Discussion of Significant Modifications to the Directives of Order No. 2001-01 Found in Tentative Order No. R9-2006-0011

San Diego Regional Water Quality Control Board
December 13, 2006

Introduction

This document identifies and discusses the most significant modifications that have been made to the directives of Order No. 2001-01 (the San Diego County Municipal Storm Water Permit), as found in Tentative Order No. R9-2006-0011 (Tentative Order). Since the Tentative Order has evolved during the reissuance process, the discussions included in this document represent the directives of the Tentative Order as they appear in its most recent version, dated December 13, 2006. The December 13, 2006 version of the Tentative Order is expected to be the final version of the Tentative Order, to be considered by the San Diego Regional Water Quality Control Board (Regional Board) for adoption at its December 13, 2006 Regional Board meeting.

The purpose of this document is to explain the most significant modifications included in the Tentative Order, in relation to the requirements of the previous Order, Order No. 2001-01. This document does not address modifications to the Tentative Order in relation to earlier versions of the Tentative Order. Those modifications are discussed in the Responses to Comments document. In addition, this document only focuses on the most significant modifications included in the Tentative Order. For a listing of all modifications, please see the document titled *Summary of Modifications to the Directives of Order No. 2001-01 Found in Tentative Order No. R9-2006-0011*. The Fact Sheet/Technical Report for the Tentative Order also includes detailed discussions of all of the significant modifications included in the Tentative Order.

Significant Modifications

<u>Site Design BMPs Required for New Development</u>

Section D.1.d.(4) of the Tentative Order requires the San Diego County Municipal Storm Water Permit Copermittees (Copermittees) to place Low-Impact Development (LID) site design BMP requirements on Priority Development Projects within their jurisdictions. Some of the LID site design BMPs included in the Tentative Order are mandatory, while others are to be implemented where applicable and feasible. The LID site design BMPs listed in the Tentative Order are consistent with the site design BMPs currently required by the Copermittees in the Model Standard Urban Storm Water Mitigation Plan (SUSMP). However, the Model SUSMP employs an open-ended approach to requirements for site design best management practices (BMPs), requiring implementation of site design BMPs “where determined applicable and feasible by the Copermittee.”

Unfortunately, this approach has proven to be ineffective in integrating LID site design BMPs into new development project designs. Audits of ten of the Copermittees' SUSMP programs exhibited that "many of the SUSMP plans reviewed for this program evaluation did not adequately address site design."[1] Moreover, the auditor identified site design as one of three principal areas where further program oversight was necessary.[2]

For these reasons, the Tentative Order directs the Copermittees to require Priority Development Projects to employ LID site design BMPs. Several LID site design BMPs that have been exhibited to be applicable and feasible under certain conditions are mandatory. This includes routing of runoff from impervious areas to pervious areas and use of permeable surfaces for portions of low traffic areas. Standard multi-family residential, small-scale single-family residential, restaurant, office building, large scale single-family residential, and retail commercial projects with typical San Diego County soil conditions have been shown to have sufficient pervious areas for significant infiltration onsite.[3] In addition, use of permeable surfaces has been exhibited to be applicable and feasible for many projects' low traffic areas in San Diego County. Permeable surface use for low traffic areas in also supported by numerous case studies nationwide.[4]

While some of the listed LID site design BMPs continue to be required on an applicability and feasibility basis, the term "as determined by the Copermittee," used in reference to determination of applicability and feasibility, has been removed. This clarifies that determination of applicability and feasibility is not solely at the discretion of the Copermittees; the Regional Board also has discretion to provide input on applicability and feasibility of LID site design BMPs where necessary. In addition, the process for determining applicability and feasibility of LID site design BMPs has been strengthened. In conjunction with the requirements for the Copermittees to develop criteria to guide the determination of applicability and feasibility, project proponents are required to "demonstrate applicability and feasibility, or lack thereof, for each LID site design BMP." This formalized process incorporated into the Tentative Order will ensure that each LID site design BMP will receive appropriate consideration by both the project proponent and the Copermittee. This increased formal consideration is reasonably expected to significantly improve implementation of the LID site design BMPs in question, due to the increased level of formal oversight. Such an

[1] Tetra Tech, Inc., 2005. Program Evaluation Report –San Diego Standard Urban Storm Water Mitigation Plan (SUSMP) Evaluation. P. 4.
[2] Tetra Tech, Inc., 2005. Program Evaluation Report –San Diego Standard Urban Storm Water Mitigation Plan (SUSMP) Evaluation. P. 3.
[3] Horner, 2006. Investigation of the Feasibility and Benefits of Low-Impact Site Design Practices ("LID") for the San Diego Region.
[4] Puget Sound Action Team and CH2M Hill, 2004. Technical Memorandum No. 1: Review of Low-Impact Development Techniques. And Natural Resources Defense Council, 2006. Rooftops to Rivers.

approach is appropriate due to the relatively subjective nature of some of the LID site design BMPs. Since particular LID site design BMPs do not lend themselves to being easily measured or assessed, it is appropriate to assess their applicability and feasibility on a case by case basis in relation to pre-determined criteria.

