# FACT SHEET/STAFF REPORT

# FOR THE

STORM WATER AND NON-STORM WATER DISCHARGES FROM THE MUNICIPAL SEPARATE STORM SEWER SYSTEM WITHIN VENTURA COUNTY WATERSHED PROTECTION DISTRICT, COUNTY OF VENTURA AND THE INCORPORATED CITIES WITHIN VENTURA COUNTY
NPDES PERMIT (CAS004002)

ORDER No. R4-2010-0108

July 8, 2010

Los Angeles Regional Water Quality Control Board

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# I. PURPOSE

The purpose of this Fact Sheet/Staff Report is to provide Permittees (Ventura County Watershed Protection District, the County of Ventura and the incorporated cities therein) and interested parties an overview of the Ventura County NPDES Permit for storm water and urban runoff discharges from municipal separate storm sewer systems (MS4s), adopted on [insert date]. This Fact Sheet/Staff Report also provides the technical basis for the permit requirements.

# II. INTRODUCTION - THE NEED TO REGULATE STORM WATER DISCHARGES

## A. Impacts

The quality of storm water and urban runoff is fundamentally important to the environmental and economic health of the Los Angeles Region (Region), and to the quality of life in southern California. Discharges of pollutants from MS4s are one of the leading causes of water quality impairment in the region. Storm water and urban runoff (during wet and dry weather) are often contaminated with bacteria from illicit connections and illicit discharges to the MS4; Polycyclic Aromatic Hydrocarbons (PAHs), from the products of internal combustion engine operation and wash off of parking lot sealants; nitrates from fertilizer application; pesticides from pest mitigating applications; herbicides from plant mitigating applications; bis (2-ethylhexyl) phthalate from the break down of plastic products; mercury from atmospheric fallout and improper disposal of mercury switches; lead from fuels, paints, and automotive parts; copper from brake pad wear and roofing materials; zinc from tire wear and galvanized sheeting and fencing; sediment from land disturbance and erosion; and dioxins as products of combustion. Water flowing over the Permittees' residential, industrial, and commercial areas conveys these untreated pollutants to and through the MS4, directly into the receiving waters of the region. The water quality impacts and related adverse ecological and public health impacts from Municipal Separate Storm Sewer System (MS4) discharges that affect receiving waters nationwide and within the region are well documented (NRC 2008).

Water quality assessments conducted by the Regional Board have identified impairments and threatened impairments of beneficial uses of water bodies in the Ventura Watersheds. These impairments include many of the Pollutants of Concern (POC) identified by the Ventura Countywide Storm Water Monitoring Program. These impairments are identified on the State of California § 303(d) list of impaired water bodies.

Studies and research conducted by other Regional agencies, and academic institutions have also identified storm water urban runoff as significant sources of pollutants to surface waters in Southern California. A regional survey of the microbiological water quality along the shoreline of the Southern California Bight (SCB), from Point Conception south to Ensenada, Mexico, was conducted during August, 1998, by 36 agencies under the coordination of the Southern California Coastal Water Research Project (SCCWRP). It was found that freshwater outlets, comprised mainly of storm drains, had the poorest water quality with 60% and 40% of the

shoreline miles exceeding monthly and daily thresholds, respectively. Freshwater outlets were also more likely to demonstrate exceedances by multiple indicators at a single site, and repeat exceedances at sites over the five-week period.[1]

Urban runoff has been found to cause significant receiving water impacts on aquatic life. In order to best identify and understand these impacts, it is necessary to include biological monitoring, using a variety of techniques, and sediment quality analyses, in a monitoring program. Water column testing alone has been shown to be very misleading. Most aquatic life impacts associated with urbanization are probably related to long-term problems caused by polluted sediments and food web disruption. An adequate analysis of receiving water biological impacts must include investigations of a number of biological organism groups in addition to studies of water and sediment quality[2].

# III. INTRODUCTION

History of Ventura MS4 NPDES Permit

In 1987, the U.S. Congress amended the Clean Water Act to specifically require storm water discharges including those from municipalities with populations 100,000 or greater, conveyed by a separate storm sewer system to be addressed as point sources of pollution under the NPDES. These municipalities were required to reduce the discharge of storm water pollutants to the maximum extent practicable (commonly referred to as the MEP standard). The U.S. and California Courts have since interpreted federal statutes to give the permitting authority the discretion to also require compliance with water quality standards. In addition, conditions in

[1] Noble, R.T., J.H. Dorsey, M.K., Leecaster, M. Mazur, C.D. McGee, D. Moore, V. Orozco-Borbón, D. Reid, K. Schiff, P.M. Vainik, and S.B. Weisberg. 1999. Southern California Bight 1998 Regional Monitoring Program: I. Summer Shoreline Microbiology. Southern California Coastal Water Research Project. Westminster, CA.

[2] Burton, G.A. Jr., and R. Pitt, Stormwater Effects Handbook: A ToolBox for Watershed Managers, Scientists, and Engineers. CRC Press, Inc., Boca Raton, FL. August 2001. 1085 pp.

NPDES permits must be consistent with the assumptions of TMDL WLAs that have been adopted.

The USEPA issued the Final Storm Water Regulations in November 1990, which required medium and large municipalities to submit a two part application. The first part required basic system description and ownership identity information. Part 2 required storm water pollutant discharge characterization data from one wet season, and a proposed storm water quality management plan.

In 1990, populations in Oxnard, Thousand Oaks, and Unincorporated Ventura County met the Census definition of medium size municipalities.

The City of Oxnard submitted a Part 1 application in 1991. After discussions with the Ventura County Flood Control District, and the City of Thousand Oaks, the Water Board decided that the VCFD as Principal Permittee would submit a system wide Part 2 application on behalf of all the municipalities in Ventura County, because of the interconnected nature of the flood control system.

A consolidated Part 2 application was submitted in 1993, and the Water Board issued the first term system-wide municipal storm water permit for Ventura County in 1994.

