first *avoid*, then *reduce*, and only *delay* as a last resort (from the SUDS Sustainable Urban Drainage Systems program in the UK).

[1] The San Diego Green Building Council officially recognized as the San Diego chapter of the US Green Building Council.

[2] These comments were prepared with support from our volunteer community, including Rosalind Haselbeck, Ph.D.- principal of Building Green Futures; and Landry Watson- Sustainability Director at DPR Construction.

COMMENTS

I. The Final permit should require copermittees to engage local community planning groups in developing Water Quality Improvement Plans for their specific Watershed Management Areas.

As mentioned in comment XI regarding stakeholder engagement, we recommend that the Final permit includes at least prescriptive requirements for engaging local stakeholders such as "community planning groups" as implementation partners. Additionally, support for Water Quality Improvement Plans should utilize existing research venues like the Scripps Institute of Oceanography, or Coastkeeper, etc; and funding resources like municipal capital improvement plans.

II. The Final Permit should recognize the EPA's findings that Low Impact Development Best Management Practices are a cost-effective approach to improving water quality and enhancing community, and should emphasize LID methods in the BMP requirements for all development projects (see E.3.a.(2)).

Implementation of Low Impact Development (LID) strategies provide environmental and economic benefits and reduce negative downstream water quality impacts. In addition other public benefits are associated with LID strategies, such as cleaner air, reduced urban temperatures, increased energy efficiency, and landscape amenities. The Final Permit should include similar language to clarify the environmental and economic benefits of LID Best Management Practices (BMPs) that form the basis of the Regional Board's policy decisions relating to development planning.

The Tentative Order should clearly define the best-in-class BMPs and create a system to catalogue the implementation strategies used by the various copermittees. The database should include the measured water quality impacts from each site to be used as a resource for future projects and development.

In particular, where there are limited landscaped areas for infiltration and treatment of runoff, rainwater harvesting should be emphasized for non-potable indoor usage, such as toilet flushing and cooling tower make up water. Note that the draft 2013 CPC Ch 17 has greatly reduced the stringency in treatment of rainwater for indoor use (debris removal, 100 micron filtration, and Escherichia coli < 100 CFU/100 ml).

Further, rainwater catchment systems that effectively address stormwater mitigation by maintaining a design storm volume storage either via weather station or manually, should also be utilized.

III. The Final Permit should include both specified Stormwater standards with an option for prescriptive, third-party requirements such as LEED certification and the Sustainable SITES initiative, where applicable.

In some cases this will include addition or clarification of the existing permit language.

For those projects including Open Space or public/private campuses including industrial, retail and office parks, military complexes, airports, botanical gardens, streetscapes and plazas, residential and commercial developments; Final Permit should reference the Sustainable SITES Initiative. The Sustainable Sites Initiative (SITES™), is a voluntary certification program through the American Society of Landscape Architects, the Lady Bird Johnson Wildflower Center at The University of Texas at Austin and the United States Botanic Garden. Projects receiving at least credits 3.5 – Manage Stormwater on Site and 3.6. – Protect and Enhance On-Site Water Resources and Receiving Water Quality under the "Site Design - Water" category should be equivalent to the same exceptions offered for LEED. (http://www.sustainablesites.org/report/Guidelines%20and%20Performance%20Benchmarks_2009.pdf)

For both building scenarios, commercial and residential new construction, Final Permit language should reference specific LEED credits addressing stormwater quantity and quality management, native/adapted landscaping, open space requirements, and landscape water use (specifically reuse of non-potable water resources). Rating Systems available (http://new.usgbc.org/leed/rating-systems)

For single family homes, the Final Permit should include an exemption from PDP requirements when they meet specified stormwater standards, not limited to LEED credits.

IV. The Final Permit should re-examine the concept of "infeasible", and require developers to take a broader perspective in determining the feasible/infeasible nature of a project.

Allowing Copermittees to develop their own criteria as to what is "technically infeasible" runs the risk of Copermittees bowing to political pressure from special interest and can result in unfair completion for development between copermittees. The intent of the system approach to watershed management must require that all jurisdictions within that watershed have the same criteria for feasible; the Final Permit is the only way to ensure that there is uniform definition of "feasible" and "infeasible".

Conventional approaches to infiltration are typically based on soil structure (clay versus sandy loam) and don't take into account biological activity. Cost analysis for building biologically active soil that can infiltrate and store water effectively needs to be included. Furthermore, the concept of infiltration needs to be broadened to the concept of "hydration". Even clay soils can slow, sink, and spread rainwater when that water is delivered to plants at the appropriate time; during our winter rainy season.

In addition, there exist opportunities for the use of "engineered" or "suspended", to enhance the feasibility on a project, and enhance its capacity for infiltration.

V. The Final Permit should take an innovative approach to retrofitting areas of existing development, in particular for areas with the highest priority water quality conditions (see E.5.e.(2)).

Retrofitting areas of existing development can be an opportunity to both address areas with the highest priority water quality conditions but also for public education on stormwater mitigation principles. Recognize that for our Mediterranean climate, there is an opportunity to emphasize municipal capital improvement to capture the 'first flush' of contaminants, in addition to the 85^{th} percentile storm. Implementing strategies on a bigger scale that benefits the community, such as curb cuts and green streets with educational signage, would be a great approach. There is good precedent for this approach elsewhere, such as Tucson, Arizona. For more information, see: http://watershedmg.org/green-streets/resources.

VI. The Final Permit should consider combining innovative with traditional stormwater mitigation strategies.

Low Impact Development (LID) techniques are typically viewed as small scale interventions that complement traditional detention basins but may not be able to fully meet the hydromodification requirements (peak flow and duration) of Priority Development Projects. Creative use of LID techniques can expand their capacity and effectiveness. For example: rainwater cisterns can provide a dual function with water conservation and stormwater mitigation. The design storm volume can be released from the cistern in response to a weather station at a rate determined by when the storm is expected, or manually by slow release of the pre-determined volume. The cistern can be sized to provide a sizable portion of the irrigation requirements. The design storm volume can be released into a bio-retention cell or other landscaped area. Detention basins can serve as the final overflow for underdrains from bioretention cells or bio-swales to reduce the peak flow of stormwater runoff. The discharge from the detention basin in this case will have a reduced flow and reduced pollutant load due to pre-treatment. Again, the use of "engineered or suspended" soils should be explored.

VII. The Final Permit should emphasize green municipal infrastructure practices that can mitigate stormwater impacts.

The strategy of "green streets" OR "green infrastructure practice" includes street-side, in-street (traffic circles, median strips), and parking lots. All of these green infrastructure practices share common themes of curb cuts to bioretention cells at a lower elevation than the street. Stormwater is typically infiltrated on site with engineered soil or gravel. Overflow during peak storm events is either directed to the storm drain via an underdrain or infiltrated at a second site nearby.

All of these approaches produce "green swathes" in urban areas which mitigate stormwater and provide aesthetic and community benefits. Finally, the local residents have the opportunity to become "stewards of their watershed". There are great examples of green streets: Elmer Avenue in Los Angeles (see: http://www.treepeople.org/sun-valley-watershed#Elmer) as well as many examples in the city of Tucson (see: http://www.watershedmg.org/sites/default/files/greenstreets/WMG_GISWNH_1.0.pdf).

Note that doing projects with existing development that are transparent, such as curb cuts that produce green streets, provide an important opportunity for education. Ultimately visible solutions that are aesthetically pleasing can influence individuals and communities toward patterns of more responsible consumption and use of water due to their increased knowledge and experience.

This represents an opportunity for community planning groups to assist with implementation.

VIII. The Final Permit should incorporate methods for reducing pollutant discharge both on a regional scale, and within the watershed for smaller creeks and waterways – through the use of meaningful enforcement actions.

The proposed MS4 Permit does not adequately address efficacious measures to protect creek and coastal receiving waters while allowing contaminated discharges to persist without adequate enforcement actions. Lacking meaningful enforcement actions, inland cities as copermittees, persist in ignoring or circumventing water quality regulations with impunity while creek and coastal receiving waters and ESA habitats continue to be incrementally degraded by polluted dry weather flows. Damage to coastal habitats is cumulative and potentially expensive in terms of restoration.

IX. The Final Permit should take into account successes in other jurisdictions for reducing pollutant load to pre-development levels.

See reports from the city of Santa Monica on MTBE mitigation and urban watershed management (http://cfpub.epa.gov/npdes/stormwater/casestudies_specific.cfm?case_id=2).

X. The Final Permit should include a *graphic representation* of both political and natural boundaries as related to the area under jurisdiction of this order.

XI. The Final Permit should recognize the resources within each Watershed or municipality, and emphasize stakeholder engagement.

Urban runoff is the San Diego region's most urgent pollution problem. Arguably, it is the most difficult to solve. In a region known for its beaches and strong tourism economy, polluted runoff makes our beaches and waterways unsafe for swimming, fishing and other recreation for at least 72 hours after a rain event. Even in dry weather, our "urban drool" from residents and businesses overwatering lawns becomes a major pollution source.

The good news is by working together as a community, we can solve this challenging public health problem. The Water Quality Improvement Plans proposed in the draft permit have the potential to become powerful tools to help us improve water quality within our watersheds. However, the Copermittees cannot be tasked with creating these plans alone. Specifically:

- The Permit should require formation of a stakeholder advisory group for each watershed that includes representatives of environmental groups with knowledge of the watershed.
- This stakeholder advisory group should work closely with the Copermittees and a regional board staff member while the Water Quality Improvement Plans are being developed to ensure these plans aggressively pursue water quality gains.
- The stakeholder advisory process should include accountability and measureable milestones to ensure the goals of the Permit are being met.

By taking advantage of the knowledge and resources of diverse stakeholders like municipalities, businesses and residents, our region can be on the cutting-edge of addressing urban runoff and creating healthier communities and watersheds. But this can only be achieved if these diverse voices are impacting the planning process in a meaningful way.

USGBC-San Diego recognizes the challenge urban runoff presents to our region, and we want to do our part to solve the problem. USGBC-San Diego is interested in participating in a Water Quality Improvement Plan development process for watersheds in the San Diego Region.

USGBC-San Diego urges the Regional Board to enhance the stakeholder participation opportunities during Water Quality Improvement Plan development and then approve the permit.

CONCLUSION

In conclusion, the U.S. Green Building Council – San Diego appreciates the approach and effort the Regional Board and its staff have put towards developing an MS4 permit for the San Diego Region. We believe that this watershed system approach will better improve the environmental, economic and social impacts associated with current water quality in our region. We look forward to a constructive relationship with the Regional Board.

Respectfully submitted,

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With support from,

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January 11, 2012

Mr. Gary Strawn
Vice Chairman
California Regional Water Quality Control Board, San Diego
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

Re: Comment—Tentative Order No. R9-2013-001, Regional MS4 Permit, Place ID: 786088Wchiu

Dear Vice Chair Strawn:

I am writing on behalf of the San Diego Regional Chamber of Commerce in response to the San Diego Regional Water Quality Control Board's Tentative Order R9-2012-0011 ("Permit") dated October 31, 2012. After reviewing the Permit, the Chamber and its members are concerned that it will impose expensive and untested regulations on local governments and businesses.

Clean, safe water is vital to the region's economy. The tourism industry is one of San Diego's largest. Maintaining its economic health requires clean water in our beaches and streams. It is important, however, that we use our limited resources wisely, and ensure that our efforts produce the desired outcome of improving water quality.

We applaud the Board's inclusion of Water Quality Improvement Plans (WQIP) as a first step in developing a cost-effective approach to improving our water. Analysis remains a critical component of a successful strategy, and we are glad to see that the Board is committed to finding the best possible solution to water quality improvement.

We are concerned, however, that the costs associated with enforcing and implementing the permit will have a negative impact on San Diego's economy. Our three primary areas of concern include: 1) the strict liability for exceeding water quality objectives; 2) the preemption of WQIPs by new and changing regulatory requirements prior to allowing the WQIPs to be developed and implemented; and 3) the lack of reliable funding sources to implement these regulatory changes.

It is necessary to hold individuals, businesses, and governments accountable, but it is critical that accountability measures are practical and have a demonstrable, positive benefit to the region's water. Because of these concerns, we respectfully request that the Permit focus on the timely development of effective and enforceable WQIPs, and that each of the WQIPs be developed through a process that ensures public participation. We ask also that the designation of appropriate Best Management Practices in each watershed be determined through the WQIP process rather than the one size fits all strategy currently being proposed in the Permit. We ask further that until the Board adopts a WQIP for a watershed that the provisions of the existing Permit remain in place for that watershed. Finally, in order to avoid unnecessary litigation, we request that the Board adopt the WQIPs as Orders implementing the proposed Permit.

We urge you to adopt final permit language that is evidence-based and both environmentally and economically sustainable. Thank you for your consideration. Please contact Leah Hemze at lhemze@sdchamber.org if you have any questions.

Sincerely,

Mark Leslie
Interim President & CEO

CC: Mr. Wayne Chiu, California Regional Water Quality Control Board, San Diego

April 10 and 11, 2013
Item No. 8
Supporting Document No. 5

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January 11, 2013

VIA EMAIL
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Wayne Chiu
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

Re: **Comments - Tentative Order No. R9-2013-0001, Regional MS4 Permit, Place ID: 786088Wchiu**

Dear Mr. Chiu:

The San Diego Unified Port District (Port) submits the following comments to the revised Tentative Order No. R9-2013-0001, NPDES No. CAS0109266, *National Pollutant Discharge Elimination System (NPDES) Permit and Waste Discharge Requirements for Discharges of Urban Runoff from the Municipal Separate Storm Sewer Systems (MS4) Draining the Watersheds within the San Diego Region* (the Permit). Except to any extent inconsistent with the comments below and other comments submitted directly on behalf of the Port, the Port concurs with the San Diego Copermittees' comments throughout the process. The Port wishes to separately address several issues in the current draft Permit. The Port continues to support the objectives of the Permit and welcomes any opportunity to work with the Regional Board to improve the Permit.