The amount of impervious surface runoff that must be routed to pervious areas has also been clarified, which will better ensure meaningful LID site design BMP implementation. The size of impervious areas draining to pervious areas must correspond to the size of the pervious areas. This helps prevent a situation where only a small portion of impervious areas is routed to pervious areas, even though the pervious area's capacity for receipt of runoff is large.

LID site design BMPs do not need to be costly. Some design options, such as concave vegetated surfaces or routing rooftop or walkway runoff to landscaped areas, are cost neutral.[5] Other site design BMPs, such as minimizing parking stall widths or use of efficient irrigation devices, are oftentimes already required. In addition, use of these site design BMPs reduces runoff quantity, allowing for treatment control BMPs on site to be smaller, therefore savings costs. Routing runoff through landscaped areas can also reduce the cost of irrigation.

Treatment Control BMP Effectiveness Required for New Development

Section D.1.d.(6)(d)(i) of the Tentative Order requires that treatment control BMPs selected for implementation at Priority Development Projects have a high or medium pollutant removal efficiency rating. The requirement allows exceptions for those Priority Development Projects that, with a feasibility analysis, can justify the use of a treatment control BMP with a low removal efficiency rating. This requirement is needed because to date, the Copermittees have generally approved low removal efficiency treatment control BMPs without justification or evidence that use of higher efficiency treatment BMPs was considered and found to be infeasible. Specifically, it has been found during audits of the Copermittees' SUSMP programs that many SUSMP reports do not adequately describe the selection of treatment control BMPs. Moreover, the United States Environmental Protection Agency's (USEPA's) contractor Tetra Tech, Inc. recommends that "project proponents should begin with the treatment control that is most effective at removing the pollutants of concern […] and provide justification if that treatment control BMP is not selected."[6]

Use of treatment control BMPs with a high or medium removal efficiency rating is needed in order to meet the maximum extent practicable (MEP) standard, unless it can be exhibited that implementation of such treatment control BMPs is infeasible. For example, the State Water Resources Control Board finds:

[5] BASMAA, 1999. Start at the Source. P. 149.
[6] Tetra Tech, Inc., 2005. Program Evaluation Report –San Diego Standard Urban Storm Water Mitigation Plan (SUSMP) Evaluation. P. 5.

"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."[7]

Treatment Control BMP Maintenance Tracking Required

Section D.1.e of the Tentative Order requires steps to be taken by the Copermittees to ensure that approved treatment control BMPs are correctly constructed and maintained, including development of a database. This is critical to ensure that the treatment control BMPs are effective in removing pollutants from urban runoff leaving Priority Development Projects. Treatment control BMP maintenance has been identified as a critical aspect of addressing urban runoff from new development and significant redevelopment by many prominent urban runoff authorities, including the California Stormwater Quality Association (CASQA), which states that "long-term performance of BMPs hinges on ongoing and proper maintenance."[8] USEPA also stresses the importance of BMP maintenance, stating: "Lack of maintenance often limits the effectiveness of storm water structural controls such as detention/retention basins and infiltration devices."[9]

This permit section is needed due to findings that treatment control BMPs and treatment control BMP maintenance have predominantly not been tracked by the Copermittees. Following audits of SUSMP implementation of ten Copermittees, each of the Copermittees were recommended to develop a tracking system for treatment control BMPs and treatment control BMP maintenance. It has been found that "source and treatment control BMPs should be tracked in order to assess the number of BMPs installed, for reporting purposes, and to create an inventory for verifying maintenance in the future."[10] Moreover, during the SUSMP audits, two of the ten Copermittees audited were found to have inadequately maintained treatment BMPs within their jurisdiction.[11] Again, it was recommended that Copermittees "should periodically inspect selected SUSMP projects to verify if BMPs are being properly maintained."[12] USEPA also recommends "post-construction inspection and maintenance of BMPs" in the Phase II storm water regulations.[13]

[7] SWRCB, 1993. Memorandum: Definition of Maximum Extent Practicable.
[8] California Stormwater Quality Association, 2003. Stormwater Best Management Practice Handbook – New Development and Redevelopment. P. 6-1.
[9] USEPA, 1992. Guidance Manual for the Preparation of Part II of the NPDES Permit Applications for Discharges from Municipal Separate Storm Sewer Systems. EPA 833-B-92-002.
[10] Tetra Tech, Inc., 2005. Program Evaluation Report –San Diego Standard Urban Storm Water Mitigation Plan (SUSMP) Evaluation. P. 6.
[11] Ibid. P. 25, 38.
[12] Ibid.
[13] Federal Register / Vol. 64, No. 235 / Wednesday, December 8, 1999 / Rules and Regulations. P. 68845.