The first term MS4 permit was adopted in 1994, and the focus of the permit was to require Ventura County municipalities to develop storm water pollution control programs in the areas of public involvement/ education; business/ industry outreach; development planning; development construction; public agency activities; and illicit connection/ discharge elimination, in addition to implementing a basic monitoring program to characterize the quality of municipal storm water discharges.

The second term MS4 permit was adopted in 2000, and the focus of the permit was the implementation of a comprehensive storm water quality management program, to reduce the discharge of storm water pollutants to the MEP, and to meet water quality standards. The monitoring program was expanded to assess mass emissions of pollutants from Ventura County Rivers to coastal waters, and to better understand the quality of wet weather discharges and their adverse impacts.

The Ventura County MS4 Program, under the leadership of the Ventura County Watershed Protection District has made significant strides in implementing programs to reduce storm water pollution. Yet, more than a decade after the first permit was issued, exceedances of water quality standards for storm water pollutants such as bacteria, and heavy metals continue. In addition, the Ventura County MS4 program having run its second term is a step behind that of Los Angeles County, which closed out its third term last December.

The third term MS4 permit identifies a default set of specific storm water BMPs that industry, construction, and public agencies must implement based on activity to reduce the discharge of storm water pollutants. The permit promotes the implementation of LID strategies for new development and redevelopment, which have the objective of maintaining pre-development

hydrology and utilizing natural controls to reduce storm water pollution. The permit incorporates for the first time TMDL WLAs adopted by the Board for impaired water bodies, which is consistent with federal and state regulations.

Report of Waste Discharge

The Permittees filed a Report of Waste Discharge (ROWD), dated January 26, 2005. The Permittees applied for renewal of their waste discharge requirements for a 5-year period, which serves as an NPDES permit to discharge wastes to surface waters.

The Regional Water Board reviewed the ROWD and determined it to be partially complete under the reapplication policy for MS4s issued by the United States Environmental Protection Agency (U.S. EPA) (61 Fed. Reg. 41697). The Regional Water Board has prepared this Order so that implementation of provisions contained in this Order by Permittees will meet the requirements of the federal NPDES regulations at 40 CFR 122.26.

The Permittees' Report of Waste Discharge contained a proposed Storm Water Management Program and a Monitoring Program to be considered by the Regional Water Board for incorporation into an MS4 NPDES Permit as permit conditions and to demonstrate compliance with federal law. The Permittees are entitled, but did not elect, to pursue a permit solely based on numeric end-of-pipe limits for storm water discharges, which would have required them to satisfy specific effluent limitations rather than implement storm water management programs. Where a MS4 permittee voluntarily chooses a Best Management Practice (BMP) based storm water management program rather than one based solely on end-of-pipe numeric effluent limits, there exists no compulsion of a specific regulatory scheme that would violate the 10th Amendment to the United States Constitution. (City of Abilene v. EPA, 325 F.3d 657 (5th Cir. 2003)).

Meetings

The Regional Water Board staff conducted meetings from October 2005 through January 2009, with Permittees, their representatives (Larry Walker Associates, and Somach, Simmons & Dunn), and various stakeholders (Building Industry Association of Southern California/Greater Los Angeles Ventura Chapter (BIA/LAV), California State Dept. of Public Health, Calleguas Municipal Water District, California Stormwater Quality Association (CASQA), City of Downey, City of Los Angeles-EMD, Coalition for Practical Regulation (CPR), Construction Industry Coalition on Water Quality (CICWQ), County of Orange, Geosyntec Consultants, Golden State, Heal the Bay; Local Government Commission, Los Angeles City; Los Angeles County Department of Public Works, Los Angeles County-SD, Los Angeles Department of Water and Power, Metropolitan Water District, Natural Resources Defense Council (NRDC), Richard Watson & Associates, San Bernardino Flood Control District, Santa Monica Bay Restoration Commission, Southern California Coastal Water Research Project, University of California Sea Grant, Ventura CoastKeeper, and Charles Abbott Associates. On April 5, 2007, September 20, 2007, and July 10, 2008 the Regional Water Board conducted workshops to discuss drafts of the NPDES Order and received input from the permittees and the public regarding proposed changes.

# IV. STATUTORY AND REGULATORY HISTORY OF THE STORMWATER PROGRAM

The Federal Clean Water Act (CWA) generally prohibits the "discharge of any pollutant," 33 U.S.C. § 1311(a), from a "point source" into the navigable waters of the United States. 33 U.S.C. § 1362(12)(A). An entity can, however, obtain a National Pollutant Discharge Elimination System (NPDES) permit that allows conditionally for the discharge of some pollutants. 33 U.S.C. § 1342(a)(1). The CWA defines point sources as "discernible, confined and discrete conveyances, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure" such as a pipe, ditch, container, rolling stock, concentrated animal feeding operation, landfill leachate collections system, vessel or other floating craft from which pollutants are or may be discharged. 33 U.S.C. § 1362; 40 CFR 122.2.

In 1987, the U.S. Congress enacted the Water Quality Act recognizing both the environmental threats posed by storm water runoff and the U.S. EPA's problems in implementing regulations for storm water discharges (NRDC II, 966 F.2d at 1296). These Amendments to the CWA established new statutory requirements to control industrial and municipal storm water discharges to waters of the United States (CWA § 402(p)).

The amendments require NPDES permits for storm water discharges from Municipal Separate Storm Sewer Systems (MS4s) to waters of the United States, and the MS4 was designated a "point source". The storm water discharge permits for MS4s (i) may be issued on a system- or jurisdiction-wide basis; (ii) shall include a requirement to effectively prohibit [unauthorized] non-storm water discharges into the storm sewers; and (iii) shall require controls to reduce the discharge of pollutants from storm water to the maximum extent practicable, including management practices, control techniques and systems, design and engineering methods, and such other provisions as the Administrator or the State determines appropriate for the control of such pollutants. (See CWA §402(p) (3) (B)).