1. Establish Connection between Discharge Prohibitions/Receiving Water Limitations and TMDL Compliance Schedules

The Permit as currently drafted includes specific provisions and schedules for implementation of total maximum daily loads (TMDLs) that have been incorporated into the Water Quality Control Plan for the San Diego Basin. *See* Permit, Attachment E. These compliance schedules have been incorporated into the Effluent Limitations provision of the Permit. Permit, II.A.3.b. ("Each Copermittee must comply with applicable WQBELs established from the TMDLs in Attachment E to this Order, pursuant to the applicable TMDL compliance schedule.").

However, no similar language is included in the Discharge Prohibitions (II.A.1.) or the Receiving Water Limitations (II.A.2.) provisions. The absence of similar language regarding TMDL compliance schedules in these provisions could potentially result in Copermittees being in violation of the Permit even though the TMDL implementation dates have not passed. In order for a Copermittee to be in compliance when the Permit becomes effective, it must also be in compliance with the applicable TMDL compliance schedule. Where a TMDL is in place, the Permit establishes compliance schedules for Discharge Prohibitions and Receiving Water Limitations that are in conflict with the TMDL compliance schedules.

The Port requests that the Discharge Prohibitions and Receiving Water Limitations provisions of the Permit be revised to make clear that the Copermittee shall not be in violation of these provisions when the Copermittee is complying with the applicable TMDL compliance schedule. Provision II.A.2.c., which appeared in the previous permit draft contains appropriate language linking the TMDL compliance schedules with the compliance schedules for Discharge Prohibitions and Receiving Water Limitations. The Port requests that similar language be included in Provisions II.A.1. and II.A.2. of the Permit.

2. <u>Permit Compliance Should be Based on the Iterative Process and Implementing Provisions of TMDL and the WQIP Rather than Numeric Limits</u>

The Permit provides that the Copermittees must be in compliance with numeric limits in order to meet water quality standards and to avoid violating the Permit. *See* Permit, II.A.1.a., II.A.1.c., II.A.2.a. The Permit also provides that each Copermittee must engage in an iterative process to implement water quality improvement strategies should water quality exceedances occur to achieve compliance with the discharge prohibitions and receiving water limitations. Permit, II.A.4. However, the Permit states that these provisions are "independently applicable, meaning that compliance with one provision does not provide a 'safe harbor' where there is no compliance with another provision." Permit, Fact Sheet, F-39.

Currently, the Permit creates a situation where the Copermittees may be in violation of the Permit the moment it goes into effect. There may be non-compliance with the Permit by a Copermittee where it is shown that a Copermittee is causing or contributing to an exceedance of water quality standards, even if that Copermittee is actively engaged in the iterative process.

While the Port acknowledges that the Regional Board may choose not to strictly enforce these permit conditions, the Copermittees remain potentially subject to an enforcement action by the Regional Board or a third-party citizen suit unless this point of compliance is clarified. The Regional Board has clear authority under the CWA and State Board policy to issue an MS4 permit that allows for iterative Best Management Practices (BMPs), rather than requiring strict adherence to water quality standards through numeric effluent limitations. *See* State Water Resources Control Board Order No. 2001-15, at pg. 8; *see also Defenders of Wildlife v. Browner,* 191 F.3d 1159, 1163, 165 (9th Cir. 1999).

Accordingly, the Permit should be revised to allow the Copermittees to achieve compliance by actively engaging in a BMP-based iterative process and by complying with implementation provisions of applicable TMDLs. The Port supports using the Receiving Water Limitations Language proposed by the California Stormwater Quality Association (CASQA), attached as Exhibit 1.

3. <u>The Permit Should Clarify the Limits and Basis for Copermittee Liability for Any Exceedances</u>

As noted, the Permit should clarify that Copermittee compliance is achieved through compliance with iterative approaches as set forth in the WQIP and any applicable BMPs, rather than any numeric limits. However, if numeric limits remain in the Permit, certain modifications should be made to avoid improper imposition of liability on Copermittees, consistent with the CWA. As discussed in the Port's comments to the previous draft of the Permit, dated September 14, 2012, the Permit should be revised to make clear that a Copermittee is only responsible for exceedances introduced into portions of MS4 facilities that it owns or operates, not merely discharges into or from all MS4 facilities within that Copermittee's geographical jurisdictional boundaries. There are numerous MS4 facilities and outfalls within the Port's tidelands jurisdictions which the Port does not own or operate. The language of the CWA, repeated in the Permit, confirms that a Copermittee is only responsible for MS4 facilities that it operates. (40 CFR 122.26(a)(3)(vi).)

For this reason, the Port cannot properly be liable for discharges into or from an MS4 facility merely because it is within the Port's tidelands jurisdiction – it must own or operate that MS4 facility. To clarify this point, the Port proposes adding the following language, which could be placed in the cover for the Permit, immediately preceding Table 2:

"The location of an MS4 facility within any Copermittee's jurisdiction boundaries does not, of itself, make the Copermittee an owner or operator of that MS4 facility."

Furthermore, the Permit must include additional provisions that ensure a Copermittee is not improperly held liable for discharges attributable to other Copermittees' MS4 inputs. Of key concern is the specter of liability for downstream MS4 operators. As one of the farthest downstream jurisdictions, the Port faces greater risk of being downstream of other Copermittees' input and discharges into the upstream MS4 facilities. The Permit should be revised to clarify that each Copermittee is liable for any input and discharges into and from its MS4 that may exceed numeric limits, but not for the input and discharges by other Copermittees, whether upstream or downstream. Unless such provisions are included, Copermittees such as the Port will face the risk of legally improper "end of the pipe" liability, even if it did not contribute any pollutants.

As written, the Permit lacks clarity regarding the appropriate basis for determining that any Copermittee has actually caused or contribute to an exceedance of water quality standards. As the Permit states, "[e]ach of the Copermittees owns or operates an MS4, through which it discharges storm water and non-storm water into water of the U.S. within the San Diego Region." Permit, Findings, I.1. It further states:

> The federal regulations make it clear that the Copermittees need only comply with permit conditions relating to discharges from the MS4s for which they are operators (40 CFR 122.26(a)(3)(vi)). This Order does not require Copermittees to manage storm water outside of their jurisdiction boundaries, but rather to work collectively to improve storm water management within watersheds.

Permit, Findings, I.2. While this language is consistent with the CWA, additional provisions are needed to ensure that one Copermittee does not become liable for input and discharges from other Copermittees. The Port requests that the Permit include language clarifying that each Copermittee is only liable for its share of the excess pollutants that it introduces into its MS4 facilities and which result in exceedances of the receiving water limits.

Such a provision is necessary since a Copermittee on an MS4 permit is only responsible for its own discharges or those over which it has control, not discharges or inputs by other Copermittees. *Jones v. E.R. Shell Contractor, Inc.*, 333 F.Supp.2d 1344, 1348 (N.D. Ga. 2004). Similarly, both the California Water Code and the Clean Water Act contemplates that liability for violations shall fall upon the "person" responsible for the violations. *See* Cal. Water Code §§ 13263(f), 13350(a); 33 U.S.C. § 1319. A Copermittee that does not generate or add pollutants to its MS4 facilities cannot credibly be characterized as having discharged pollutants. Likewise, a Copermittee cannot properly be subject to liability for excess pollutants introduced into segments of the MS4 outside its jurisdiction. Copermittees cannot control such MS4 facilities and the CWA clearly does not require a Copermittee to exert such control.

To alleviate this problem and to ensure compliance with the applicable statutes and case law, the Port requests that the Permit be revised to explicitly state the each Copermittee is only liable for the portion of any excess pollutants that cause or contribute to any violations of the Permit that are introduced into the portion of the MS4 owned or operated by that Copermittee.

a. <u>The Permit Should Include the Appropriate Regional Board Burden of Proof to Establish Liability of a Copermittee for MS4 Discharges</u>

The Permit should also include provisions that will ensure one Copermittee is not held liable for pollutant discharges generated by or introduced into the MS4 facilities by other Copermittees. Without delineating the basis for assigning and/or apportioning liability among the Copermittees, there is an unacceptable risk that "end of pipe" Copermittees may be held liable for violations caused by pollutants generated and introduced into MS4 facilities primarily, or even exclusively, by "upstream" Copermittees. In particular, as the trustee of the tidelands of the San Diego Bay, the Port is one of the Copermittees located farthest downstream. There is an attendant increased risk that in the event any pollutants are discharged into the San Diego Bay, such pollutants would not have originated from any Port MS4 facilities but from MS4 facilities farther upstream.

To ensure that the Regional Board does not hold Copermittees such as the Port responsible for pollutants introduced into or originating from other Copermittees' MS4 facilities, the Permit must be revised to include and clarify the Regional Board's burden of proof for establishing a particular Copermittees' liability. *See Rapanos v. United States*, 547 U.S. 715, 745 (2006); *see also Sackett v. E.P.A,* 622 F.3d 1139, 1145-1147 (9th Cir. 2010), reversed on other grounds, *Sackett v. E.P.A.* (2012) 132 S. Ct. 1367 ("We further interpret the CWA to require that penalties for noncompliance with a compliance order be assessed only after the EPA proves, in district court, and according to traditional rule of evidence and burdens of proof, that defendants violated the CWA in the manner alleged in the compliance order."). The Regional Board must have the affirmative duty to prove that a Copermittee introduced pollutants into the MS4 that are discharged in the violation of the Permit.

In contrast to this legally required approach, the Permit presently states that the Copermittees must comply with certain procedures to come into compliance in the event an exceedance occurs. *See* Permit, II.A.4.a. The language would effectively impose liability on all Copermittees until a Copermittee could prove that it did not contribute to the excess pollutants in the discharge, even though the Regional Board would not have raised, and would not legally be entitled to, a rebuttable presumption that the exceedance resulted from that particular Copermittee's actions. To prevent a Copermittee being put in the legally untenable position of having to prove its innocence in the first instance, the Regional Board should have an initial burden of proving that the exceedances relate to contribution by a particular Copermittee.

Accordingly, the Port requests that Section II.A.4.a. is revised to read:

> If exceedance(s) of water quality standards persist in receiving waters notwithstanding implementation of this Order, *upon a showing by the Regional Board by a preponderance of the evidence that the discharges of pollutant from the MS4 for which each Copermittee is an owner or operator caused or contributed to the exceedance(s) of the water quality standards, those* Copermittees must comply with the following procedures: (emphasis added).

b. <u>Monitoring Requirements Should be Revised to Include Monitoring that Will Ensure Jurisdiction Accountability</u>

As a further necessary safeguard against improperly broad or joint and several liability for discharges, the Permit must include provisions that will allow the Regional Board and the

Copermittees to determine the sources of any exceedances discharged to receiving waters. Unless the Permit requires such monitoring, there remains the risk that downstream Copermittees will be held liable for upstream discharges. This issue of identifying and establishing a Copermittee's violation of an MS4 permit is critical and has been the subject of recent judicial attention. The Port requests that the Permit include a monitoring program that meets and satisfies the evidentiary standards discussed in *Los Angeles County Flood Control District v. Natural Resources Defense Council, Inc., et al.*, No. 11-460 (U.S. Jan. 8, 2013) and *Natural Resources Defense Council, Inc. v. County of Los Angeles*, 673 F.3d 880 (9th Cir. 2011), necessary to establish a particular Copermittee's discharges and/or violations of the Permit. Without such monitoring, the risk persists that "end of pipe" Copermittees will be held liable for upstream jurisdictional discharges, without proper jurisdictional accountability.

We again emphasize that the Port is dedicated to the protection and enhancement of water quality and that the Port strongly supports the objectives of the Permit. We welcome the opportunity to work with the Regional Board in order to achieve our mutual goals. Please contact us if you have any questions or would like any clarification of the Port's position.

Very truly yours,

Scott E. Patterson

SEP/BPS
cc: William D. McMinn, Esq.

EXHIBIT 1

CASQA Proposal for Receiving Water Limitation Provision

D. RECEIVING WATER LIMITATIONS

1. Except as provided in Parts D.3, D.4, and D.5 below, discharges from the MS4 for which a Permittee is responsible shall not cause or contribute to an exceedance of any applicable water quality standard.

2. Except as provided in Parts D.3, D.4 and D.5, discharges from the MS4 of storm water, or non-storm water, for which a Permittee is responsible, shall not cause a condition of nuisance.