Therefore, the Order has been crafted with minimum measurable outcomes to ensure that the Copermittees' treatment control BMP maintenance tracking programs are adequate and effective. These minimum measurable outcomes largely incorporate suggestions from the Copermittees' June 7, 2006 comments on the March 10, 2006 version of the Tentative Order. For example, the minimum measurable outcomes ensure that all high priority treatment control BMPs are inspected annually and set a minimum annual inspection frequency at 20% of approved treatment control BMPs. Inspection of 20% of approved treatment control BMPs is roughly equivalent to inspection of all treatment control BMPs once during the permit cycle, but allows the Copermittees to focus on particular treatment control BMPs, rather than inspecting treatment control BMPs the Copermittees have identified as not needing inspections. In addition, inspection of projects with drainage inserts is required roughly every other year, due to the need of drainage inserts for frequent maintenance and their relative likelihood of failure due to lack of maintenance. The Tentative Order also includes a cap on the number of annual treatment control BMPs required. This is necessary because as the number of treatment control BMPs constructed continues to increase, the Copermittees inspection burden will likewise continue to increase. Overtime, the number of treatment control BMP inspections required could drain resources from other important urban runoff management activities.

Hydromodification Management Plan Required

Section D.1.g of the Tentative Order addresses the changes in a watershed's runoff characteristics resulting from development, together with associated morphological changes to channels receiving the runoff. These changes are termed hydromodification. As the total area of impervious surfaces increases in previously undeveloped areas, infiltration of rainfall decreases, causing more water to run off the surface at a higher rate. Runoff from developed areas can produce erosive flows in channels under rainfall conditions where previously they did not exist. Moreover, runoff from developed areas increases the duration of time that channels are exposed to erosive flows. The increase in the volume of runoff and the length of time that erosive flows occur ultimately intensify sediment transport, causing changes in sediment transport characteristics and the hydraulic geometry (width, depth, slope) of channels.[14]

These types of changes have been documented in southern California. It has been reported that researchers studying flood frequencies in Riverside County have found that increases in watershed imperviousness of only 9-22% can result in increases in peak flow rates for the two-year storm event of up to 100%.[15] Such changes in runoff have significant impacts on channel morphology. It has recently been found that ephemeral/intermittent channels in southern California

[14] Santa Clara Valley Urban Runoff Pollution Prevention Program, 2005. Hydromodification Management Plan. P. 1-1.
[15] Schueler and Holland, 2000. Storm Water Strategies for Arid and Semi-Arid Watersheds (Article 66). The Practice of Watershed Protection.

appear to be more sensitive to changes in imperviousness than channels in other areas. Morphology of small channels in southern California was found to change with only 2-3% watershed imperviousness, as opposed to 7-10% watershed imperviousness in other parts of the nation.[16]

Stream channels typically respond to increased runoff rates and durations by increasing their cross-sectional area to accommodate the higher flows. This is done through widening of the channel banks, down-cutting of the channel bed, or both. This channel instability results in streambank erosion and habitat degradation, which is a significant impact to beneficial uses. Channel instability causes impacts to beneficial uses through sedimentation, loss of overhead cover, and loss of instream habitat structures, such as the loss of pool and riffle sequences.[17] Numerous studies have exhibited the link between urbanization, poor habitat quality, and impaired beneficial uses such as reduced insect and fish diversity.[18] These findings are also supported by the Copermittees' bioassessment data, which typically exhibits Poor to Very Poor Index of Biotic Integrity ratings for San Diego County channels, even though toxicity is frequently not found to be persistent.[19]

This section of the Tentative Order expands the requirements for control of hydromodification caused by changes in runoff resulting from development and urbanization. Expansion of these requirements is needed due to the current lack of a clear standard for controlling hydromodification resulting from development. While the Model SUSMP developed by the Copermittees requires project proponents to control hydromodification, it provides no standard or performance criteria for how this is to be achieved. Without any kind of clear standard or criteria, what must be done to prevent hydromodification is not known by project proponents and plan reviewers. As a result, project proponents do not know what to propose (if anything) and Copermittee review staff do not know what to require (if anything). Ultimately, Priority Development Projects implement few measures which can be expected to adequately control hydromodification. In any event, it is clear that Priority Development Projects in San Diego County are not implementing the type of measures which have been identified and required in other parts of California as necessary to prevent hydromodification.

[16] Coleman, et. al., 2005. Effect of Increases in Peak Flows and Imperviousness on the Morphology of Southern California Streams. P. iv.
[17] Schueler and Holland, 2000. The Importance of Imperviousness (Article 1). The Practice of Watershed Protection.
[18] Ibid.
[19] County of San Diego, 2005. San Diego County Municipal Copermittees 2003-2004 Urban Runoff Monitoring Final Report. By MEC Analytical Systems – Weston Solutions, Inc. Index of Biotic Integrity ratings give an absolute value to the benthic community quality based on the range of reference conditions in the region. The Index of Biotic Integrity ratings can be used to evaluate community conditions over time to monitor the effects of habitat degradation or the success of restoration efforts.