Ordinarily, an NPDES permit imposes [numerical] effluent limitations on such discharges. See 33 U.S.C.§ 1342(a)(1) (incorporating effluent limitations found in 33 U.S.C. § 1311). First, a permit-holder "shall . . . achiev[e] . . . effluent limitations . . . which shall require the application of the best practicable control technology [BPT] currently available." 33 U.S.C. § 1311(b)(1)(A). Second, a permit-holder "shall . . . achiev[e] . . . any more stringent limitation, including those necessary to meet water quality standards, treatment standards or schedules of compliance, established pursuant to any State law or regulations (under authority preserved by section 1370 of this title)." 33 U.S.C. § 1311(b)(1)(C). In the case of MS4 NPDES discharge permits, federal courts have ruled that the U.S. EPA has the discretionary authority under "33 U.S.C. § 1342(p)(2)(E) to determine that ensuring strict compliance with state water-quality standards is necessary to control pollutants, or to require less than strict compliance with state water-quality standards, such as a BMP approach" (*Defenders of Wildlife v. Browner*, 191 F.3d 1159 (9th Cir., 1999)). Under 33 U.S.C. § 1342(p)(3)(B)(iii), the U.S. EPA has the choice to include either best management practices or numeric limitations in the permits. NRDC II, 966 F.2d at 1308

("Congress did not mandate a minimum standards approach or specify that [the] EPA develop minimal performance requirements.").

**Regulatory Scheme**

On November 16, 1990, pursuant to CWA § 402(p), the U.S. EPA promulgated regulations at 40 CFR 122.26 which established requirements for storm water discharges under the NPDES program. The U.S. EPA defines storm water at 40 CFR 122.26 (b)(13) as 'storm water runoff, snow melt runoff, and surface runoff and drainage' [related to storm events or snow melt] (55 Fed. Reg. 47990, 47995). Non storm water discharges to the MS4 are to be "effectively prohibited" by the MS4 operator. "Effective prohibition" meant that the MS4 Permittee was to implement programs to eliminate "illicit discharges" to the storm drain system unless authorized under NPDES permits issued independent of the MS4 permit (55 Fed. Reg. 47995). The storm water regulations also intended to not hold MS4 Permittees responsible for certain categories of non storm water discharges, such as uncontaminated ground water infiltration, natural springs, rising groundwater, streams and diversions, from the MS4. Such discharges might need to be addressed under independent NPDES permits when specifically identified on a case-by case basis by the MS4 Permittee or the permitting authority.

The U.S. EPA initially intended that storm water discharges from the MS4 be primarily addressed through the implementation of BMPs on an iterative approach because of the intermittent and variable nature of storm flows and pollutant concentrations as well as insufficient data at the time the regulations were promulgated (61 FR 43761). However, the U.S. EPA's scheme for non-storm water discharges from the MS4 is to bring them under the existing framework of the NPDES program at 40 CFR 122.44(d). (55 Fed. Reg. 47995). Furthermore, federal regulations state that non-numerical limitations such as BMPs for non-storm water discharges may be authorized only where numerical limits are not feasible (40 CFR 122.44(k)). In any case, if the Permittee fails to implement adequate BMPs to prevent exceedance of the water quality standards, the permitting authority "may have to consider other approaches to water quality protection" (61 Fed. Reg. 43761; *Interim Permitting Approach*, Response #6, EPA 833-D-96-00, 1996).

The CWA §303(d)(1)(A) requires each State to conduct a biennial assessment of its waters, and identify those waters that are not achieving water quality standards. The resulting list is referred to as the 303(d) list. The CWA also requires States to establish a priority ranking for waters on the 303(d) list of impaired waters and to develop and implement TMDLs for these waters. A TMDL specifies the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards, and allocates the acceptable pollutant load to point and nonpoint sources. The elements of a TMDL are described in 40 CFR 130.2 and 130.7. A TMDL is defined as "the sum of the individual waste load allocations for point sources and load allocations for nonpoint sources and natural background" (40 CFR 130.2). Regulations further require that TMDLs must be set at "levels necessary to attain and maintain the applicable narrative and numeric water quality standards with seasonal variations and a margin of safety that takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality" (40 CFR 130.7 (c) (1)). The regulations at 40 CFR 130.7 also state that TMDLs shall take into account critical conditions for stream flow, loading and water quality parameters. The U.S. EPA has circulated guidance for establishing WLAs for storm water discharges in

TMDLs and their incorporation as numerical limitations in MS4 Storm Water Permits (U.S. EPA Office of Water Memo, *Establishing Total Maximum Daily Load Wasteload Allocations for Storm Water Sources and NPDES Permit Requirements Based on those WLAs*, November 22, 2002).

Since provisions in NPDES permits must reflect the assumptions and requirements of available TMDLs (40 CFR 122.44 (d)(1)(vii)(B)), the NPDES permit must incorporate the WLAs as either BMPs (reasonably expected to achieve the WLAs when implemented and properly maintained), under specified circumstances (40 CFR 122.44(k)(2) & (3)), or as a Water Quality Based Effluent Limitations (WQBEL) expressed numerically. Where a non-numeric effluent limitation is selected, the permits administrative record must support the expectation that the BMPs are sufficient to achieve the WLAs. (40 CFR 124.8, 124.9, and 124.18.)

State Regulatory Authority and Permit History

The State of California is one of forty-five States with duly delegated authority under the CWA to implement the NPDES permitting program. The Porter-Cologne Act (California Water Code) authorizes the State Board, through the nine regional boards, to issue NPDES permits, and regulate and control the discharge of pollutants into waters of the State. To comply with the CWA, the Los Angeles Regional Water Board (LA Water Board) issued the first storm water permit ("predecessor permit") for the County of Ventura on August 22, 1994, to the municipalities (Permittees) in Ventura County (Order No. 94-082; NPDES Permit No. CAS004002). The Ventura County MS4 Permit was reissued on July 27, 2000 (Order No. 00-108; NPDES Permit No. CAS004002).