3. In instances where discharges from the MS4 for which the permittee is responsible (1) causes or contributes to an exceedance of any applicable water quality standard or causes a condition of nuisance in the receiving water; (2) the receiving water is not subject to an approved TMDL that is in effect for the constituent(s) involved; and (3) the constituent(s) associated with the discharge is otherwise not specifically addressed by a provision of this Order, the Permittee shall comply with the following iterative procedure:

   a. Submit a report to the State or Regional Water Board (as applicable) that:

      i. Summarizes and evaluates water quality data associated with the pollutant of concern in the context of applicable water quality objectives including the magnitude and frequency of the exceedances.

      ii. Includes a work plan to identify the sources of the constituents of concern (including those not associated with the MS4to help inform Regional or State Water Board efforts to address such sources).

      iii. Describes the strategy and schedule for implementing best management practices (BMPs) and other controls (including those that are currently being implemented) that will address the Permittee's sources of constituents that are causing or contributing to the exceedances of an applicable water quality standard or causing a condition of nuisance, and are reflective of the severity of the exceedances. The strategy shall demonstrate that the selection of BMPs will address the Permittee's sources of constituents and include a mechanism for tracking BMP implementation. The strategy shall provide for future refinement pending the results of the source identification work plan noted in D.3. ii above.

      iv. Outlines, if necessary, additional monitoring to evaluate improvement in water quality and, if appropriate, special studies that will be undertaken to support future management decisions.

      v. Includes a methodology (ies) that will assess the effectiveness of the BMPs to address the exceedances.

      vi. This report may be submitted in conjunction with the Annual Report unless the State or Regional Water Board directs an earlier submittal.

b. Submit any modifications to the report required by the State of Regional Water Board within 60 days of notification. The report is deemed approved within 60 days of its submission if no response is received from the State or Regional Water Board.

c. Implement the actions specified in the report in accordance with the acceptance or approval, including the implementation schedule and any modifications to this Order.

d. As long as the Permittee has complied with the procedure set forth above and is implementing the actions, the Permittee does not have to repeat the same procedure for continuing or recurring exceedances of the same receiving water limitations unless directed by the State Water Board or the Regional Water Board to develop additional BMPs.

4. For Receiving Water Limitations associated with waterbody-pollutant combinations addressed in an adopted TMDL that is in effect and that has been incorporated in this Order, the Permittees shall achieve compliance as outlined in Part XX (Total Maximum Daily Load Provisions) of this Order. For Receiving Water Limitations associated with waterbody-pollutant combinations on the CWA 303(d) list, which are not otherwise addressed by Part XX or other applicable pollutant-specific provision of this Order, the Permittees shall achieve compliance as outlined in Part D.3 of this Order.

5. If a Permittee is found to have discharges from its MS4 causing or contributing to an exceedance of an applicable water quality standard or causing a condition of nuisance in the receiving water, the Permittee shall be deemed in compliance with Parts D.1 and D.2 above, unless it fails to implement the requirements provided in Parts D.3 and D.4 or as otherwise covered by a provision of this order specifically addressing the constituent in question, as applicable.

Unified Port of San Diego

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January 11, 2013

Mr. Wayne Chiu
San Diego Regional Water Quality Control Board
9174 Sky Park Ct., Suite 100
San Diego, CA 92123-4340

Submitted via email: wchiu@waterboards.ca.gov

Subject: Comment – Tentative Order No. R9-2013-0001, Regional MS4 Permit, Place ID: 786088Wchiu

Dear Mr. Chiu,

The San Diego Unified Port District (Port) respectfully submits this comment letter regarding Tentative Order R9-2013-0001 National Pollutant Discharge Elimination System (NPDES) Permit and Waste Discharge Requirements for Discharges from the Municipal Separate Storm Sewer Systems (MS4s) in the San Diego Region (Tentative Order).

The Port has been actively involved in the development process of the Tentative Order and we support the Regional Board's Water Quality Improvement Plan (WQIP) concept in the Tentative Order with its proposed flexibility to focus resources on the priority problems in the watershed. However, the Tentative Order also contains prescriptive requirements that are in addition to the WQIP and would be very costly and at times infeasible to implement. With constrained budgets and staff resources, these additional costs may unintentionally limit the ability to conduct other water quality efforts having greater environmental benefits for the Bay.

The Port has worked alongside the other San Diego County Municipal Copermitees (Copermitees) to collectively submit a red-line strikeout document recommending changes to the permit language. With the exception of the proposed WQIP-based compliance option, the Port fully supports the recommendations provided in the Copermittee red-line strike-out. This document will be submitted through the County of San Diego. The changes help to clarify permit compliance points and provide a more efficient monitoring program to support the end goal of improving water quality. We strongly encourage you to consider the Copermittee's proposal and the Port's comments listed below.

1. <u>Jurisdictional Accountability</u>

The Port is committed to our role as an environmental steward of San Diego Bay. That commitment is reflected in a number of programs both regulatory driven and beyond compliance, that are focused on protecting and rehabilitating the Bay's resources. The

Port's Stormwater Program is an important part of this effort. At the same time we recognize that discharges from upstream jurisdictions impact our efforts to protect bay water quality. San Diego Bay is the receiving water body for a large watershed in which the Port is located at the extreme end. We are aware that most discharges from the MS4 to San Diego Bay are from storm drain easements under the authority of other jurisdictions. With this in mind, we support jurisdictional accountability throughout the watershed and we encourage the Regional Board to incorporate these concepts throughout the Permit.

2. WQIP-based Compliance and Modifications to Provision A

The Regional Board staff has presented the WQIP as an iterative process that allows for adaptive management so that compliance with water quality standards is achieved over time. It is the Port's opinion that the WQIP process, as currently proposed in the Tentative Order, adequately allows for compliance based upon WQIP implementation. However, what is missing is the linkage between the Discharge Prohibitions, Effluent Limitations, and Receiving Water Limitations in Provision A and the iterative process set forth in the WQIPs.

Modifications to Provision A are required to ensure implementation of that iterative process. Without a modification, jurisdictions are potentially open to third-party lawsuits and their resources may be directed to addressing a one-time exceedance. The Port requests that the Permit establishes a clear linkage between compliance with Provision A to compliance with the WQIP and the other Provisions of the Permit.

3. WQIP Development Timeline

The Tentative Order proposes an aggressive schedule for WQIP development and JURMP program updates. The timeline for WQIP development (9 months) does not allow for adequate time between due dates for required deliverables. Concerns with the timeline are as follows:

- Formal agreements such as a Memorandum of Understanding and/or Cost Share agreements will be required within the watershed groups. Although the preliminary work may begin before permit adoption, the process cannot be completed until the Permit is adopted and the requirements are known. These agreements are integral to upholding jurisdictional accountability within the watershed groups. This process will take an estimated three months.

- The water quality priorities and goals are due within the first six months, followed by a two month public comment period. While this first deliverable deadline may be feasible, potential modifications to the priorities and goals may be necessary as a result of the public comments received. Should modifications to the priorities and goals be required, there will be little time to develop the strategies and schedules.

- Time is needed to address comments from the public or Regional Board throughout the process and to obtain management and jurisdictional governing body approvals. Governing body approvals take an average of three months.

The Port requests that the timeframe for permit deliverables is extended as outlined in the Copermittee's revised WQIP development schedule in the red-line strike-out submittal.

4. <u>Illegal Discharges: Air Conditioning Condensation</u>

The Tentative Order requires air conditioning condensation to be directed to landscaped areas or other pervious surfaces where feasible. Substantial structural modifications may be required to meet this requirement and discharges of this type may not be a priority pollutant source that is identified in the WQIP. The Port requests that the requirement to direct air conditioning condensation to landscaping be encouraged and not required.

5. <u>Retention Requirement for Priority Development Projects</u>

As proposed in the Tentative Order, Priority Development Projects are to implement BMPs to retain the volume of runoff equivalent to the design capture volume or the estimated volume that would be retained if the site was fully undeveloped. Due to the Port's location at the headwaters of San Diego Bay, a high groundwater table and existing soils with low infiltration rates, retention is not technically feasible on Port tidelands. The Port is at the bottom of the watershed so consequently retained runoff must be stored for a longer period of time after the peak of a storm. Large underground storage tanks to store the runoff would be infeasible because most tanks would have significant design constraints due to the high groundwater table, flat topography, and high receiving water elevation, making gravity flow drainage systems nearly impossible. Above ground storage tanks would be infeasible because most of Port tidelands are built-out and there is limited room for these facilities. Also, above ground storage tanks pose a vector hazard and a visual nuisance.

Similarly, the proposed alternative compliance options such as an offsite mitigation option or increasing the treatment area onsite also is not feasible for the Port. The land within the Port is largely built-out and area to use for additional treatment is extremely limited. Meeting this requirement would come at a cost to proposed projects that would make them infeasible. Furthermore, mitigation outside of the Port's jurisdiction is also not an option because the Port would not have the authority to enforce the implementation and maintenance of BMPs outside of its jurisdiction. The Port requests that the retention requirement be removed from the permit.

6. <u>Predevelopment Design Reference Used for Hydromodification Controls</u>

The Tentative Order requires the use of "**pre-development** (naturally occurring)" as a runoff reference condition for hydromodification controls. Establishing the pre-development condition of a site requires a reference start date, which is not outlined in the draft, and also requires accepted and defensible references to the **pre-development** soils, vegetation and topography which are also not identified in the permit. This requirement will also create additional and unnecessary costs to each jurisdiction and to the project without additional water quality benefits. A recommended alternative would be the use of a "**pre-project**" runoff reference. This reference point is already being used by the Copermittees in the current MS4 permit and has been used in other MS4 permits in the State. The Port requests that the **pre-development** design reference in the permit is replaced with **pre-project**.

7. Hydromodification Exemption

An exemption to hydromodification requirements that is in the current MS4 permit has been removed in the Tentative Order. The exemption applies to projects that discharge to conveyance channels that are stabilized (i.e. concrete lined) all the way to the receiving water. Hydromodification requirements are included in the permit to mitigate for potential erosion and channel degradation downstream of a development project. Projects that discharge to a stabilized conveyance channel do not present potential erosive impacts downstream or channel degradation therefore, the imposition of hydromodification requirements on such projects is unnecessary and will not provide water quality benefits. The Port requests that the hydromodification exemption for projects that discharge to stabilized conveyance systems be reinserted in the permit.

On behalf of the Port, I wanted to thank you for providing us the opportunity to engage with you and the other stakeholders through the public workshops, and the ability to submit comments on the Tentative Order. Please contact Allison Vosskuhler at (619) 686-6434 or avosskuhler@portofsandiego.org if you have any questions or would like additional clarification on the information provided.

Sincerely,

Randa Coniglio

Randa Coniglio,
Executive Vice President, Operations
San Diego Unified Port District

cc: Paul Fanfera
Bill McMinn
Karen Holman
Allison Vosskuhler

DM#557567

San Diego Coastkeeper
2825 Dewey Road #200
San Diego, CA 92106

Building Industry Association of San Diego County
9201 Spectrum Center Blvd., Suite 110
San Diego, CA 92123

January 11, 2013

Via e-mail to wchiu@waterboards.ca.gov & hand delivery
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

RE: Comments on Tentative Order Number: R9-2013-0001

Dear Mr. Chiu:

San Diego Coastkeeper and the Building Industry Association of San Diego County respectfully submit the following joint comments on the draft San Diego Regional Municipal Separate Storm Sewer System permit, Tentative Order No. R9-2013-0001.

- The Water Quality Improvement Planning process should have more robust stakeholder input.

- Each Water Quality Improvement Plan should have a stakeholder advisory group that sits in Water Quality Improvement Plan meetings, consisting of an environmental representative with knowledge of the watershed, an independent engineer/hydrologist/scientist, and a regional board staff member.

- Water Quality Improvement Plans should be done consecutively, starting with the worst watershed first.

- Because infiltration may not be feasible everywhere in San Diego County, reasonable "off-ramps" for infiltration requirements are appropriate.

- The Water Quality Improvement Plan development process must solicit and include a menu of alternative compliance options developers could use within a watershed.

- Copermittees should create and publish a schedule of public input opportunities for Water Quality Improvement Plans.

- The Permit should specify that Copermittees must accept quality-controlled data received from third parties provided that the data has been development in conformity with the lasted version of Standard Methods of Water and Waste Water Analysis.

Respectfully submitted,

Jill Witkowski	Borre Winckel
Waterkeeper	President & CEO
San Diego Coastkeeper	BIA San Diego

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January 11, 2013

File Number: 0100-092378

Mr. Wayne Chiu, P.E.
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

Re: Comment – Tentative Order No.R9-2013-0001, Regional MS4 Permit, Place ID: 786088Wchiu

Dear Mr. Chiu:

This letter comments on the San Diego Regional Water Quality Control Board's Tentative Order R9-2012-0011 ("Permit") dated October 31, 2012. After reviewing the proposed Permit, I am convinced that the benefits of the Permit as drafted overreachs in a way that will result in detrimental consequences that cannot be overriden by the theoretical benefits hoped to be achieved. The Permit as currently drafted imposes expensive, onerous, and untested regulations on local governments, businesses, and residents. These new regulations will impact the region's economy in a way that far exceeds whatever water quality benefit may result.

I understand the importance of clean, safe water to the region. As a member of the business community, I too am interested in improving San Diego's water. It is important, however, that we use our limited resources wisely, and ensure that our efforts produce the desired outcome of improving water quality without shutting down our economy or placing unreasonable and infeasible burdens on our local governments, businesses and residents.

I applaud the Board's inclusion of Water Quality Improvement Plans (WQIP) as a first step in developing a cost-effective approach to improving our water. Analysis remains a critical component of a successful strategy, and I am glad to see that the Board is committed to finding the best possible solution to water quality improvement.

I am concerned, however, that the costs associated with enforcing and implementing the permit will have a negative impact on my business and San Diego's economy. The four primary areas of concern include: 1) the strict liability for exceeding water quality objectives; 2) the additional and changing requirements for development projects, impacting items such as storm water retention and discharge; 3) the preemption of WQIPs by new and changing regulatory requirements prior to allowing the WQIPs to be developed and implemented; and 4) the lack of reliable funding sources to implement these regulatory changes.