To address this situation, this section of the Tentative Order requires the development and implementation of a Hydromodification Management Plan and outlines a process for the development and implementation of a standard and criteria to limit hydromodification of downstream channels. The required process is based on processes currently being developed and/or used in the San Francisco Bay Area and Los Angeles and Ventura Counties.[20] It also corresponds with the planned second phase of the Southern California Stormwater Monitoring Coalition's Hydromodification Control Study, which is expected to develop a regional stream classification system, a numerical model to predict the hydrological changes resulting from development, and to identify effective mitigation strategies.

The Copermittees are to develop a channel standard that will maintain the pre-project erosion and deposition characteristics of channel segments receiving urban runoff discharges from Priority Development Projects as necessary to maintain or improve the channel segments' stability conditions. The channel standard is used as a basis for development of runoff flow rate and duration criteria. Stream channel erosion is caused by increases in runoff flow rates and durations for the small and moderate magnitude runoff flows above the threshold for sediment transport and channel bank erosion.[21] Runoff flow rate and duration criteria identify the range of runoff flows for which flow rates and durations must be controlled to pre-project conditions in order to meet the channel standard. This involves identifying the critical flow that produces the critical shear stress that initiates bed movement or that erodes the toe of channel banks, and then relating the critical flow to a percentage of the 2-year peak flow, which serves as the lower bound of the range of runoff flows which must be controlled. The upper bound of the range of runoff flows which must be controlled can be based on the runoff flows where significant post-project increases in the total work done on the channel do not occur.

Due to the ongoing high level of development in San Diego County, this section of the Order also contains a requirement for development and implementation of interim hydromodification criteria for large Priority Development Projects. Without interim hydromodification criteria, major Priority Development Projects will be developed without hydromodification controls, resulting in impacts to relatively stable streams with good habitat quality. Examples of areas that can be expected to be developed in the near future include the Otay Valley Hydrologic Area and the Bonsall Hydrologic Subarea.

Priority Development Projects over 50 acres in size are required to meet the interim criteria because large projects have a greater potential to impact streams through hydromodification. Larger projects create more impervious surface,

[20] See http://www.cccleanwater.org/construction/nd.php or http://www.scvurppp.org/ under "C.3 Submittals" for examples of a Hydromodification Management Plans.
[21] Santa Clara Valley Urban Runoff Pollution Prevention Program, 2005. Hydromodification Management Plan. P. 5-1.

increasing runoff flow rates and durations to a greater extent, resulting in greater potential for hydromodification of receiving channels. The 50 acre size limit was chosen based on high priority status placed on construction sites larger than 50 acres. Applying an interim criteria to projects over 50 acres in size is manageable for Copermittees because of the relative infrequency of development projects larger than 50 acres. Approximately 88% of the construction sites with coverage under the statewide General Construction Storm Water Permit are smaller than 50 acres in size. Moreover, since larger Priority Development Projects typically have greater resources, they have the capability to conduct the necessary analyses and implement measures to maintain the morphology of receiving channels. For example, such analysis (together with proposed implementation of flow rate and duration controls) has been conducted for the Rancho Mission Viejo project in southern Orange County.[22]

The timelines included in the Tentative Order for development and implementation of the Hydromodification Management Plan and the interim hydromodification criteria are based on timelines suggested by the Copermittees and other interested parties. The Copermittees are provided roughly three years to develop the Hydromodification Management Plan and one year to develop and implement interim hydromodification criteria. These timelines are appropriate because data collection, the size of San Diego County, varying geologic and climatic conditions, and the need to develop a contract and hire a consultant all result in the need for significant time for program development.

Phased Grading Required for Construction

Section D.2.c.(1)(a)vi of the Tentative Order provides specificity regarding phased grading requirements, prescribing that phased grading must be implemented at construction sites according to a designated maximum disturbed area, as determined by the Copermittees. This specificity has been added to the Tentative Order because of the importance of phased grading in controlling sediment from leaving construction sites. Phased grading minimizes the size of disturbed areas at construction sites, as well as the amount of time that bare soil is exposed to erosive conditions.[23] USEPA provides guidance in support of phased grading, stating "construction should be planned to occur in phases in order to minimize the amount of disturbed land exposed at any one time, thus limiting the overall erosion potential of the site."[24] It is important to note that phased grading does not limit the overall development of a project. Moreover, phased grading should not be confused with seasonal restrictions on grading.

The Copermittees are required to designate a maximum disturbed area to be applied at construction sites, which is the maximum amount of land allowed to be

[22] County of Orange, 2004. The Ranch Plan Draft Environmental Impact No. 589. Section 4.5.
[23] Schueler, T. and Holland, H., 2000. "Muddy Water In – Muddy Water Out?" The Practice of Watershed Protection. P. 5.
[24] USEPA, 1990. "Sediment and Erosion Control: An Inventory of Current Practices." P. III-1.

open to active grading at any one time. All other areas on site must be undisturbed or fully protected by erosion control BMPs. The Tentative Order prescribes that construction projects within the Copermittees' jurisdiction are not allowed to actively grade more than the maximum disturbed area, unless authorized to do so in writing by the Copermittee. Prior to a Copermittee's authorization to exceed the maximum disturbed area, the construction site must be in compliance with applicable storm water regulations and have adequate control practices implemented to prevent storm water pollution. The Copermittee's ability to authorize active grading beyond the maximum disturbed area gives the construction industry the flexibility needed to conduct business while continuing to protect water quality.