Because of the complexity and networking of the storm drain system and drainage facilities within and tributary to the County of Ventura, the LA Water Board adopted a countywide approach in permitting storm water and urban runoff discharges. The permit requires Permittees to conduct monitoring and to implement programs in the areas of public involvement and participation, industrial/commercial inspection, development planning, development construction, public agency activities; to reduce the discharge of pollutants in storm water to the Maximum Extent Practicable (MEP) from the permitted areas in the County of Ventura to the waters of the U.S.; and to not cause or contribute to exceedances of receiving water limitations. In addition, Permittees are required to effectively prohibit the discharge of unauthorized non storm water into the MS4 and receiving waters (except where they are authorized under a NPDES permit), by implementing a program to detect and eliminate illicit discharges/connections to the MS4.

The Ventura County MS4 Permit requires Permittees to develop, and implement a timely, comprehensive, cost-effective storm water pollution control program to reduce the discharge of pollutants in storm water to the Maximum Extent Practicable (MEP) to the waters of the U.S. and to ensure that discharges from the MS4 do not cause or contribute to receiving water limitation exceedances. In addition, it states that discharges from the MS4 to waters of the U.S. including, but not limited to those within the Calleguas Creek, Santa Clara River, Ventura River, Malibu Creek, and Ventura County Coastal watershed management areas are required to meet water quality standards. Upon establishment of TMDLs by the State or the U.S. EPA, the State is required to incorporate, or reference, the TMDLs in the State Water Quality Management Plan

(40 CFR 130.6 (c) (1), 130.7). The Water Quality Control Plan for the Los Angeles Region (Basin Plan), and applicable statewide plans, serves as the State Water Quality Management Plan governing the watersheds under the jurisdiction of the LA Water Board. LA Water Board-issued NPDES permits must contain provisions consistent with the State Water Quality Management Plan.

# V. DISCUSSION OF SPECIAL PROVISIONS

## A. General Requirements

### Non Storm Water Discharges

Federal Regulations promulgated on November 16, 1990 at 40 CFR 122.26 required Permittees to effectively prohibit all non-storm water discharges into the MS4 and receiving waters. However, the federal regulations also included a list of specific non-storm water discharges that "need not be prohibited" as long as they are not a source of pollutants that exceed water quality standards, and meet all conditions where specified by the Regional Board Executive Officer. These discharges include among others, discharges from potable water sources.

## B. Watershed Initiative Participation

Introduction

The Principal Permittee consents to participate in water quality meetings for watershed management and planning, including but not limited to the Southern California Stormwater Monitoring Coalition (SMC) and other Watershed planning groups, as appropriate.

Participation

The Principal Permittee consents to participate in the following regional water quality programs, and projects for watershed management and planning:

(a) SMC Regional Monitoring Programs
  (1) Southern California Regional Bioassessment
    (A) Level of effort per watershed
      (i) Probabilistic sites per watershed
        (I) Ventura River - Six
        (II) Santa Clara River - Three
        (III) Calleguas Creek - Six
      (ii) Integrator sites per watershed
        (I) Ventura River - One
        (II) Santa Clara River - One
        (III) Calleguas Creek – One
        (IV) Six
        (V) Fixed sites per watershed

(I) Ventura River - One
(II) Santa Clara River - One
(III) Calleguas Creek - One

(b) Southern California Bight Projects
(1) Regional Monitoring Survey – 2008, and successive years.

## C. Public Information and Participation Program

Introduction

Implementation of a PIPP is a critical BMP and a necessary component of a storm water management program. The State Board Technical Advisory Committee "recognizes that education with an emphasis on pollution prevention is the fundamental basis for solving nonpoint source pollution problems." The USEPA Phase II Fact Sheet 2.3 (Fact Sheet 2.3) finds that "An informed and knowledgeable community is critical to the success of a storm water management program since it helps insure the following: (i) greater support for the program as the public gains a greater understanding of the reasons why it is necessary and important, and (ii) greater compliance with the program as the public becomes aware of the personal responsibilities expected of them and others in the community, including the individual actions they can take to protect or improve the quality of area waters."

The USEPA's, Public Participation/Involvement Minimum Control Measure fact Sheet finds that Public education and outreach involves using effective mechanisms and programs, guided by a detailed outreach strategy, to engage the public's interest in preventing stormwater pollution. A key factor to consider when developing a strategy is that the public has varying levels of background knowledge of both storm water management and their role in reducing storm water pollution. Furthermore, the public can provide valuable input and assistance to a municipal storm water management program and, therefore, should play an active role in the development and implementation of the program. An active and involved community is essential to the success of a storm water management program
because it allows for:

- Broader public support since residents who participate in the development and decision making process are partially responsible for the program and, therefore, are more likely to take an active role in its implementation.
- Shorter implementation schedules due to fewer obstacles in the form of public and legal challenges and increased sources in the form of residents volunteers.
- A broader base of expertise and economic benefits since the community can be a valuable, and free, intellectual resource; and A conduit to other programs as residents involved in the storm water program development process make important cross-connections and relationships with other community and government programs.

This benefit is particularly valuable when trying to implement a storm water program on a watershed basis.

Discussion of New Requirements

1) The Draft Ventura MS4 Permit requires Permittees to work with existing local watershed groups or organize watershed Citizen Advisory Groups/ Committees. The intent of this requirement is to solicit public input for messages/activities that will persuade the public to modify their common activities to reduce/prevent pollutants from being discharged in storm water. A paper presented by David Galvin during the 4th National Conference Nonpoint Source and Stormwater Pollution Education Programs October 17-20, 2005 *Measuring Results from Outreach and Education Programs: Can We See Improvements Downstream? states, "Experiential programs appear to be more powerful than information campaigns, more likely to connect people with their watershed. Activities such as citizen volunteer monitoring, hands-on restoration, storm-drain-stenciling projects, and other ways to get an experiential element incorporated into the program have a greater likelihood of success. Get peoples' feet wet and their hands dirty. Once they have invested in the watershed, even in a tiny part of it, they will have more ownership." Direct feedback from the public on storm water pollution prevention messages can be an inexpensive alternative to traditional surveys and studies as well as promoting increased public support for storm water pollution prevention campaigns. The Draft Ventura MS4 Permit requires Permittees to establish watershed Citizen Advisory Groups/ Committees, which can be a subset of existing committees/groups. The intent of this requirement is to solicit public input for messages/activities that will persuade the public to modify their common activities to reduce/prevent pollutants from being discharged in storm water. A paper presented by David Galvin during the 4th National Conference Nonpoint Source and Stormwater Pollution Education Programs October 17-20, 2005 *Measuring Results from Outreach and Education Programs: Can We See Improvements Downstream? states, "Experiential programs appear to be more powerful than information campaigns, more likely to connect people with their watershed. Activities such as citizen volunteer monitoring, hands-on restoration, storm-drain-stenciling projects, and other ways to get an experiential element incorporated into the program have a greater likelihood of success. Get peoples' feet wet and their hands dirty. Once they have invested in the watershed, even in a tiny part of it, they will have more ownership." Direct feedback from the public on storm water pollution prevention messages can be an inexpensive alternative to traditional surveys and studies as well as promoting increased public support for storm water pollution prevention campaigns.