SheppardMullin

It is necessary to hold individuals, businesses and governments accountable, but it is critical that the accountability measures can be reasonably achieved and are likely to have a significant and positive impact on San Diego's water. Because of these concerns, I respectfully request that the Permit focus on the timely development of effective and enforceable WQIPs, and that each of the WQIPs be developed through a process that ensures public participation. I ask also that the designation of appropriate Best Management Practices in each watershed be determined through the WQIP process rather than the one size fits all strategy currently being proposed in the Permit. I ask further that until the Board adopts a WQIP for a watershed that the provisions of the existing Permit remain in place for that watershed. Finally, in order to avoid unnecessary litigation I request that the Board adopt the WQIPs as Orders implementing the proposed Permit.

I urge you to adopt final permit language that is evidence-based and both environmentally and economically sustainable. Thank you for your consideration. Please contact me if you have any questions.

Very truly yours,

Donna Jones

Donna D. Jones
for SHEPPARD, MULLIN, RICHTER & HAMPTON LLP

SMRH:407690211.1

cc: Leah Hemze

Southern California Gas Company

A Sempra Energy utility®

January 11, 2013

Mr. Wayne Chiu, P.E.
California Regional Water Quality Control Board
San Diego Region
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

VIA E-Mail: wchiu@waterboards.ca.gov

Re: Comment – Tentative Order No. R9-2013-0001, Regional MS4 Permit, Place ID: 786088Wchiu

Dear Mr. Chiu and Board Members:

The Southern California Gas Company (SCG) provides transmission and distribution of natural gas throughout San Diego County and southern Orange County. Delivery of these essential public services requires routine and emergency construction, operation and maintenance of its linear utility infrastructure. A primary mandate to utilities and other entities with linear facilities regulated by the California Public Utilities Commission and/ or other state and federal regulatory agencies is to provide safe and reliable service. The above-referenced draft MS4 permit (draft Permit) would impact SCG facilities in our service territory within Region 9.

Our comments and recommended revisions to specific issues in the draft Permit are provided below.

<u>Non-Storm Water Discharges</u>

There is still confusion in the draft Permit regarding which non-storm water discharges are prohibited and must be eliminated and those discharges that are authorized. The draft Permit both states that it authorizes and prohibits non-storm water discharges but it is not always clear which are authorized and which are prohibited. In multiple locations (e.g. Finding 15), the draft Permit states that non-stormwater discharges into the MS4s must be "effectively prohibited" or eliminated. This section conflicts with other sections (Section II.A.1.b., for example), which state, consistent with EPA's regulations, that non-stormwater discharges authorized by a NPDES permit are authorized to be discharged to the MS4 system. One change that would help to clarify this issue would be to revise Finding 15 as follows:

> **Non-Storm Water and Storm Water Discharges.** Non-storm water discharges from the MS4s are not considered storm water discharges and therefore are not subject to the MEP standard of CWA section 402(p)(3)(B)(iii), which is explicitly for "Municipal … *Stormwater Discharges* (emphasis added)" from the MS4s. Pursuant to CWA 402(p)(3)(B)(ii), non-storm water discharges into the MS4s must be effectively prohibited. ***However, consistent with EPA's regulations, the draft Permit authorizes discharges of non-storm water to MS4s that are either authorized by a separate NPDES permit, or the discharge is a category of non-storm water discharges or flows that must be addressed pursuant to Provisions <u>E.2.a.(1)-(5)</u> of this Order.***

Prohibition of Non-Storm Waters

Section E.2.a.6. would prohibit any category of non-stormwater under Section E.2.a.1-4. if it is found by the co-permittee or the Regional Board to be a source of pollutants to receiving waters. We recommend that this section be revised to also allow the co-permittees to designate different and/ or additional BMPs to be implemented as opposed to prohibiting the category of non-stormwater and suggest the following language:

> If the Copermittee or San Diego Water Board identifies any category of non-storm water discharges listed under Provisions E.2.a.(1)-(4) as a source of pollutants to receiving waters, the category must be prohibited through ordinance, order, or similar means and addressed as an illicit discharge. ***Alternately, the Copermittee can designate different and/ or additional BMPs to be implemented as opposed to prohibiting the category of non-stormwater.***

Building Fire Suppression System Maintenance Discharges

Section E.2.a.5.a.1. would require the co-permittees to treat building fire suppression system maintenance discharges (e.g., sprinkler line testing and flushing) as an illicit discharge. These discharges have historically been allowed under existing MS4 permits and municipal ordinances with the use of appropriate BMPs. These activities are mandated by code and insurance companies and are essential to maintain a safe and reliable fire water delivery system. Changing existing systems to discharge to the sewer may not be feasible and/ or be expensive due to the existing plumbing configurations. These discharges should continue to be authorized with the implementation of appropriate BMPs as determined by the MS4. If existing BMPs are found to be inadequate, different and/ or additional BMPs could be required to be implemented by the MS4.

Discharges to Areas of Special Biological Significance

The draft Permit should clarify that non-storm water discharges (e.g., potable hydrotest dewatering, groundwater dewatering discharges, etc.) made pursuant to NPDES permits to MS4 systems that discharge to Areas of Special Biological Significance (ASBS) are authorized. These types of discharges are critical to on-going infrastructure development, maintenance and operation and the State Water Board's March 2012 "Exceptions to the Ocean Plan for Discharges to Areas of Biological Significance" provides that the NPDES permitting authority can authorize these discharges to ASBS by making an appropriate finding in the applicable MS4 permit. **We urge the RWQCB to include the following language as part of Finding 32:**

> ***"The ASBS exception authorizes the discharge of non-stormwater to a MS4 when an NPDES permitting authority finds that the discharge does not alter natural ocean water quality in the ASBS. Accordingly, the RWQCB finds that since NPDES permits for non-stormwater discharges contain conditions and requirements to protect water quality and many of these permits are for short-term and/ or intermittent discharges (e.g., discharges from utility vaults and underground structures, construction groundwater dewatering, hydrostatic test water discharges, potable water discharges), these discharges will not alter natural ocean water quality and herein authorizes their discharge to MS4 systems that discharge to ASBS."***

Further, the following Sections need to be revised to ensure consistency and support the above finding:

- **Section II.A.1.d.:**

  "Storm water discharges ***and non-stormwater discharges made pursuant to NPDES permits*** from the City of San Diego's MS4 to the San Diego Marine Life Refuge in La Jolla, and the City of Laguna Beach's MS4 to the Heisler Park ASBS are authorized under this Order subject to the Special

Protections contained in Attachment B to State Water Board Resolution No. 2012-0012 applicable to these discharges, included in Attachment A to this Order. All other discharges from the Copermittees' MS4s to ASBS are prohibited."

- **Section 2.I.A.1.e.2.ii**. in Attachment A needs to be revised to reference the above finding:

  "An NPDES permitting authority may authorize non-storm water discharges to an MS4 with a direct discharge to an ASBS only to the extent the NPDES permitting authority finds that the discharge does not alter natural ocean water quality in the ASBS ***(see Permit Finding 32)***."

<u>**Non-stormwater Action Levels**</u>

The draft Permit should not subject non-stormwater discharges made pursuant to NPDES permits to action levels. Section II.C.1. would subject non-stormwater discharges to action levels. However, non-stormwater discharges that have NPDES permits are subject to their own discharge requirements. Setting additional, perhaps conflicting, requirements on these discharges is unnecessary and will lead to confusion. **We therefore urge the RWQCB to revise the draft Permit to clarify that the proposed non-stormwater action levels are not applicable to non-stormwater discharges that have NPDES permits**.

<u>**Development Planning**</u>

The draft Permit should not subject linear underground/ overhead (utility) projects (or LUPs) to permanent post-construction requirements. Section E.3. requires permanent BMPs for all development projects. LUP construction projects are regulated pursuant to the State Water Board's Stormwater Construction General Permit (CGP). Finding 76 in the CGP specifically excludes LUPs from permanent post-construction requirements due the nature of their construction. For consistency with the CGP, the draft Permit needs to clarify that Section E.3. is not applicable to LUPs as defined in the CGP. **We urge the RWQCB to make the following revisions:**

- **Finding 10**

  Pollutants Generated by Land Development. Land development has created and continues to create new sources of non-storm water discharges and pollutants in storm water discharges as human population density increases. This brings higher levels of car emissions, car maintenance wastes, municipal sewage, pesticides, household hazardous wastes, pet wastes, and trash. Pollutants from these sources are dumped or washed off the surface by non-storm water or storm water flows into and from the MS4s. When development converts natural vegetated pervious ground cover to impervious surfaces such as paved highways, streets, rooftops, and parking lots, the natural absorption and infiltration abilities of the land are lost. Therefore, runoff leaving a developed area without BMPs that can maintain pre-development conditions will contain greater pollutant loads and have significantly greater runoff volume, velocity, and peak flow rate than pre-development runoff from the same area. ***The nature of linear underground/ overhead projects (LUPs) is to return project sites to pre-construction conditions. Therefore, consistent with Finding 76 in the SWRCB's Storm Water Construction General Permit[1], LUPs are not subject to post-construction requirements.***

  [1] Order 2009-0009-DWQ, as amended by Orders 2010-0014-DWQ and 2012-0006-DWQ, contains the definition of Linear Underground/ Overhead Projects.

- **Definition of "Development Project"**

  "**Development Projects** - Construction, rehabilitation, redevelopment, or reconstruction of any public or private residential project, industrial, commercial, or any other projects. ***Development Projects do not include linear underground/ overhead projects as defined in the SWRCB Storm Water Construction General Permit (Order 2009-0009-DWQ, as amended by Orders 2010-0014-DWQ and 2012-0006-DWQ).***

The enclosed comments are in reference to the language found in the draft Permit. We request that these revisions also be made to the draft Permit's Fact Sheet/Technical Report.

Thank you for this opportunity to provide you with our comments. Please call Dianne Franks at 213-215-7583 if you have any questions concerning this letter.

Sincerely,

Crystal Yancey-York

Crystal Yancey-York
Environmental Programs Manager

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Via e-mail to *wchiu@waterboards.ca.gov* January 11, 2013

Wayne Chiu
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100

San Diego, CA 92123-4340

RE: Comments on Tentative Order Number: R9-2013-0001

The South Laguna Civic Association, established in 1946, supports comments and recommendations submitted September 14, 2012 by the "Environmental Groups" regarding the administrative draft of the San Diego Regional Municipal Separate Storm Sewer System (MS4) Permit, Tentative Order No. R9-2013-0001 ("Administrative Draft Permit").

While a regional permit can provide improved levels of efficiency, smaller, high value habitats and coastal receiving waters established as critical marine life recovery areas may be overlooked. The Aliso Watershed in south Orange County represents an area requiring closer consideration.

Aliso Creek discharges 1 to 5 million gallons per day of dry weather urban runoff from known inland MS4 point sources. Twenty years of monitoring reports and over $20 million have clearly identified at least one dozen offending storm drains with daily dry weather flows exceeding 150,000 gallons per day (GPD). Only one storm drain in Laguna Niguel has received a Clean-up and Abatement Order during this period.

As recently as 1982, surveys of Aliso Creek indicated no flows throughout the dry season. In fact, early ranching of Aliso Canyon with subsequent destruction of critical native trees and vegetation led to long drought conditions and widespread, fatal dehydration of cattle.

Today, the primary source of elevated creek flows originates exclusively from inland over-irrigation and careless discharges of recycled water. Non-native creek flows transport a toxic variety of pollutants and carcinogens from residential, commercial and municipal known point sources with measurable quantities of herbicide, pesticide, fertilizer, automotive and similar residues to protected creek, estuary and coastal receiving waters. Aliso Beach is permanently posted for contaminated water and remains a risk to public health and safety.
(Please see Exhibit A – 2011 Aliso Creek Daily Flow/e.g., August 1, 2011 @ 7.6cfs = 4.9 MGD)

Economics of Water Pollution

Water Districts profit significantly from the sales of recycled water yet fail to be held accountable by the SDRWQCB for illicit discharges generated specifically by careless over-irrigation. Over-irrigation produces hundreds of thousands of dollars in excess revenues each year to inland Water Districts that persistently ignore the impact of their product water. Profiting from water pollution discharges to protected receiving waters is illegal as adjudicated by Friends of the Earth v Laidlaw (2000) and other statutes and regulations.

"District Court found that Laidlaw had gained a total economic benefit of $1,092,581 as a result of its extended period of noncompliance with the permit's mercury discharge limit; nevertheless, the court concluded that a civil penalty of $405,800 was appropriate. In particular, the District Court found that the judgment's "total deterrent effect" would be adequate to forestall future violations…" (Friends of Earth, Inc. v. Laidlaw Environmental Services (TOC), Inc. - 528 U.S. 167 (1999)

In the Aliso Watershed, recycled water sold for irrigation and over watering produces an average creek discharge flow of 3 MGD during the nine month dry season. Sold at $1000 per Acre Foot (AF), this irrigation product water yields revenues to inland Water Districts of over $10 million during the five year MS4 Permit cycle. (calculation: 3 MGD = 9 AF x $1000/AF x 300 days = $ 2.7/year x 5 year permit cycle = $10 mil+).

Lacking effective enforcement measures by the SDRWQCB, these excessive and illegal profits encourage increased sales of irrigation water without any accountability for the obvious impacts of water products to protected creek and coastal receiving waters. The Irvine Ranch Water District, El Toro Water District, Santa Margarita Water District and Moulton Niguel Water District must not be allowed to profit from water pollution.

Persistent violations of MS4 requirements are acknowledged by all parties yet the SDRWQCB refuses to invoke effective enforcement measures and fines. Without economic disincentives, offending Water Districts gain illegal profits while inland cities accumulate tax property revenues from poorly engineered development projects. Citations against the more egregious offending storm drain dischargers can release funds for effective mitigation measures and support incentives for regional MS4 compliance.