This permit requirement is not unprecedented. The Caltrans construction standard specifications states that no more than 17 acres be exposed unless otherwise approved by their engineer in writing.[25] If needed, local Caltrans districts can decrease the maximum disturbed soil area to 5 acres during the rainy season.[26] In the Tentative Order, the Copermittee determines the maximum disturbed acreage size.

Advanced Treatment Required for Construction

Section D.2.c.(2) of the Tentative Order requires the implementation of advanced treatment for sediment at construction sites that the Copermittees determine to be an exceptional threat to water quality. In evaluating the threat to water quality, the following factors shall be considered: (1) soil erosion potential; (2) the site's slopes; (3) project size and type; (4) sensitivity of receiving water bodies; (5) proximity to receiving water bodies; (6) non-storm water discharges; and (7) any other relevant factors. Advanced treatment is defined in the Tentative Order as "using mechanical or chemical means to flocculate and remove suspended sediment from runoff from construction sites prior to discharge." Advanced treatment consists of a three part treatment train of coagulation, sedimentation, and polishing filtration.

Advanced treatment has been effectively implemented extensively in the other states and in the Central Valley Region of California.[27] In addition, the Regional Board's inspectors have observed advanced treatment being effectively implemented at large sites greater than 100 acres and at small, 5 acre, infill sites. Advanced treatment is often necessary for Copermittees to ensure that discharges from construction sites are not causing or contributing to a violation of water quality standards. For example, the Basin Plan lists the water quality objective for turbidity as 20 NTU for all hydrologic areas and subareas except for

[25] State of California, Department of Transportation, 2002. "Standard Specifications for Construction of Local Streets and Roads." Section 7-1.01G; P. 52.
[26] Caltrans Storm Water Quality Handbooks, 2000. "Construction Site Best Management Practices Manual." Section 2.2.4.1.
[27] SWRCB, 2004. Conference on Advanced Treatment at Construction Sites.

the Coronado HA (10.10) and the Tijuana Valley (11.10). For certain construction sites with large slopes and exposed areas, the only technology that is likely to meet the 20 NTU standard is advanced treatment combined with erosion and sediment controls. To ensure the MEP standard and water quality standards are met, the requirement for implementation of advanced treatment at construction sites that pose an exceptional threat to water quality has been added to the Tentative Order.

Specific Schedule for Maintenance of the Municipal Separate Storm Sewer System (MS4) Required

Section D.3.a.(3) of the Tentative Order requires regular inspection and maintenance of MS4 facilities. Regular MS4 maintenance is critical to the successful implementation of urban runoff management programs. USEPA finds that "Lack of maintenance often limits the effectiveness of storm water structural controls such as detention/retention basins and infiltration devices. […] The proposed program should provide for maintenance logs and identify specific maintenance activities for each class of control, such as removing sediment from retention ponds every five years, cleaning catch basins annually, and removing litter from channels twice a year. If maintenance activities are scheduled infrequently, inspections must be scheduled to ensure that the control is operating adequately. In cases where scheduled maintenance is not appropriate, maintenance should be based on inspections of the control structure or frequency of storm events. If maintenance depends on the results of inspections or if it occurs infrequently, the applicant must provide an inspection schedule. The applicant should also identify the municipal department(s) responsible for the maintenance program."[28] USEPA also specifically address the importance of catch basin maintenance, stating: "The removal of sediment, decaying debris and highly polluted water from catch basins has aesthetic and water quality benefits, including reducing foul odors, reducing suspended solids, and reducing the load of oxygen-demanding substances that reach receiving waters" and "Catch basin cleaning is an efficient and cost-effective method for preventing the transport of sediment and pollutants to receiving water bodies."[29]

The MS4 maintenance schedule requirements in the Tentative Order are based on these USEPA recommendations, as well as Regional Board experience gained during oversight of the Copermittees' MS4 maintenance programs. The Regional Board has found that regularly scheduled MS4 maintenance requirements are needed in the Tentative Order to provide minimum measurable outcomes for assessment of Copermittee program implementation. Minimum measurable outcomes are necessary because it has been found that

[28] USEPA, 1992. Guidance Manual for the Preparation of Part II of the NPDES Permit Applications for Discharges from Municipal Separate Storm Sewer Systems. Washington D.C. EPA 833-B-92-002.
[29] USEPA, 1999. Storm Water Fact Sheet Catch Basin Cleaning. EPA 832-F-99-011.

inappropriate reductions in MS4 maintenance have occurred during Order No. 2001-01's permit cycle. For example, one Copermittee states in its Jurisdictional Urban Runoff Management Program document that it will inspect 50% of its MS4 facilities annually; however, this Copermittee recently reported that it is now only inspecting approximately 17% of its MS4 facilities, even though approximately 70% of the inspected facilities required cleaning. Such reductions in MS4 maintenance can have significant impacts on water quality by allowing greater amounts of debris to enter receiving waters. Therefore, minimum measurable outcomes are needed to maintain an adequate level of MS4 inspection and cleaning. Minimum measurable outcomes will help ensure that structural controls are in adequate condition to be effective year round, but especially at the beginning of and throughout the rainy season.