2) The Draft Ventura MS4 Permit requires an increase in media impressions and identifies the media venues. The intent of these changes is to provide an increase in public knowledge of storm water pollution prevention practices in an effective and cost efficient manner. Several studies have found that an increase in the frequency of storm water pollution prevention messages contributes to the likelihood that these messages will be remembered.

3) The Draft Ventura MS4 Permit requires outreach to ethnically diverse communities. The USEPA, Tailoring Outreach Programs to Minority and Disadvantaged Communities and Children Fact Sheet finds that, "many residents of ethnically and culturally diverse communities don't speak English. English messages contained in public education outreach materials may not be effectively reaching a significant portion of some communities. The intent of this provision is to encourage behavior changes that reduce pollutants in storm water to a portion of the population who might otherwise be overlooked.

4) The Draft Ventura MS4 Permit requires Permittees to work with other regional and/or statewide agencies and associations such as the California Storm Water Quality Association (CASQA), to develop a corporate outreach program to educate and inform corporate and local managers about storm water regulations and Best Management Practices (BMPs). The intent of this provision is to ensure that management is aware of the potential impacts their business can have on storm water quality, facilitate compliance with storm water requirements, and give management sufficient guidance to train staff throughout their business on appropriate business practices to mitigate the potential water quality impacts of their operations.

5) The Draft Ventura MS4 Permit requires Permittees to implement a Business Assistance Program to provide technical information to small businesses to facilitate their efforts to reduce the discharge of pollutants in storm water. The provision requires the distribution of storm water pollution prevention education materials to operators of auto repair shops, car wash facilities (including mobile car detailing), mobile carpet cleaning services, commercial pesticide applicator services and restaurants providing guidance on appropriate business practices to mitigate the potential impacts their business practices can have on storm water quality.

## D. Industrial/Commercial Businesses Program

Purpose

The purpose of the **Industrial/Commercial Businesses Program** is to assure that the implementation of adequate controls and inspection and monitoring activities at industrial/commercial sites will assist municipalities comply with the Maximum Extent Practicable and water quality standards for discharges from their MS4s. The goal of the program is also to assure that the need not be permitted non-stormwater discharges, such as air conditioning condensate, drains for foundations, footings, and crawl spaces, etc., are not a significant source of pollution and the Permittees are actively enforcing the prohibition against non-stormwater discharges. The Permittees have the legal authority to actively control pollutants in storm water discharges, to prohibit illegal discharges/illicit connections, to control spills, and to require compliance with the local ordinances, including the implementation of source control BMPs and other necessary control measures and carry out inspections within their respective jurisdictions.

Legal Framework

In this third iteration of the MS4 stormwater discharges permit to be issued to Ventura County MS4 Permittees, there are a number of upgrades for the industrial/commercial business program in comparison with the previous 2000 permit. The upgrades are in line with the current requirements in the Los Angeles MS4 permit issued in 2001 and other MS4 permits recently issued in California, e.g. Sacramento, San Bernandino MS4 permits and nationwide, e.g. Seattle, Washington. This iterative approach for MS4 stormwater discharge permits, to contain better

tailored BMPs, it is described by the USEPA in its *Interpretative Policy Memorandum on Reapplication Requirements* of MS4s issued by USEPA (61 Fed. Reg. 41697). In the Memorandum, USEPA specifies that "…[it] is seeking to improve existing MS4 storm water management programs by using information and experience municipalities have gained during the previous permit term." In its *Interpretative Memorandum* Q&As part (EPA 833-D-96-001), USEPA further clarified that based on the Section 301 of the Clean Water Act (CWA), it is required that discharger permits include effluent limitations necessary to meet State Water Quality Standards (WQS). However, under the CWA and NPDES regulations, permitting authorities may employ a variety of conditions and limitations in storm water permits, including BMPs, performance objectives, narrative conditions, monitoring triggers, action levels (e.g., monitoring benchmarks, toxicity reduction action levels, etc.), as the necessary water quality-based effluent limitations.

The types of activities proposed in the new Ventura MS4 permit are similar with the conditions currently found in the Los Angeles MS4 permit. It is important to note that similar controls for industrial/commercial sites required by the Los Angeles MS4 permit, including inspection activities, are also required in the San Bernardino MS4 permit that was challenged in Court. In the decision for that case, the Appellate Court found that "[…] permittees are responsible for inspecting construction and industrial sites and commercial facilities within their jurisdiction for compliance with and enforcement of local municipal ordinances and permits" (***City of Rancho Cucamonga v. Regional Water Quality Control Bd.- Santa Ana Region (2006)*** *Feb 27* ***Cal/4*** *E037079*).