Environmentally Sensitive Areas (ESA)

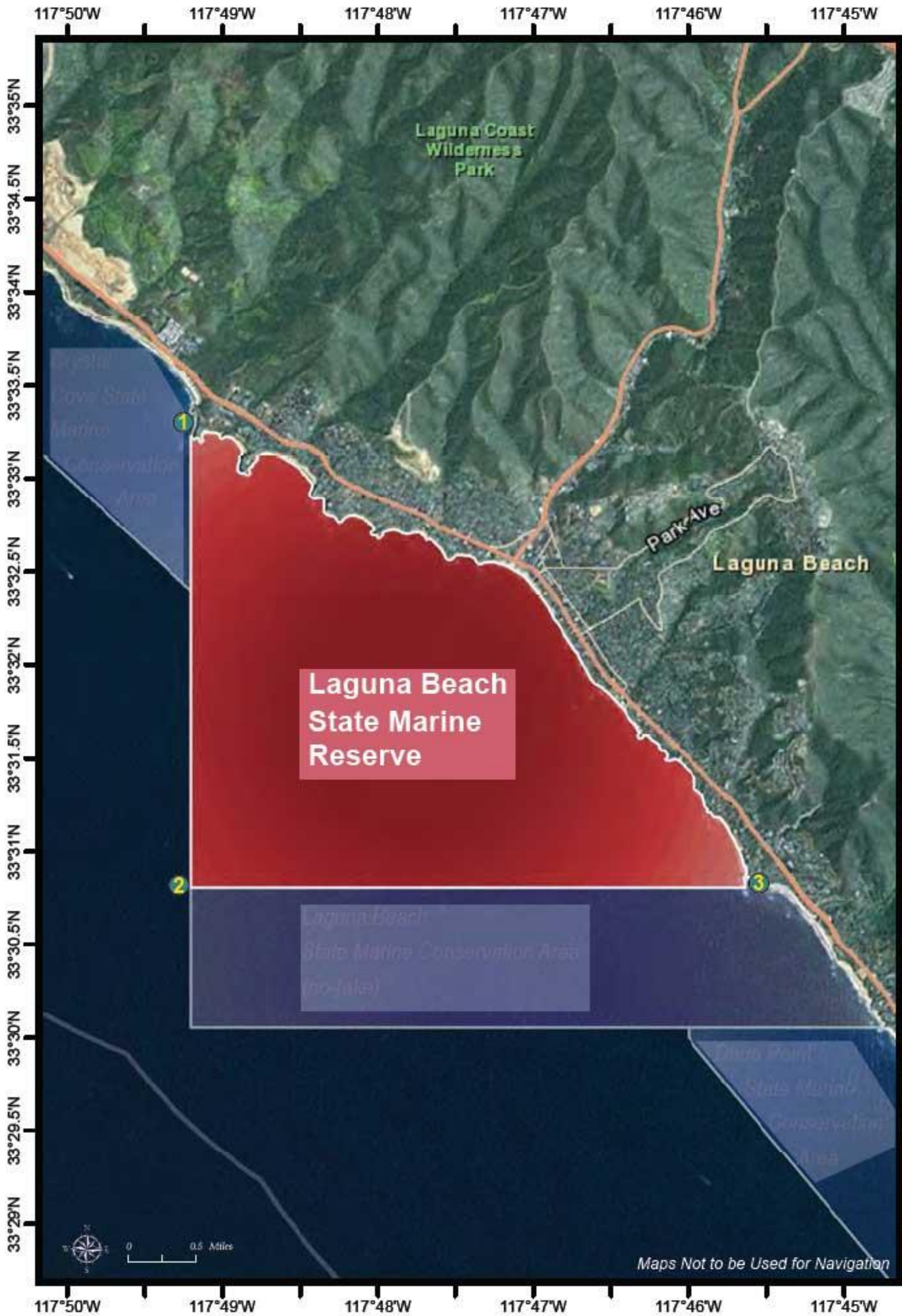
The Aliso Watershed is a compact 34 square mile area suffering decades of neglect and pollution originating from poorly engineered residential developments among inland cities. Plans to add 17,000 new houses to South Orange County in the coming years will exacerbate the water pollution crisis facing Laguna Beach. Runoff management plans fail to control dry weather urban runoff and knowingly contribute directly to increased flows and erosion during routine storm events.

The Aliso Creek Wilderness Park remains degraded from erosion impacts to streambed habitat and threatens to expose critical sewage infrastructure transporting 10 to 15 million gallons of secondary sewage to the Aliso Creek Ocean Outfall only 1.2 miles offshore. A recent study by TetraTech for the South Orange County Wastewater Authority (SOCWA) determined the integrity of creek infrastructure to be capable of failure in as little as 5 years. Coastal receiving waters at the mouth of Aliso Creek are impaired by polluted urban runoff flowing at 1 to 5 million gallons per day (GPD). Aliso Creek is listed as a 303(d) Impaired Water Body by the Clean Water Act and continues to fail to meet present and previous MS4 Permit requirements. (Exhibit B – Aliso Creek Watershed 303(d) Impaired Waterbodies)

All Co-Permitees, as signatories to the MS4 Permit, are legally responsible for water quality in terms of coastal receiving waters. The regulatory and legal nexus is clear between unpermitted discharges by inland Co-Permitees, creek erosion and infrastructure damage, ocean pollution and public health hazards associated with these contaminated daily flows.

Aliso Beach, at the mouth of the federally listed contaminated creek, is permanently posted. However, coastal receiving waters are protected as the Laguna Beach State Marine Conservation Area established unanimously by the California Fish & Game Commission on January 1, 2012.

Laguna Beach State Marine Reserve



The proposed MS4 Permit does not adequately address efficacious measures to protect creek and coastal receiving waters while allowing contaminated discharges to persist without adequate enforcement actions. Lacking meaningful enforcement actions, inland cities as Co-Permitees, persist in ignoring or circumventing water quality regulations with impunity while creek and coastal receiving waters and ESA habitats continue to be incrementally degraded by polluted dry weather flows. Damage to coastal habitats is cumulative and potentially expensive in terms of restoration.

Likewise, failed Best Management Practices (BMP) stormwater facilities required as a Condition of Approval for inland residential, industrial and municipal developments are inadequately engineered devices incapable of mitigating elevated flows from stormwater events directed to creek and coastal receiving waters. The cumulative impacts of contaminated dry weather discharges and elevated stormwater flows have destroyed the functions of the Aliso Estuary (a protected coastal wetland), tidepools, fish nurseries and local kelp forests.

Shellfish areas in California receive the highest water quality protection standards. The economic value of shellfish to the economy is well established and place names such as Abalone Point, Mussel Cove, Shellfish Beach, etc. along Laguna Beach's coastal receiving waters suggests the prominence of shellfish habitat in the local area. Routine underwater surveys of mussel grounds near the mouth of Aliso Creek reveal large areas of dead shellfish likely exposed to the urban runoff plume. Dry weather discharges and elevated stormwater flows to Laguna Beach's coastal receiving waters are incompatible with protection of ESA Shellfish habitat and should be vigorously regulated and prohibited in the proposed MS4 Permit.

Laguna's coastal receiving waters are prime foraging grounds for protected marine life including coastal dolphins, gray whales and blue whales.

Safari/Marc Carpenter, via Associated Press

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A blue whale surfacing at 1000 Steps, South Laguna

The California Coastal Act is specific in protecting the health and welfare of marine mammals among other species. Therefore, the proposed MS4 Permit must address water quality inconsistencies among regulating agencies.

1. California Coastal Act, Article 4, Section 30230. Recent summer sightings of federally protected Blue Fin Whales feeding at the location of the Aliso Ocean Outfall suggest the need for compliance with the Coastal Act. The unseasonal presence of marine mammals feeding on krill indicates the presence of phytoplankton populations sustained by nutrient rich urban runoff and offshore sewage discharge plumes migrating to surface waters. New research also highlights the presence of hormonal endocrine disruptors in recycled water and sewage discharges as a contributing factor in the feminization of male fish.

2. California Coastal Act, Article 4, Section 30231. The SDRWQCB overlooks requirements for "the biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams."

3. Water Reuse Law, Water Code Sections 461-465 and Water Reclamation Law, Water Code Sections 13500-13556 requiring beneficial reuse of inland water product to implement recycled water throughout Laguna Beach in achieving a State mandated 20% reduction in imported water by 2020.

The recent Army Corp of Engineers Study Area Map recognizes the relationship of MS4 regulated areas by incorporating the coastal receiving waters for lower Aliso Creek project considerations. No similar map or chart is available to track and monitor regulated coastal receiving waters subjected to the contaminated urban runoff "freshwater lens".

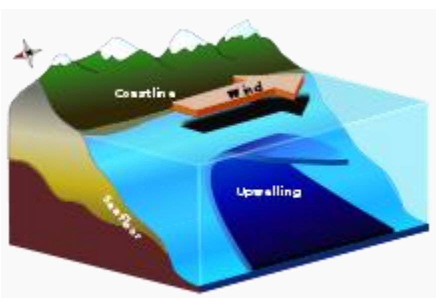
U.S. Army Corps of Engineers
Aliso Creek Ecosystem Restoration Study
USGS Topographic Map

Figure 2.1-1

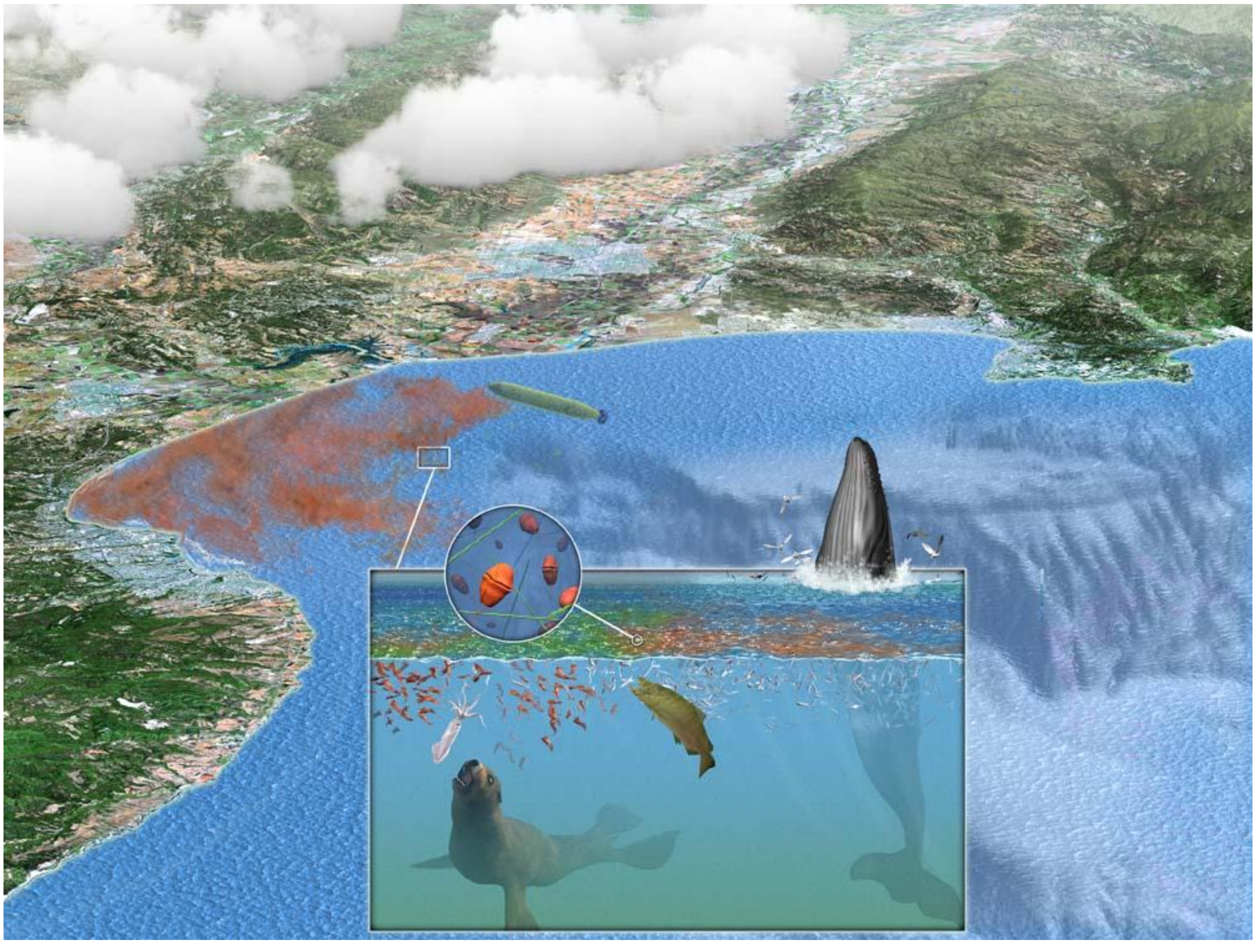
Urban Runoff, Secondary Sewage Discharges & Ocean Upwelling

Coastal receiving waters at the mouth of Aliso Creek are protected as the Laguna State Marine Conservation Area (SMCA). These important tidepool, rocky shore and kelp forest habitats, however, are subjected to multiple water pollution impacts from the combined urban creek urban runoff plume and Aliso Creek Ocean Outfall.

Ocean upwelling transports contaminates from the offshore sewage discharges to shore and mix with the visible creek urban runoff freshwater plume. Harmful algae blooms fed by these "nutrient rich" discharges plague coastal receiving waters and contribute to the destruction of kelp forests and shoreline fish nurseries. Beach visitors, often from regional low-income disadvantaged communities, suffer exposure to severe public health threats.