Street Sweeping Required

Section D.3.a.(5) of the Tentative Order requires regularly scheduled street sweeping, based on priorities according to the volume of trash and/or debris accumulated on streets. Federal National Pollutant Discharge Elimination System (NPDES) storm water regulation 40 CFR 122.26(d)(2)(iv)(A)(3) supports street sweeping provisions, requiring "practices for operating and maintaining public streets, roads and highways and procedures for reducing the impact on receiving waters of discharges from municipal separate storm sewer systems." These practices are necessary, because USEPA finds that "public streets, roads, and highways can be significant sources of pollutants in discharges from MS4s" and "in almost all instances, the pollutant concentrations in initial storm water discharge from heavily traveled streets is significant."[30] To address these discharges, USEPA states "maintenance activities that can reduce pollutants in storm water discharges include catch basin cleaning, litter control, and targeted street sweeping."[31] The Wisconsin Department of Transportation has found that a high efficiency street sweeper can reduce total suspended sediment levels due to regular sweeping."[32] In addition, USEPA asserts that "streets and parking lots can contribute significant pollutant loadings to urban runoff. Therefore sweeping programs that can remove a portion of these materials from streets and parking lots may significantly reduce the pollutant load contributions to urban runoff."[33]

The Tentative Order requires a prioritized street sweeping program based on levels of trash and debris accumulated on streets. Since the Copermittees have found trash to be a regional water quality problem,[34] it is reasonable to require

[30] USEPA, 1992. Guidance Manual for the Preparation of Part II of the NPDES Permit Applications for Discharges from Municipal Separate Storm Sewer Systems. Washington D.C. EPA 833-B-92-002.
[31] Ibid.
[32] Wisconsin Department of Transportation, 2002. Freeway Sweeping to Reduce Runoff Pollutants.
[33] USEPA, 1999. Preliminary Data Summary of Urban Storm Water Best Management Practices. EPA-821-R-99-012.
[34] San Diego Stormwater Copermittees, 2005. Baseline Long-Term Effectiveness Assessment.

street sweeping prioritization based on observed street trash/debris levels. While the Tentative Order provides minimum frequencies for street sweeping, complete flexibility is provided to the Copermittees to determine which areas must be swept at each of the three minimum frequencies outlined in the Tentative Order. This flexibility allows the Copermittees to design their street sweeping programs in a manner that maximizes effectiveness. For example, areas with high levels of debris are to be swept most frequently, while areas with lower levels of debris are to be swept less frequently. This will maximize the collection of debris with existing resources.

The frequencies required by the draft Order are in conformance with current practices of cities in the region and CASQA recommendations. CASQA recommends monthly sweeping of all curbed streets at a minimum. Such a minimum street sweeping frequency is generally appropriate. The overall effectiveness of street sweeping can be improved, however, by acknowledging that some areas should be swept more frequently and other areas less frequently, based on levels of debris generated in the area. CASQA supports this approach, suggesting that municipalities increase sweeping of streets with high pollutant loadings, especially in high traffic and industrial areas. In the Tentative Order, the Regional Board attempted to utilize an approach similar to CASQA's by requiring minimum prioritized street sweeping frequencies based on levels of debris generated.[35]

Moreover, the minimum street sweeping frequencies are essential because they provide minimum measurable outcomes for street sweeping activities. This assures that all Copermittees are meeting a minimum level of implementation and allows for the Regional Board to track compliance.

Industrial/Commercial Inspection Requirements Combined

Section D.3.b.(3) of the Tentative Order combines inspection requirements for industrial and commercial sites. The Copermittees are essentially required to inspect 25% of their inventoried industrial and commercial sites annually. Inspection of 25% of inventoried industrial and commercial sites maintains current inspection levels, which is appropriate based on compliance rates observed during past inspections. A minimum level of inspections is included in the Tentative Order to provide a measurable minimum outcome, which ensures that inspections are conducted and provides the means to assess Copermittee compliance.

However, the Tentative Order provides the Copermittees with substantial flexibility in conducting their industrial and commercial inspection programs. By combining industrial and commercial sites into one group and requiring

[35] California Stormwater Quality Association, 2003. Stormwater Best Management Practice Handbook – Municipal.

inspections of a percentage of the sites, the Copermittees have flexibility in determining which sites to inspect. This allows the Copermittees to conduct inspections where they believe they will be most effective.