On a separate action that challenged the Los Angeles MS4 permit, the Superior Court determined "that the Permit contains reasonable inspection requirements for these types of facilities… Addressing pollution after it has entered the storm sewer system is not working to meet legislative goals. More work is required at the source of pollution… Federal law requires [municipal] permittees to inspect dischargers… Nothing in the regulations precludes the inspections of facilities with state-issued permits…" ***(In Re L.A. County Municipal Storm Water Permit Litigation (2004)*** *BS080548)* In a subsequent decision, the Appellate Court upheld the Superior Court decision and the inclusion in the permit of the requirement to inspect industrial/commercial and construction sites ***(County of Los Angeles et al. v. California State Water Resources Control Board et al. (2006) Nov 6 Cal/5*** *B184034)*: "The legal authority extended to: requiring persons to comply with permittees' ordinances; holding dischargers to storm drain systems accountable; controlling pollutants and their potential contributors; inspecting, watching, and monitoring procedures to insure compliance with the permit including prohibition of illicit discharges into storm drain systems; and requiring the use of best management practices to reduce pollutant discharge into the storm drain systems to the maximum extent possible"(underlined added). In addition, the Court recognized the Regional Board's authority to require in NPDES permits the implementation of specific better-tailored BMPs that achieve compliance with the MEP and WQS: "the regional board has the authority to impose additional restrictions… the federal Clean Water Act authorizes National Pollutant Discharge Elimination Systems permits to set forth specific practices which will restrict polluted storm water runoff… Thus, nothing in state law is violated by the specific pollution control requirements imposed on the permittees."

Regional Board is authorized under 40 CFR 122.44(k)(2) to require BMPs in lieu of numeric effluent limitations in NPDES permits when the Regional Board finds numeric effluent limitations to be infeasible. The Regional Board may also impose BMPs which are "reasonably necessary… to carry out the purposes of the Clean Water Act" under 40 CFR 122.44(k)(3). Both of these standards for imposing BMPs were recognized in ***NRDC v. Costle, 568 F.2d 1369, 1380 (D.C. Cir. 1977)***. Furthermore as mentioned before, the same authority was recognized in the state Appellate Circuit in ***County of Los Angeles et al. v. California State Water Resources Control Board et al. (2006) Nov 6 Cal/5 B184034.***

State of the pollution at sites of industrial/commercial activity

Since the NURP study[1] in early 1980s, sites of industrial activity demonstrated the potential of contributing higher quantities of pollutants into the stormwater runoff when compared with other land uses. Data from the NURP study were analyzed further in the *U.S. Geological Survey (USGS) Urban Storm Water Data Base for 22 Metropolitan Areas Throughout the United States* study[2]. The USGS report summarized additional monitoring data compiled during the mid-1980s, covering 717 storm events at 99 sites in 22 metropolitan areas, and documented problems associated with metals and sediment concentrations in urban stormwater runoff.

The *California Stormwater BMP Handbook - Industrial and Commercial* published in January 2003 by California Stormwater Quality Association (CASQA) lists as potential pollutants from sites of industrial activities: sediments, nutrients, metals, organics and toxicants, oil and grease, bacteria, pesticides. The type of activity or facility that potentially discharge those pollutants in stormwater runoff include vehicle & equipment fueling, vehicle & equipment maintenance and repair, outdoor loading & unloading of materials, outdoor storage of raw materials, products, and byproducts, building and grounds maintenance, parking/storage area maintenance.

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[1] Results of the Nationwide Urban Runoff Program, Volume 1—Final Report. U.S. EPA. 1983. Office of Water. Washington, D.C.

[2] U.S. Geological Survey Urban Storm Water Data Base for 22 Metropolitan Areas Throughout the United States. Driver, N.E., M.H. Mustard, R.B. Rhinesmith, and R.F. Middleburg. 1985. Report No. 85–337 USGS. Lakewood, CO.

USEPA's *Considerations in the Design of Treatment BMPs to improve Water Quality* (EPA 600/R-03/103, September 2002) also shows that lands of industrial/commercial use contribute significant loads of pollutant in urban areas. As examples, the industrial land uses may typically contribute 0.2 lb/ac/yr of lead, 0.4. lbs/ac/yr of zinc, 0.6 lb/ac/yr of chromium, 500 lb/ac/yr of suspended solids, while commercial land uses typically contribute 2.7 lb/ac/yr of lead, 2.1 lb/ac/yr of zinc, 0.15 lb/ac/yr of chromium, 1,000 lb/ac/yr of suspended solids. In the same document urban stormwater pollutants event mean concentrations for different U.S. regions show concentrations for copper, lead, zinc consistently above water quality standards.

The water quality monitoring data submitted by the Ventura MS4 Permittees (Annual Monitoring Report 04-05) reveal that a number of constituents, such as metals, PAHs, pesticides exceeded the receiving water quality standards during wet events. Because studies and research demonstrated that the same types of pollutants are typically released in higher quantities into stormwater runoff from sites of industrial and commercial activities, there is a strong presumption that pollutants in stormwater runoff discharges from those sites cause or contribute to the exceedances.

Studies that are more recent confirm that tendency. The *Critical Source Selection and Monitoring Report*[1] performed on behalf of Los Angeles MS4 Permittees, identified seven highest ranked pollution potential activities to be, in order of ranking: (i) wholesale trade (scrap, auto dismantling), (ii) *automotive repair/parking*, (iii) fabricated metal products, (iv) motor freight (including trucking), (v) chemical and allied products, (vi) automotive dealers/gas stations, (vii) primary metals products. It is significant to note that five out of seven categories of activities are subject to Phase I industrial storm water regulations. Although *automotive repair/parking* and *automotive dealers/gas stations* categories were not the focus of the Phase I storm water regulations, the study identified these commercial categories as significant potential pollutant contributors based on the principles developed in the critical source criteria study.