Multiple requests to South Coast Wastewater Authority for a comprehensive interactive map of the Aliso Creek coastal discharge plume and the Aliso Creek Ocean Outfall Plume are routinely ignored. An accurate map will identify protected coastal receiving water resources including tidepools, rocky fish nurseries and shellfish habitats, kelp forests, dolphin birthing and foraging grounds, as well as near shore whale migration routes. Charting dominant littoral currents and counter currents will reveal distribution patterns of urban runoff induced Harmful Algae Blooms and thermal plumes. Lacking such basic information, assurances of safe ocean water quality are presented without a fundamental scientific understanding of coastal dynamics.



Dry weather urban runoff plumes to Laguna's coastal receiving waters feed summer-long Harmful Algae Blooms (HABs) contributing to domoic acid poisoning of sea lions, whales, shellfish and fishing resources.

Hydromodification

The rapid regional development of residential tracts over the past few decades has been accomplished using grading techniques to create long, flat terraced building sites. In an effort to simplify construction on flat sites, natural contours are replaced with cut and fill earthworks removing natural top soils before paving over hydric substrates and native deep root vegetation. These practices expose expansive clay soils.

Developers avoid expensive deep caissons to bedrock or multiple dewatering wells and simply pour concrete pads over unstable clay substrate. City leaders seeking increased tax revenues and development fees utilize engineers unfamiliar with local clay soils and the semi-arid ecology to approve massive grading plans that ultimately fail.

Unsuspecting homeowners subsequently experience extensive expansion and contraction of clay subsoils following annual storm events. As foundations fail, water supply lines, sewage lines and related infrastructure become compromised requiring expensive repairs. By this time, however, developers have either moved or filed for bankruptcy protection leaving thousands of present homeowners without remediation opportunities. Engineers, city planners and elected officials, while complicit, are not held accountable through enforcement by the SDRWQCB. Poorly engineered residential developments with substandard clay soils continue to be approved to aggravate the condition and burden taxpayers for expensive repairs.

The Aliso Watershed is a clear example of faulty hydromodification design. Beginning with the construction of the federal Chet Holfield Ziggerat Complex, large areas of the native creek with valuable hydric soils were paved over for massive parking lots. The channelized creek lost critical inland wetlands and groundwater percolation sites with the removal of over 1500 feet of the creek ox bow. This wetland site historically provided water, fish and double canopy vegetative cover for the early "Nigueli"... the name of a Juaneno Native American village once located near a lagoon along Aliso Creek. The City of Laguna Niguel derives its name from the Spanish designation of this critical creek ox bow area.

Systematic destruction of vast native watershed trees and vegetation to support early ranching activities continue to plague the effectiveness of this and many watersheds in the San Diego region. Developers and complacent city planners exploiting degraded ranchlands simply continue the “biodegradation” while avoiding the true costs to the environment and taxpayers for their profiteering urbanization schemes. Facing unrelenting pressure from developers, water districts and municipalities, regulatory agencies charged with protecting critical creek and coastal receiving waters, fail to invoke effective enforcement with measurable water quality benefits.

Recommended Actions

Poorly engineered projects can be re-engineered to achieve mandated water quality objectives.

1. Maps of all creek and coastal receiving waters indicating water quality impacts can be created by SCCWRP, Scripps, NOAA or any number of competent university or regulatory groups. A Bioregional Watershed Map will identify degraded land elements, offending storm drain outlets and candidate areas for re-forestation and estuarine/coastal restoration.

2. On an annual basis, citations against the primary six known storm drain point sources in each watershed can incrementally compel clean-up and abatement throughout a given watershed bioregion without the burden of costs to abate all points of contamination at once. Failed Best Management Practices (BMPs) urban runoff facilities, required as a Condition of Approval for inland residential developments, can be retrofitted with dry weather diversions to local Publically Owned Treatment Works (POTWs) or, alternatively, re-engineered with deep groundwater injection wells.

3. Fines must be allocated to re-vegetate impaired watersheds and kelp forests to restore the native functions of semi-arid creeks and protected coastal receiving waters. A re-forested Aliso Canyon with a canopy similar to San Mateo Creek will qualify for California Cap and Trade

funding to offset costs. Restoration of natural habitats is demonstrated to be the best, most cost effective measure for improving watershed water quality.

4. Restoration of high value coastal wetlands and estuaries will guarantee protection of natural beach sand berms and provide measurable improvement to coastal receiving waters. Funds from the California Coastal Conservancy and other wetland recovery resources can offset costs.

5. Watershed restoration will offer multiple community benefits by reducing destructive stormwater flows, eliminating pollutants and increasing eco-tourist revenues to surrounding cities. Large street cisterns incorporating designs proposed by GeoSynTech for the re-development of the Aliso Golf Course can serve as a model for extensive rainwater harvest/reuse systems. Restoration of some or all of the 1500 foot Aliso Creek Ox Bow in Laguna Niguel can restore hydric soils to reduce stormwater impacts.

6. Increased use of recycled water for wildland fire suppression along the entire Highway 73 Toll Road bisecting the Laguna Greenbelt will maintain a healthy, fire safe wilderness area. Orange County Measure M and State Proposition funds are available to offset costs. Increased use of recycled water reduces ocean discharges to the Laguna State Marine Conservation Area.

7. A citywide network of recycled water for all of Laguna Beach will reduce imported water demand significantly and increase water security, disaster preparedness and fire suppression resources. Revenues from routine use for irrigation mandated Fuel Modification Zones will provide new revenue streams. Laguna Beach is the only Orange County city without a comprehensive recycled water program and remains a "once use" community of valuable imported water.

The MS4 Permit Renewal process offers the opportunity to advance beyond failed measures and begin the renewal of the region's unique watershed and coastal ecology. All Stakeholders can benefit through proactive initiatives and, as the overall watershed ecology improves, the cost savings from stormwater damage, water pollution, protracted litigation and public health threats will become evident. The South Laguna Civic Association has offered constructive, critical information and suggestions during the previous MS4 Permit cycle which have been largely ignored to the public's detriment.
(Exhibit C – SLCA Comments on Tentative Order No. R9-2007-0002 NPDES, No. CAS0108740)

Cooperation and courage are essential and the South Laguna Civic Association remains committed to working towards real, measurable, sustainable solutions. On behalf of our community and the many visitors from throughout the world to our shores, we thank you for your review and support of our recommended actions.

Michael Beanan

Vice President
South Laguna Civic Association

mike@southlaguna.org

Attachments

Exhibit A - Daily Mean Discharge in Cubic Feet/Second - Water Year Jul 2011 to Jan 30, 2012
Exhibit B - Aliso Creek Watershed 303(d) Impaired Waterbodies)
Exhibit C – SLCA Comments to Tentative Order No. R9-2007-0002 NPDES, No. CAS0108740

Exhibit A - Daily Mean Discharge in Cubic Feet/Second Water Year Jul 2011 to Jan 30, 2012

Day	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
1	5.5	7.6	5.7	4.9	4.9	4.9	5.6		
2	5.4	6.3	5.6	4.6	4.8	4.8	5.6		
3	5.3	5.6	5.6	4.6	4.8	5.2	5.7		
4	5.8	5.4	5.5	12	26	4.9	5.6		
5	5.8	5.4	5.9	145	13	5	5.9		
6	5.5	5.4	6	28	20	5.4	5.8		
7	5.4	5.5	5.6	10	11	5.7	5.7		
8	5.5	5.4	5.4	6.9	6.9	6	7.1		
9	5.8	5.7	5.4	5.8	5.7	6.5	6		
10	5.7	5.6	8.4	5.3	5.2	5.9	5.6		
11	5.7	6	7.8	5	5.1	5.7	5.7		
12	5.8	5.8	7.1	5	36	22	5.7		
13	5.7	5.8	5.7	5.1	18	16	5.8		
14	5.8	5.7	5.2	5.1	8.7	8	5.4		
15	6	5.6	5.2	4.9	6.3	38	5.5		
16	5.9	5.7	5.1	4.9	5.5	18	19		
17	5.9	5.7	5.4	5	5.3	8.2	7.4		
18	5.9	5.4	5.3	5.3	5.2	6.9	6.1		
19	5.9	5.7	5.1	5.4	5.1	6.3	5.7		
20	5.8	5.7	5.1	5.4	86	6.4	5.5		

21	5.8	5.6	5	5.6	36	6		69	
22	6	5.6	5	5.3	10	5.5		16	
23	5.9	5.8	5.1	5.5	7.2	5.4		56	
24	5.9	5.8	5.1	5.5	6.1	5.5		19	
25	6	5.7	5.1	5.6	5.6	5.5		9.2	
26	5.6	5.8	5.1	5.3	5.4	5.7		7.3	
27	5.6	5.6	5.2	4.9	5.3	5.8		6.6	
28	5.7	5.6	5	4.9	5	5.7		6.1	
29	5.9	5.6	5	4.7	5.1	5.5		5.9	
30	5.7	5.8	5	4.7	5.1	5.7		------	
							------	------	---
31	8.9	5.8	------	4.8	------	5.9		---	

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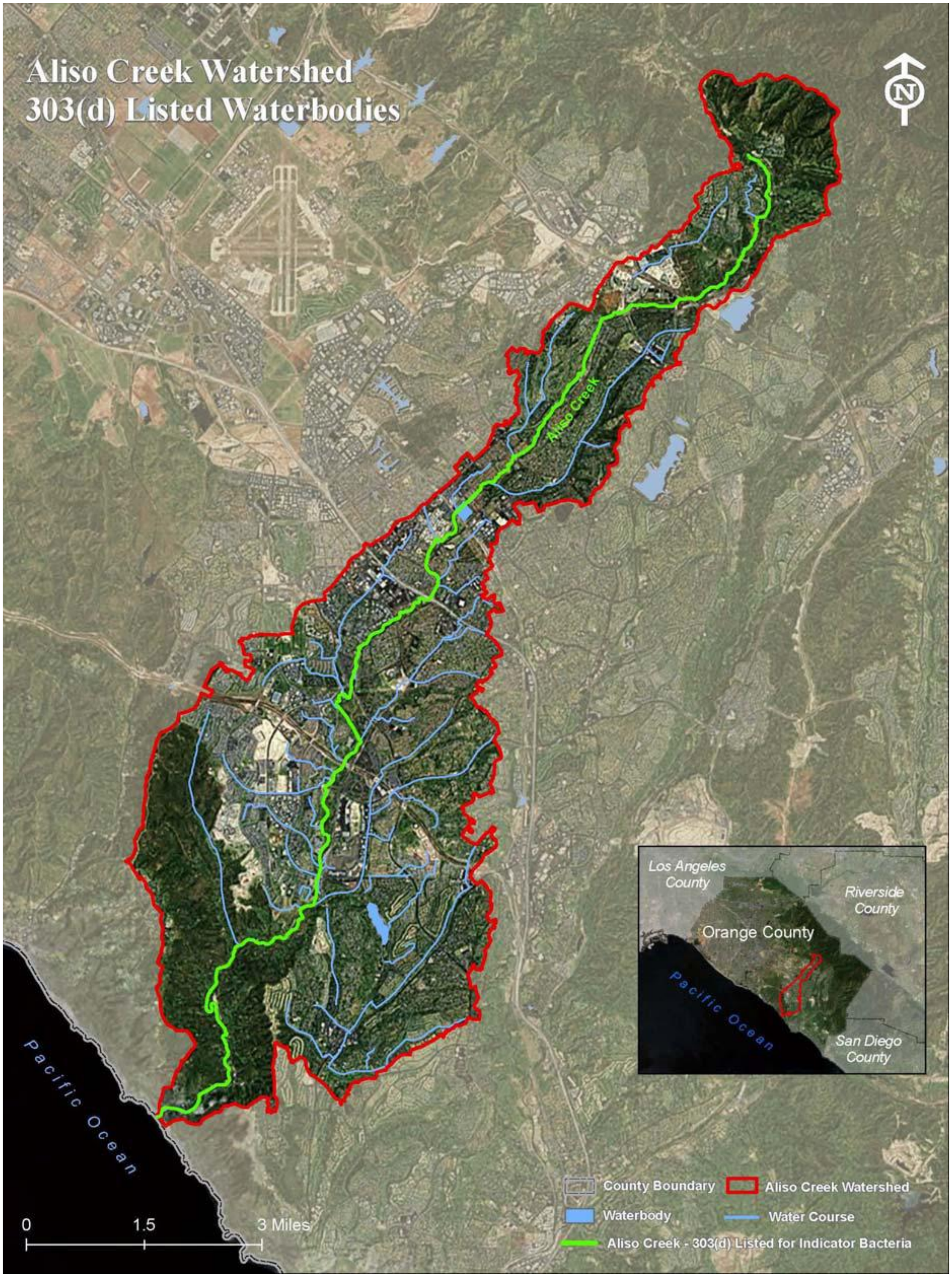

Exhibit C - SLCA Comments to 2007 MS4 Permit

Jeremy Haas April 11, 2007
California Regional Water Quality Control Board
San Diego Region 9
9174 Sky Park Court, Suite 100
San Diego, CA 92123
RE: Tentative Order No. R9-2007-0002 NPDES, No. CAS0108740

The members of the community of South Laguna represented by the South Laguna Civic Association, established in 1946, recognizes urban runoff from dry weather flows continues to be discharged through regional storm drain systems permitted exclusively to convey rain water.

The proposed SDRWQCB Tentative Order No. R9-2007-0002 knowingly, willfully and intentionally perpetuates a threat to health and safety while contributing to degradation of local creek and coastal water resources by allowing MS4 storm drain systems to transport polluted water originating from the imported water supply industry.