The Tentative Order also provides the Copermittees with the option of utilizing third parties to partially meet their inspection requirements. Up to 30% of the Copermittees' inspection requirements may be fulfilled by a third party inspector program. For example, if a Copermittee has inventoried 400 commercial and industrial sites, then 25% or 100 sites are required to be inspected annually. A third party inspector could inspect 30 of those sites, leaving the Copermittee only having to inspect 70 sites. Also for every three inspections conducted by a third party, the Copermittee is required to inspect an additional site. In the example, the Copermittee would have to inspect an additional 10 sites to the 100 required to be inspected annually. The additional 10 sites could be inspected by the Copermittee or by a third party inspector. The Tentative Order allows only partial fulfillment of the inspection requirements by third party inspections because third party inspections have yet to be proven effective. No information or data has been submitted by the Copermittees or other interested parties exhibiting the effectiveness of third party inspections. As such, third party inspections will essentially be conducted as a pilot program during the permit term in order to better assess their effectiveness.

Watershed Activities That Reduce Pollutant Discharges Required

Section E.2.f of the Tentative Order requires each group of watershed Copermittees to implement two Watershed Water Quality Activities annually which reduce pollutant discharges causing the high priority water quality problems in their watersheds. In crafting this section of the Tentative Order, the Regional Board sought to obtain a balance between the ability to assess compliance with the Order and Copermittee flexibility in implementing the Order.

So that compliance with the section's requirements can be assessed, the section requires each group of watershed Copermittees to implement a minimum number of Watershed Water Quality Activities which will directly and significantly abate sources and reduce pollutant discharges causing the high priority water quality problems within their watershed. This requirement provides a measurable minimum outcome for Watershed Urban Runoff Management Program (WURMP) implementation. Measurable minimum outcomes for WURMP implementation are needed in the Tentative Order because it has previously been found that Copermittee implementation of Watershed Water Quality Activities was inadequate. In a detailed review of the Copermittees' 2003-2004 Watershed Urban Runoff Management Program Annual Reports, the Regional

Board reported that for most watersheds, the Copermittees' "water quality activities" would not result in any significant reduction of pollutant discharges.[36]

While the Tentative Order specifically requires implementation of a measurable number of Watershed Water Quality Activities, it also provides significant flexibility to the Copermittees regarding what constitutes a Watershed Water Quality Activity. The bottom line requirement for Watershed Water Quality Activities is that they directly reduce pollutant discharges during the reporting period for which the Copermittees are to receive credit for their implementation. Beyond this bottom line requirement, the Copermittees have ample implementation flexibility. For example, both jurisdictional and regional activities can be considered Watershed Water Quality Activities, provided the activities are organized and conducted on a watershed basis, targeting watersheds' high priority water quality problems. Total Maximum Daily Load (TMDL) activities can also be used by the Copermittees to meet the minimum Watershed Water Quality Activities requirements. Moreover, Copermittees within a watershed can implement different Watershed Water Quality Activities, provided they are part of the watershed Copermittees' larger watershed strategy.

Utilization of Copermittee Framework for Assessing Program Effectiveness Required

Section I of the Tentative Order requires the Copermittees to assess the effectiveness of the implementation of their programs and activities. The section requires both specific activities and broader programs to be assessed since the effectiveness of efforts may be evident only when considered at different scales. The effectiveness assessment requirements incorporate the approaches developed by the Copermittees in their October 16, 2003 "Framework for Assessing the Effectiveness of Jurisdictional Urban Runoff Management Programs," including use of "outcome levels" and "major effectiveness assessment elements."

During review of the Copermittees' annual reports, the Regional Board has frequently needed to request that the Copermittees improve their effectiveness assessments and utilize the various assessment methods that are available. Moreover, half of the Copermittees audited were found to have inadequate effectiveness assessments which frequently lacked use of measurable goals. For these reasons, the Order contains language requiring the Copermittees to utilize the various outcome levels "where applicable and feasible." This will help ensure that the Copermittees vigorously use outcome levels, while also providing the Copermittees with flexibility to develop techniques to use outcome levels where such techniques do not currently exist.

[36] Regional Board, 2005. Supplemental Report for Review of Notices of Violation Issued to the San Diego County Copermittees for Watershed Urban Runoff Management Program Implementation. P. 5-14.

The Tentative Order also includes an emphasis on assessment of the Copermittees' watershed programs in terms of changes to water quality. Since the entire thrust of the watershed urban runoff management programs is to improve the high priority water quality problems within the various watersheds, assessment of changes to water quality is necessary to assess the effectiveness of the watershed urban runoff management programs. After 15 years of implementation of the storm water program in San Diego County, impact of the program on water quality must be assessed. Without such assessments, it will not be known whether the watershed urban runoff management programs are achieving their purpose. Moreover, such assessment can help validate current efforts, which is essential for maintaining program support, while also guiding future efforts.

Assessments of Copermittee programs in terms of water quality have been conducted by Copermittees in the past and have been found to be useful. For example, the City of Encinitas reports decreasing bacteria levels in commercial areas following increased inspections of commercial facilities. The City also reports similar results in residential areas following increased residential education efforts.[37] Such information provides very useful feedback to the Copermittees, since the results can be localized or watershed-based.