[1] Critical Source Selection and Monitoring Report, Woodward-Clyde, 1997

| Rank (pollution potential)[1] | Industrial Category | SIC Code |
|---|---|---|
| 1 | Wholesale trade (scrap, auto dismantling) | 50 |
| 2 | Automotive repair/parking | 75 |
| 3 | Fabricated metal products | 34 |
| 4 | Motor freight (including trucking) | 42 |
| 5 | Chemical and allied products | 28 |
| 6 | Automotive Dealers/Gas Stations | 55 |
| 7 | Primary Metals Products | 33 |

More recent research reviewing stormwater monitoring data reveals that the stormwater runoff from industrial sites contains significant loads of pollutants. In *Utility of Stormwater Monitoring- H. Lee, M.K. Stenstrom- Water Environ. Res., 77, 219 (2005)*, the authors reviewed three years of stormwater monitoring data from industrial sites in Los Angeles County covered by the statewide Industrial Activities Stormwater General Permit (IASGP). The authors concluded that the data clearly show that certain industrial sectors contribute higher quantities of pollutants in the stormwater runoff. In addition, concentrations of metals exceeded the stormwater benchmark values suggested by the US EPA more frequently than the basic water-quality parameters. In *Industrial Storm Water Monitoring Program Existing Statewide Permit Utility and Proposed Modifications* (*H. Lee, M.K. Stenstrom* -US EPA cooperative agreement CP-82969201 from the California State Water Resources Control Board, contract number 02-172-140-0, 2005) the authors examined data collected over the nine-year period from 1992 to 2001 from industrial sites in Los Angeles and Ventura County covered by the statewide IASGP. The analysis of the expanded data set confirmed the conclusions of the prior research that industrial/commercial sites contribute higher quantities of pollutants in the stormwater runoff.

[1] Critical Source Selection and Monitoring Report (Table 1-3) - Woodward-Clyde, 1996

Nationwide and statewide research and monitoring data has shown that nurseries are also a category of facilities that tend to release a higher quantity of pollutants in stormwater runoff. Recognizing this class of facilities and activities as a potential source of pollutants, the Regional Board adopted a *Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands within the Los Angeles Region (Waiver),* Order No. R4-2005-0080. The Waiver covers discharges from "irrigated lands where water is applied for producing crops and, … includes, but is not limited to, land planted for row, vineyard, field and tree crops as well as nurseries, nursery stock production, and greenhouse operations… which are not subject to waste discharge requirements, including Municipal Separate Storm Sewer System (MS4) or other National Pollutant Discharge Elimination System (NPDES) permits." However, because the non-agricultural nurseries present in the urban environment can manifest the same characteristics as their agricultural counterparts, the nurseries under specified NAICS codes are covered under the current Ventura MS4 permit.

Proposed Enhancements

The new permit requirements build on the activities and experience gained in the previous ones and moves from a more educational effort to the next iteration of better source control BMPs implementation, inspection and enforcement. A special emphasis is put on mandatory implementation of a baseline minimum set of common sense source control BMPs recommended by the California Stormwater Quality Association (CASQA) BMP Handbook similar to the approach suggested by the Permittees in their ROWD for controlling pollution in stormwater discharges from construction sites.

In their ROWD, the Ventura County Permittees did not propose an enhancement of their program to control pollutants in stormwater runoff from industrial/commercial sites into the MS4 further than the provisions contained in the 2000 permit. The Permittees also did not propose any improvements in the monitoring program to better characterize the discharge of pollutants from sites of industrial or commercial use and prioritize the activities to control them. In addition, the Permittees did not propose any improvements in the type and extent of BMPs that must be implemented at industrial/commercial sites in order to control the quantity of pollutants into the stormwater runoff discharged into their MS4s. The Permittees must require the implementation of such controls at industrial/commercial sites to the extent that municipalities can comply with the MEP and water quality standards for discharges of stormwater from their MS4s.

Based on the dual coverage and partnership approach between the permitting authority and municipalities that the USEPA called for in the storm water regulations and in order to best use limited resources at the State and local level, the permit includes the following improvements.

Recognizing that this permit represents a *third iteration* permit, and building upon the experience and tools developed under the previous permits, the Industrial/Commercial program has been elevated to an inspection, baseline mandatory source control BMPs implementation and enforcement program. Based also on the extensive educational effort performed by the Permittees since mid 1990s to familiarize industrial and commercial site operators with the requirements of the stormwater pollution prevention techniques and municipal regulations, the new permit includes a number of enhancements. Municipalities are required to control the storm

water discharges associated with industrial activities and other commercial facilities identified as significant contributors of pollutants through the implementation of a mandatory baseline minimum set of source control BMPs; performance of an inspection program to verify the adequacy of BMPs implementation in the field and compliance with the municipal ordinances; and assist the Regional Board in ensuring that industrial activities subject to regulations are covered by the general industrial stormwater permit. Regional Board will also assist the municipalities in case of instances of egregious non-compliance with the municipal ordinances and state and federal laws and regulations.

Many owner/operators of industrial/commercial sites should be familiar by now with the legal requirements outlined in the municipal ordinances and the type of BMPs necessary to minimize the contribution of pollutants into stormwater runoff from their sites. The enhancements are also based on the results of the monitoring data showing that pollutants of concern that are typically discharged from sites of industrial and commercial activities cause or contribute to the exceedances of the water quality standards. The permit includes conditions that the Permittees:

- Continue to update the inventory of industrial/commercial sites under their jurisdiction;
- Perform routine inspections;
- Require minimum set of source control BMPs implementation as a baseline;
- Enforce against violators of the municipal ordinances requirements.

The permit also provides for an enhanced coordination between Municipal and RB stormwater industrial programs.

Costs Evaluation

These permit enhancements have a limited financial impact and represent only an incremental increase in costs. A number of municipalities are already performing inspections, many of them in a very efficient way by combining various regulatory aspects, e.g. industrial waste, stormwater, etc., into one consolidated inspection program. Therefore, for those municipalities the increase in costs may be fiscally minimal to neutral. For those municipalities that performed site visits only, the increase may be incrementally elevated but by sharing in the experience of the municipalities that use a consolidated inspection program where the stormwater inspections are an addition to an already existing inspection program, those costs can be minimized. The *Pollution Source Control Practices Manual 8* (Center for Watershed Protection, July 2004) estimates that non-regulatory site inspections (site visits) range in cost between $30 to $80 per facility. The regular site inspections range in cost between $75 to $175 per facility. For on site illicit discharge investigations where the threat to water quality is higher or the damage already occurred the costs range from $200 to $900 per facility, but the municipalities in many cases can recuperate those costs through an enforcement action allowed under municipal ordinances. In order to alleviate some of the added costs, a number of municipalities use a permitting approach for sites of industrial/commercial activity discharging stormwater runoff into the MS4. The cities collect a fee as a consolidated charge for permitting a facility for various municipal services such as pretreatment, stormwater, potable water, solid waste, etc., programs.