Dry weather flow rates in the subject watershed presently exceed all previous flow rates and are recognized as the principle source of nutrient loading and ocean pollution. Chemical fingerprinting analysis of urban runoff by the Santa Margarita Water District attributes the source of 60% to 90% of urban runoff dry weather flows as originating from imported water sources in either Northern California or Colorado. Dry weather flows to storm drains are from anthropogenic influences rather than natural storm events.

Seminal research by the University of Southern California and others concludes urban runoff is responsible for feeding prolonged, destructive algae blooms along the Southern California Bight. In conveying inland sources of fertilizer and phosphates nutrients, dry weather urban runoff estimated at 5,000,000 gallons per day in the Aliso Watershed alone is causing increased outbreaks of domoic acid poisoning and deaths among sea mammals in Laguna Beach. The SDRWQCB fails to take into consideration impacts of uncontrolled dry season urban runoff on the health and welfare of coastal receiving waters. In spite of repeated requests, the SDRWQCB and Co-Permitees to not incorporate the urban runoff ocean plume into the watershed mapping procedure rendering decision making ineffective and monitoring activities scientifically incomplete.

As indicated in Staff Reports, the SDRWQCB, South Orange County Wastewater Authority (SOCWA), inland cities and County Co-Permitees continue to fail to Cleanup and Abate contaminated dry weather urban runoff flows and thereby violate key statues of the Porter-Cologne Act and Clean Water Act.
In allowing the County and City Co-Permitees to continue to discharge polluted urban runoff water flows, the members of the SLCA and the general public are denied access to safe, unpolluted coastal recreational opportunities while exposing them to known respiratory and digestive illnesses. The incremental and cumulative discharge from Aliso Watershed storm drains also knowingly and willfully contributes to potential health risks from consuming local fish.

Likewise, potential private property values are threatened by disclosures during real estate transactions of public health hazards emanating from polluted coastal waters.

Residences at the mouth of Aliso Creek are permanently damaged by summer urban runoff from erosion and stagnant ponds. Damage from urban runoff pollution to critical kelp habitats and marine mammals characteristic of South Laguna Marine Reserve off of Aliso Beach are well documented in the scientific literature.

The Aliso Watershed has more than 64 storm drains with elevated fecal coliform levels and excessive flow rates. The inability of the SDRWQCB over the past 20 years to control illegal dry weather discharges suggests a pattern of failed interventions portending a dangerous precedent of chronic future water pollution to the community of South Laguna with a population of 5,000 residents and the general beach visiting public.

The South Laguna Civic Association (SLCA) seeks a thorough review of the laws, regulations and facts pertaining to mismanagement of the subject MS4 Storm Drain Permit. Verifiable action capable of significant reductions in dry weather flow rates must be implemented. Numerical flow rate reduction, specific performance benchmark deadlines and significant penalties for non-compliance must be incorporated into any credible permitting process. Interception of urban runoff flows at known inland point sources is technologically feasible through deployment of approved Best Available Control Technologies presently used by the development, military and oil industries. If necessary, a watershed Cleanup and Abatement Order can accelerate permitting and fast track measures until such time full compliance is achieved.

Failure to mitigate or comply requires the SDRWQCB to be directed to California Water Code Section 13304(a) and following to seek an injunction against the County and offending cities or perform the work itself. Concurrent with the present evaluation of Tentative Order No. R9-2007-0002, the SLCA seeks emergency action due to significant, immediate and potential harm from known health risks associated with dry weather urban runoff conveying elevated levels of fecal coliform and other contaminates to South Laguna since:

1. Substantial harm to the community of South Laguna will continue to occur this summer from exposure to dry-weather flows of contaminated urban runoff in the subject watershed. The approval of a systematically flawed MS4 Storm Drain Program will establish a dangerous precedent in the Aliso Creek Watershed and other impaired watersheds in the State of California to the detriment of South Laguna’s public health and safety as well as the protection of natural resources.

2. Neither the inland cities, County, SDRWQCB, SOCWA nor public will incur substantial harm from issuance of a comprehensive dry weather storm drain management program. The South Laguna Civic Association, in fact, will benefit from incremental reduction of contaminated flows from inland storm drains into creek and coastal receiving waters. Establishing a pattern of enforcement and full compliance with cleanup and abatement laws will initiate additional timely actions by the SDRWQCB to improve water quality in the Aliso Watershed and elsewhere. Costs associated with a comprehensive program to control dry weather flows can be minimized by fines, deployment of cost saving water conservation measures and revenues generated from beneficial reuse opportunities of 5 million gallons of urban runoff per day in the Aliso Watershed.

3. As indicated in this and other communications, substantial questions of fact and law are associated with the proposed Tentative Order No. R9-2007- 0002. The fact remains that immediate compliance and cessation of dry weather urban runoff is technologically and economically feasible as demonstrated by earlier diversions to the Moulton Niguel Water District's sewer treatment facility and, later, short term operation of mobilized urban runoff filtration units.

The narrative below cites a number of laws pertaining to enforcement of Cleanup and Abatement Orders (California Water Code Section 13304); the SWRCB Water Quality Enforcement Policy (February 19, 2002; pages 3,4,11,26, 39,42); regulations and policies governing Environmental Justice (Government Code Section 65040.12 and Public Resources Code Section 72000).

The County and City Co-Permitees concede their failure to Cleanup and Abate elevated levels of fecal coliform and increased urban runoff flow rates in the Aliso Watershed. The SDRWQCB does not comply with California Water Code Section 13304. Indeed, during the past 20 years, the Regional Board has failed to effectively intervene.

California Water Code Section 213300-13308, Chapter 5, provides the SDRWQCB Enforcement authority to issue a Cleanup and Abatement Order to remedy dry weather urban runoff.

Section 13304(a) "Upon failure of any person to comply with a cleanup and abatement order, the attorney general, at the request of the board, shall petition the Superior Court of the County for an issuance of an injunction requiring the person to comply with the order."

The SDRWQCB unwillingness to enforce compliance also violates Section 13304 (1)(b);(2)(a), (c), (e) to expend available money themselves to perform cleanup, abatement or remedial work; to intervene to perform the work itself; recover costs for cleanup and abatement work; and protect or prevent threatened probability of harm to persons, property or natural resources.

It is again worth noting, temporary compliance was achieved in 2003 utilizing mobilized water filtration units recognized among Best Management Practices (BMP). During its brief period of operation, the above BMP treated over 14 million gallons at JO3PO2 to reduce fecal coliform from 10,000 cfu's to less than 1. The SDRWQCB, SOCWA, Moulton Niguel Water District, City of Laguna Niguel and County dischargers arbitrarily elected to terminate this effective technology to experiment with low cost constructed wetlands, which ultimately failed to reach compliance levels for fecal coliform at the JO3PO2 outlet and took no effort to remove flows originating from abandoned imported water sources.

The SWRCB Water Quality Enforcement Policy (February 19, 2002; pages 3,4,11,26, 39,42) specifically directs the Regional Board to take action against the following:

- Any knowing, willful, or intentional violation of the (Porter Cologne Act)
- Any violation of (the Porter Cologne Act) that enables the violator to benefit economically from noncompliance, either by realizing reduced costs or by gaining a competitive edge advantage.
- Any violation that is a chronic violation or that is committed by a recalcitrant violator.
- Any violation that cannot be corrected in 30 days.

The SDRWQCB has taken no action pursuant to the above policies while proceeding to accommodate City and County Co-Permitees, Water Districts, SOCWA and developers at the expense of and detriment to the members of the SLCA and the general public.

Section 13350(m) of the Porter-Cologne Clean Water Act defines nuisance as anything which meets all of the following requirements:

1. Is injurious to health, or is indecent of offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life and property.

2. Affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal.

3. Occurs during, or as a result of, the treatment or disposal of wastes.

Dry weather urban runoff meets and exceeds the legal definition of "nuisance" by virtue of it's widespread impacts to water quality variables. "Waste" refers to "waste water" knowingly and willfully generated by imported and reclaimed water sold at reduced rates that ignore significant post-irrigation dry weather urban runoff impacts.

Members of the South Laguna Civic Association are at particular risk of injurious health from frequent exposure to pollution in Aliso Creek and recreational coastal water activities. Such threats and illnesses create an obstruction to the free use of public property at local County parks, protect State Marine Reserves and beaches to thereby interfere with the comfortable enjoyment of life and property.
The extent of annoyance and damage is unequal with increasing harm to individuals such as swimmers, surfers, SCUBA divers, etc. with more frequent contact to polluted creek and ocean waters according to recent studies by the University of California, Irvine. Young children playing long hours at the beach and pregnant women are particularly high-risk populations.

The casual relationship occurring with the discharge of contaminated urban runoff wastewater with elevated fecal coliform levels is well established in scientific and medical literature as to impose a viable threat to the community of South Laguna. Government Code Section 65040.12 and Public Resources Code Section 72000 states:

"…the fair treatment of people of all races, cultures and income with respect to the development, adoption, implementation and enforcement of environmental laws, regulations and policies"

The proposed Tentative Order No. R9-2007-0002 is discriminatory and violates the State of California's definition of Environmental Justice.

As previously noted, the community of South Laguna and visitors to the Aliso Creek Watershed and Aliso Creek County Beach have entreated the SDRWQCB for decades for relief from polluted urban runoff flows resulting from the non-regulation or enforcement of the County/City's chronic storm drain discharges of dry season urban runoff. Local low income and working class residents have suffered damages to health, safety and liberty in their access to Aliso Creek and the Pacific Ocean.

Despite the obvious tangible and verifiable nature of these damages, South Laguna and the general public have yet to receive any effective regulatory assistance either from the State or Regional Water Boards. This failure to provide relief is not due to any lack of knowledge or information. The SDRWQCB has repeatedly and extensively investigated the mechanism by which storm drains physically convey fecal coliform bacteria and other contaminants downstream into the Aliso/Woods Canyon Regional Wilderness Park, South Laguna and the Aliso Creek County Beach. There remains no doubt that the City/County dry weather storm drain discharges are the cause of summer beach and ocean pollution.

Despite this clear and present causal relationship, the SDRWQCB and Staff have denied pleas from the public for remedial action in the form of abatement of nonseasonal storm drain urban runoff, beneficial reuse for sustainable treatment projects, water conservation and immediate temporary mobilized emergency capture/treatment options common among petrochemical, agribusiness and development economic sectors. In addition, the SDRWCB has not supplied a contingency emergency plan to protect our community and the public from current and summer dry weather MS4 storm drain discharges.

Instead, the Regional Board has relied on promulgating more general directives and future contamination tables, which may or may not be effective in abating polluted urban runoff. The proposed Tentative Order No. R9-2007-0002 is to accommodate the failures of inland Water Districts, SOCWA, Cities and County at the expense of the community, public and ocean ecology.

The SDRWQCB action when combined with the Staff and City/County history of ineffective action towards the residents and visitors of South Laguna, have the cumulative effect of giving second class status to the physical health and safety needs of the public in the Aliso Watershed. Thus any action by the Regional Board to approve the use of MS4 Storm Drain System to knowingly convey dry weather urban runoff flows is discriminatory and violates the State of California’s definition of Environmental Justice.

Conclusion

The general regulations, requirements and studies pertaining to the Aliso Creek Watershed and associated MS4 Storm Drain System are clearly not effective in controlling water pollution or the effects of artificially elevated flow rates during the area’s annual ten month dry season.

More than twenty years and $20 million dedicated to achieve compliance in a relatively small, compact 34 square miles residential development watershed is an enormous investment and, ultimately, waste of taxpayer revenues. The failure to achieve compliance represents a lost opportunity to demonstrate effective interventions to protect communities like South Laguna from polluted urban runoff and sends a message to the public that urban runoff pollution cannot be controlled.

Despite the various failed efforts over two decades, the fact remains numerous State laws are being violated by the SDRWCB for allowing the discharge of dry weather flows with elevated fecal coliform and related contaminate levels to continue to pollute daily the protected receiving waters of Aliso Creek and the Pacific Ocean. By this communication, the SLCA reserves the right to appeal any unfavorable decision perpetuating dry season urban runoff flows to Aliso Beach, South Laguna to the SWRCB and State Attorney General for timely relief.

The South Laguna Civic Association appreciates the efforts by the San Diego Regional Water Quality Control Board to consider the enormous impacts of uncontrolled dry weather urban runoff pollution before approving a genuinely effective Storm Drain Permit Program for the Aliso Watershed.

Respectfully submitted,

Michael Beanan, Director
South Laguna Civic Association
PO Box 9668
South Laguna, California, 92651

From: Colin F. MacKinnon
To: Chiu, Wayne@Waterboards
Subject: Public Comment on Water Permit
Date: Friday, January 11, 2013 1:32:52 PM

Mr. Gary Strawn
Vice Chairman
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

Re: Comment—Tentative Order No. R9-2013-001, Regional MS4 Permit, Place ID: 786088Wchiu

Dear Vice Chair Strawn:
I am responding to the San Diego Regional Water Quality Control Board's Tentative Order R9-2012-0011 ("Permit") dated October 31, 2012. After reviewing the proposed Permit, I am concerned it will impose expensive, onerous, and untested regulations on local governments, businesses, and residents.

Everyone understands the importance of clean, safe water to the region. As a member of the business community, I too am interested in improving San Diego's water. It is important, however, that we use our limited resources wisely, and ensure that our efforts produce the desired outcome of improving water quality.

I applaud the Board's inclusion of Water Quality Improvement Plans (WQIP) as a first step in developing a cost-effective approach to improving our water. Analysis remains a critical component of a successful strategy, and I am glad to see that the Board is committed to finding the best possible solution to water quality improvement.