Additional Monitoring Required

The core components of the monitoring program are based on the Copermittees' monitoring proposal. This includes new monitoring stations called Temporary Watershed Assessment Stations located in the upper portions of watersheds, in combination with the traditional Mass Loading Stations located at the bottom of San Diego County's main watersheds. In addition, monitoring at the Temporary Watershed Assessment Stations and Mass Loading Stations has been expanded under the new monitoring program to include monitoring during dry weather, as opposed to monitoring only during storm events. This increase in the number of monitoring stations, together with the inclusion of dry weather monitoring, is offset by a reduction in the number of storm events to be monitored during the permit term. The additional information garnered from the Temporary Watershed Assessment stations and dry weather monitoring is expected to make up for any loss of information resulting from reduced monitoring of storm events.

In addition to new monitoring aspects based on the Copermittees' monitoring proposal, the monitoring program includes additional targeted monitoring to address various urban runoff issues. This additional monitoring includes trash monitoring, pyrethroid monitoring, MS4 outfall monitoring, and source identification monitoring.

[37] City of Encinitas, 2006. Jurisdictional Urban Runoff Management Program Annual Report FY 2004-2005. P. 11-9.

Monitoring for trash is needed because trash conditions impacting beneficial uses have frequently been observed within the Copermittees' jurisdictions. For example, the Regional Board directed the Copermittees within the watersheds of Chollas and Paleta Creeks to implement the "iterative process" to address violations of water quality standards due to trash conditions within the creeks.[38] The Regional Board also issued a Notice of Violation to the City of Escondido for trash conditions in Escondido Creek.[39] Moreover, the Copermittees have identified trash as a regional priority.[40]

A program to monitor pyrethroids is needed because they are the leading insecticides sold to homeowners and have been found at toxic levels in suburban stream sediments in California when investigated.[41] Moreover, their use is likely to increase as diazinon use decreases. Monitoring of pyrethroids will help guide efforts to ensure that the gains achieved by the phasing out of diazinon are not nullified by increased use of pyrethroids.

The Tentative Receiving Waters and Urban Runoff Monitoring and Reporting Program also requires the Copermittees to develop and implement a program to monitor pollutant discharges from MS4 outfalls. After over 15 years of program implementation, most Copermittees have not monitored their MS4 discharges significantly and still do not know the quality of those discharges during various conditions. Such monitoring is critical, since it will provide for prioritization of areas for increased management efforts. It will also provide the Copermittees the ability to better assess and improve their jurisdictional programs and BMPs. For example, the Copermittees' assessment framework calls for assessing changes in load reductions and MS4 discharge quality.[42] Monitoring of MS4 outfalls will enable the Copermittees to meet these program assessment goals. Without monitoring of MS4 outfalls, it is unclear how these program assessment goals will be met. This type of monitoring is recommended for high priority outfalls by the Stormwater Monitoring Coalitions' Model Monitoring Technical Committee.[43]

In addition, the Tentative Receiving Waters and Urban Runoff Monitoring and Reporting Program requires the Copermittees to develop and implement a program to identify sources of discharges of pollutants causing the priority water quality problems within each watershed. Identification of sources causing priority water quality problems is a central purpose of urban runoff management

[38] Regional Board, 2001. California Water Code Section 13267 Directives Issued to the City of San Diego, City of La Mesa, City of Lemon Grove, and City of National City.
[39] Regional Board, 2000. Notice of Violation No. 2000-181.
[40] San Diego County Copermittees, 2005. Report of Waste Discharge. P. C-3.
[41] Science News Online, 2006. A Little Less Green? Studies Challenge the Benign Image of Pyrethroid Insecticides. www.sciencenews.org/articles/20060204/bob9/asp.
[42] San Diego Municipal Stormwater Copermittees, 2003. A Framework for Assessing the Effectiveness of Jurisdictional Urban Runoff Management Programs. P. 14.
[43] Model Monitoring Technical Committee, 2004. Model Monitoring Program for Municipal Separate Storm Sewer Systems in Southern California. P. 5-55.

programs. Monitoring which enables the Copermittees to identify sources of water quality problems aids the Copermittees in focusing their management efforts and improving their programs. In turn, the Copermittees' programs can abate identified sources, which will improve the quality of urban runoff discharges and receiving waters. Source identification monitoring is a key component of the Model Monitoring Program, which states "once it has been determined […] that urban runoff is, or is likely to be, a significant source of one or more receiving water problems, then more intensive source identification efforts are called for."[44] Moreover, in its review of the Copermittees' monitoring proposal, Tetra Tech, Inc. finds that "after some years of assessment monitoring, it is time to look more systematically at determining the relative urban contributions and the sources of urban runoff that contribute to identified receiving water problems."[45]

Since monitoring for trash, pyrethroids, MS4 outfalls, and source identification studies is new, the Copermittees are provided significant leeway in the development and implementation of the programs. The Copermittees can utilize the flexibility incorporated into the monitoring requirements to develop programs that are workable for them while providing the necessary information.

[44] Model Monitoring Technical Committee, 2004. Model Monitoring Program for Municipal Separate Storm Sewer Systems in Southern California. P. 4-17.
[45] Tetra Tech Inc., 2006. Review of San Diego County MS4 Monitoring Program. P. 15.