I am concerned, however, that the costs associated with enforcing and implementing the permit will have a negative impact on my business and San Diego's economy. The three primary areas of concern include:

1) the strict liability for exceeding water quality objectives;
2) the preemption of WQIPs by new and changing regulatory requirements prior to allowing the WQIPs to be developed and implemented; and
3) the lack of reliable funding sources to implement these regulatory changes.

It is necessary to hold individuals, businesses and governments accountable, but it is critical that accountability measures are practical with demonstrable, positive effects on water quality. Because of these concerns, I respectfully request that the Permit focus on the timely development of effective and enforceable WQIPs, and that each of the WQIPs be developed through a process that ensures public participation. I ask also that the designation of appropriate Best Management Practices in each watershed be determined through the WQIP process rather than the one size fits all strategy currently being proposed in the Permit. I ask further that until the Board adopts a WQIP for a watershed that the provisions of the existing Permit remain in place for that watershed. Finally, in order to avoid unnecessary litigation I request that the Board adopt the WQIPs as Orders implementing the proposed Permit.

I urge you to adopt final permit language that is evidence-based and both environmentally and economically sustainable. Thank you for your consideration. Please contact me if you have any questions.

Sincerely,

Colin F. MacKinnon, CEO
Transition IT, LLC
619-517-2167

Transition IT
TransXfer
Cloud Blog

April 10 and 11, 2013
Item No. 8
Supporting Document No. 5

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

JAN 11 2013

Wayne Chui
San Diego Regional Water Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

Re: Draft San Diego Regional MS4 Permit

Dear Mr. Chui:

The following are EPA Region 9's comments on the draft permit for the municipal separate storm sewer system (MS4) located within the jurisdiction of the San Diego Regional Board, which the Board released for public comment on October 31, 2012. We also provided comments on an early draft of this permit in a letter to the Board dated February 14, 2012. For the most part, we are pleased with the latest version of the permit and we commend the Board and its staff for their extensive efforts in developing this draft permit. We also offer the following comments for the Board's consideration:

A. Total Maximum Daily Loads (TMDLs)

In our February 14, 2012 letter, we also generally supported the Board's approach for incorporation of applicable TMDL requirements into the permit, i.e., incorporation of applicable wasteload allocations (WLAs) as numeric effluent limits. We urge the Board to retain this approach in the final permit as well since it will enhance enforceability and will most clearly ensure consistency with the WLAs.

Our February 14, 2012 letter had also suggested revisions of certain provisions of the early draft permit related to TMDLs; the October 31, 2012 draft permit has been substantially revised from the early draft and many of our early comments have been addressed. However, as discussed below, we still have certain concerns whether the monitoring requirements of the October 31, 2012 draft permit would be adequate to ensure compliance with the TMDLs.

Sections II.D.1 and 2 set forth the receiving water monitoring and MS4 outfall monitoring requirements of the draft permit. In general, a monitoring program would be developed and conducted by the permittees to assess the impacts of the discharges and the effectiveness of the Water Quality Improvement Plans (WQIPs), focusing on the highest priority water quality conditions. Compliance with applicable WLAs from TMDLs would be one of several competing priorities in selecting monitoring locations in the receiving waters and at MS4 outfalls.

Attachment E to the draft permit requires monitoring at MS4 outfalls or receiving water locations, but the locations to be monitored are not fully specified. Although TMDL compliance would presumably receive a high ranking in setting the monitoring program priorities, it is still not clear that appropriate monitoring locations would necessarily be selected to measure compliance with WLAs. As such, we recommend that Section II.D of the permit clarify that notwithstanding other monitoring priorities, at a minimum, appropriate monitoring locations must be selected to ensure compliance with all applicable WLAs and associated effluent limitations. The permit should specify that a mix of receiving water and representative end-of-pipe monitoring locations must be selected to ensure that the monitoring data collected will be sufficient to determine compliance with effluent limitations based on WLAs and to determine whether individual copermittees have caused or contributed to observed in-stream noncompliance. The permit should provide that the parties that develop and submit for Regional Board review a monitoring plan for a WQIP agree to the use of monitoring plan results for purposes of compliance determination.

Section II.D.2.c.(2) of the draft permit also requires monitoring at an "appropriate" frequency for the post-transitional period; the transitional monitoring program (Section II.D.2.a.(3)) would require twice/year monitoring during the wet season. We recommend the permit clarify the minimum monitoring frequency for the post-transitional period and suggest maintaining the twice/year frequency.

Attachment E also describes the specific provisions for TMDLs adopted and approved that are applicable to this tentative order. We note that a few of the compliance requirements provided in an existing TMDL were not included in this tentative order. We recommend that all applicable TMDL WLAs and compliance endpoints be included in Attachment E. For instance, the TMDL for Indicator Bacteria Project I – Twenty Beaches and Creeks in San Diego Region (including Tecolote Creek), provided both concentration-based and mass-based TMDLs. All identified TMDL WLAs and endpoints should be included in Attachment E to prevent confusion with the WLA requirements described and adopted in the TMDL.

Provision B.6 identifies the WQIP submittal, updates and implementation. Paragraph 3 under this Provision should clarify that the intent of all monitoring and assessment is to improve our evaluation of the waterbodies' conditions, including the 303(d) listed impaired waterbodies. We recommend paragraph 3 under Provision B.6 be modified to the following:

> *"All State identified impaired waterbodies within the Watershed Management Area should be placed on the 303(d) List as required under CWA Section 303(d) and 40 CFR §130.7(b)(4)). However, in specific cases supported by robust analytical documentation the implementation of the Water Quality Improvement Plans may demonstrate that TMDLs are not necessary for identified impaired waterbodies within the Watershed Management Area if the analytical record demonstrates that technology-based effluent limitations required by the CWA, more stringent effluent*

limitations required by state, local, or federal authority, and/or other pollution control requirements (e.g., best management practices) required by local, state or federal authority are together stringent enough to implement applicable water quality standards associated with the waterbody impairment causes within a reasonable period of time."

Finally, we reiterate our suggestion from the February 14, 2012 letter that a provision be added to the draft permit to address TMDLs approved during the term of the permit; we had suggested a provision similar to section O of the 2012 MS4 permit for the City of Salinas (NPDES permit No. CA0049981) available at: http://www.ci.salinas.ca.us/services/maintenance/pdf/NPDES_Permit.pdf. The provision requires the development and submittal (within one year of final TMDL approval) of a plan for complying with applicable WLAs. Such a provision would expedite compliance with the WLAs by the permittees.

B. Low Impact Development (LID) Requirements

In our February 14, 2012 letter, we generally supported the LID provisions of the early draft permit, and we continue to largely support the proposed LID requirements of the October 31, 2012 draft permit. The proposed requirements in the October 31, 2012 draft (beginning on page 78) are also similar to the requirements in other recent California MS4 permits such as those for Los Angeles and Orange Counties. As you know, Region 9 is encouraging the Boards to include measurable requirements in MS4 permits to enhance clarity and enforceability of the permits. We are pleased to see the inclusion of the measurable requirement for onsite management of the runoff from the 85% storm similar to other recent permits. However, we also note that Section II.E.3.c.(1)(a)(ii) of the October 31, 2012 draft permit provides a new alternative of retaining the volume (determined by modeling) that would retained under natural, undeveloped conditions. We are concerned that this option may create uncertainty and provide opportunities for subjective analyses that would be resource intensive and difficult to review. For this reason, and for consistency with other recent California MS4 permits, we recommend that Section II.E.3.c.(1)(a)(ii) of the proposed permit be removed. However, if this provision is retained, the permit and fact sheet should fully clarify that undeveloped conditions refer to natural conditions prior to any anthropogenic impacts.

We did raise a couple of questions regarding LID in our February 14, 2012 letter which we believe have been adequately addressed in the latest draft. We had been unclear concerning requirements related to biofiltration; the October 31, 2012 permit has been restructured in a way which clarifies the questions we had raised.

We had also suggested that the Board may want to consider off-site water supply augmentation projects as an acceptable alternative when onsite stormwater management is not feasible. Several recent studies have highlighted the many benefits (such as energy savings) of increased stormwater infiltration for groundwater recharge. We note such a provision has been added to the draft permit, and we support this provision.

C. Water Quality Improvement Plan Review

In our February 14, 2012 letter, we had expressed concern whether the public would have an adequate opportunity to review draft WQIPs consistent with the 2005 decision by the Second Circuit Court in *Waterkeeper Alliance et al. v. EPA*, 399 F.3d 486, and the 2003 decision by the Ninth Circuit Court in *Environmental Defense Center, Inc. v. EPA*, 344 F.3d 832. We are pleased to see the draft permit (section F) and the fact sheet have been revised to clarify that the Board would be soliciting public comment concerning draft WQIPs submitted to the Board for approval during the term of the permit.

The fact sheet and the permit also describe the WQIPs as dynamic and evolving documents which are likely to be updated and modified over time in accordance with the iterative process. Although permittees must solicit public input in developing proposed updates that are submitted to the Board, it does not appear that public comment would necessarily be solicited concerning Board action in approving, disapproving or revising proposed updates; we suggest that an opportunity be provided for public comment on such Board actions similar to that provided when the original WQIPs are submitted.

D. Prescriptive BMP Requirements

In our February 14, 2012 letter, we expressed concern that the early draft permit would only require inspections of construction sites "at an appropriate frequency"; this provision has also been included in the October 31, 2012 draft permit. We noted in our comments that the existing San Diego MS4 permit includes specific frequencies for the inspections (such as once/two weeks, or once/month), as do other recent California MS4 permits such as the San Ana Board's 2009 MS4 permit for Orange County. As noted earlier, we are trying to improve the clarity and enforceability of MS4 permits and terms such as "an appropriate frequency" reduce clarity and make enforcement of the permit more difficult. Such provisions may also be insufficient to ensure compliance with the Clean Water Act's requirement to reduce pollutants in the discharges to the maximum extent practicable (MEP). We recommend that the permit specify the required frequency of construction site inspections.

Certain other provisions of the October 31, 2012 draft permit are also less prescriptive than the existing permit, such as the storm drain maintenance requirements and the inspection requirements for commercial and industrial facilities. We recognize that the Board is attempting to improve the environmental outcome of its stormwater program by shifting the focus from prescriptive BMPs to prescriptive water quality results, and we concur with the increased emphasis on water quality results. However, we are not convinced that the prescriptive BMPs of the existing permit are as significant a burden as portrayed in the draft fact sheet, and we suggest they be retained for the most part in the new permit to ensure permit clarity, enforceability and compliance with MEP. To the extent the requirements for numeric water quality goals in the WQIPs would also ensure compliance with MEP, such requirements would be acceptable.

We recommend the permit or fact sheet also clarify that the numeric water quality goals (and the schedule for attainment of the goals) in the draft WQIPs would become enforceable permit requirements once the Plans are approved by the Board. EPA's 1999 regulations for Phase II MS4s (64 FR 68722, December 8, 1999) required similar measurable goals for stormwater management programs and intended that "goals" would be enforceable permit requirements once approved. Further, a wide variety of measurable goals were intended to be considered including measurable BMPs and measurable water quality improvements.

E. Action Levels

In our February 14, 2012 letter, we expressed concern that there did not seem to be any clear actions which would be required on the part of permittees if an action level concentration were exceeded. Although the draft fact sheet of October 31, 2012 provides additional insight into the Board's intent, we still believe the clarity and enforceability of the permit would be enhanced by adding clearer provisions for acting upon action level exceedences to the permit similar to the Board's 2009 permit for Orange County.

Footnote 7 in the proposed permit notes that NALs are not intended to be enforceable limitations. Provision II.C.1.b.(2) also provides that some NALs may be based on WLAs established in TMDLs included in Attachment E of the permit. We believe the Board intends the WLAs to be enforceable permit requirements; as such, we recommend NALs not be based on the WLAs. Instead, enforceable effluent limitations should be incorporated that are consistent with and ensure effective implementation of WLAs.

F. Toxicity Testing

The toxicity testing monitoring provisions proposed in the draft permit should be brought up to date with those in MS4 permits recently issued by the State Water Board (Caltrans MS4) and the Los Angeles Regional Water Board (Los Angeles MS4). Following the approach in these permits, only chronic toxicity monitoring should be required and biological toxicity test endpoints should be analyzed using the Test of Significant Toxicity hypothesis testing approach. At minimum, the permit should be revised to reflect the following requirements: (1) monitoring for chronic toxicity in fresh or marine waters shall be estimated as specified in U.S. EPA's short-term chronic toxicity methods in the most recent edition of 40 CFR 136; and (2) for chronic toxicity test samples (either stormwater or non-stormwater), the in-stream waste concentration (IWC) is 100 percent to calculate either a pass or fail test sample result following Appendix A in

National Pollutant Discharge Elimination System Test of Significant Toxicity Implementation Document (EPA 833-R-10-003, June 2010). A pass result indicates no toxicity at the IWC. A fail result indicates toxicity at the IWC.

G. Permit Expiration Date

In our letter of February 14, 2012, we had expressed concern that the Board appeared to be considering a permit term longer than five years to accommodate the expiration dates of the current MS4 permits for Orange County and Riverside County. We noted such a provision would conflict with NPDES regulations at 40 CFR 122.46 which require that the term of a permit not exceed five years. We are pleased to see the proposed permit term has been revised to be consistent with this requirement.

We appreciate the opportunity to provide our views on the draft permit. If you would like to discuss these comments, please contact me at (415) 972-3464 or Eugene Bromley of the NPDES Permits Office at (415) 972-3510.

Sincerely,

David Smith, Manager
NPDES Permits Office (WTR-5)