The *California Stormwater BMP Handbook - Industrial and Commercial* states that source control BMPs are preferred over treatment control BMPs because they are generally effective if implemented properly and are usually, but not always, less costly than treatment control BMPs. Typical source control nonstructural (operational) and structural BMPs include using alternative less toxic chemicals and covering an activity area that is a pollutant source. The BMP Handbook continues to state: "the axiom of "80% of the problem can be solved with 20% of the effort" probably is true for most industries. Low or modest cost BMPs, many of which may already be in place, will usually provide satisfactory protection." The BMP Handbook provides a list of the categories of structural and operational source control BMPs that should be considered:

- Installing berms or simple curbing to divert runoff water from around the activity area to reduce the amount of polluted stormwater leaving the area;
- Implementing overhead coverage: this includes structures that provide horizontal coverage of materials, chemicals, and pollutant sources from contact with stormwater and authorized non-stormwater discharges;
- Using secondary containment structures: this generally includes containment structures around storage tanks and other areas for the purpose of collecting any leaks or spills;
- Moving an outdoor operation indoors;
- Designating equipment wash areas;
- Good housekeeping;
- Preventive maintenance;
- Spill prevention and response;
- Material handling and storage;
- Material and practices substitution;
- Waste handling and recycling;
- Employee training;
- Routine inspections;
- Record keeping and internal reporting;
- Quality assurance

As early as the early 1990's, USEPA recognized that: "EPA believes the pollution prevention approach is the most environmentally sound and cost-effective way to control the discharge of pollutants in stormwater runoff from industrial facilities… The first class of management practices includes those that are low in cost, applicable to a broad class of industries and substances, and widely considered essential to a good pollution control program. Some examples of practices in this class are good housekeeping, employee training, and spill response and prevention procedures. The second class includes management practices that provide a second line of defense against the release of pollutants. This class addresses containment, mitigation, and cleanup… Experience with these practices and controls has shown that they can be used in permits to reduce pollutants in storm water discharges in a cost-effective manner." (58 Fed. Reg. 61162) A number of municipalities in the nation, such as Pierce County, Washington, under Ordinance No. 96-47 are already requiring the implementation of mandatory source control BMPs since the late 1990's.

Although the operational source control measures are considered inexpensive, typically involving the costs of staff performing good housekeeping activities with the use of low cost

materials and tools, for some of the structural source control BMPs some costs data is available. For example, in the *Pollution Source Control Practices Manual* the costs for storage protection devices range from $3.50 to $5.00 per square foot of concrete slab (6"), containment pallets from $50 to $350 based on the size and number of barrels to be stored, for storage buildings from $6 to $11 per square foot, and between $25 to $500 for tarps and canopies depending on the size of area to cover. Also, discounted spill containment kits, storm drain plugs, drip pans, tarps, range in cost from $60 to $250 per facility.

For the educational aspect of their program, it is estimated that a presentation to a business group ranges in cost between $40 to $60 per hour, while a business recognition program, such as Sacramento's *Clean Water Business Partner Program* range in cost between $40 to $75 per facility. Municipalities can also employ a Stormwater School concept that requires owners/operators found in minor violation of the stormwater ordinances to participate in a mandatory stormwater quality protection seminar. Similar techniques used for the Pretreatment Program showed that participation by high-level management from non-compliant permittees in such courses demonstrated a higher rate of compliance after the participation. This technique can be used in lieu of a fine or issuance of a Notice of Violation for minor violations of the municipal code.

In some cases, the baseline source control measures alone may not be sufficient to assure the reduction of pollutants in stormwater runoff to levels that will guarantee compliance with the applicable standards. In those instances, the municipalities have the legal authority to require the mitigation of pollution through the implementation of additional treatment controls. This is of elevated importance for areas of the MS4s that may discharge into receiving waters of increased environmental sensitivity or in need of special protection.

Conclusion

Because the ROWD submitted by the applicants does not include any proposed significant improvements and because the monitoring data submitted by the Permittees shows exceedances of water quality standards for a number of pollutants that can be released in stormwater runoff from industrial/commercial sites the proposed enhancements are appropriate and reasonable. The municipalities have performed an extensive effort to educate the industrial/commercial site owners/operators about the source control pollution prevention techniques for over a decade. They also familiarized the facility owners/operators with the requirements of the municipal ordinances as they pertain to the protection of the quality of stormwater runoff. The types of baseline source control measures required by the permit are proven very effective and inexpensive in most cases. Many of these measures should be part of the routine operations by now, such as good housekeeping, employee training, elimination of non-stormwater discharges, removal of illicit connections, etc. Since many of these techniques are already implemented, they should not represent a significant fiscal burden for compliance for the industrial/commercial facilities.

There is ample case law that demonstrates and supports Regional Board's authority to require the enhancements proposed in this permit. The additional requirements represent only an incremental fiscal burden for the Permittees, many of whom currently perform activities close to

the level expected by the proposed permit. The permit also builds on the tools and activities prescribed in the previous permits in an iterative mode, focusing on implementation of better-tailored BMPs, inspection, enforcement activities and a better coordination with the Regional Board's activity for a more efficient use of limited resources.

The administrative record contains a substantial volume of technical and legal material that supports the findings of this permit. The significant amount of documentation material currently available demonstrates that many effective techniques and methods are available, in many cases at low or moderate costs levels. One of the remaining challenges is to assure their full and unequivocal implementation at every industrial/commercial site that contributes or has the potential to contribute significant quantities of pollutants in the stormwater runoff discharges. [Briefly, the level to be achieved is the "Pharmacy Cleanliness" level due to aggressive source control and pollution prevention BMPs implementation, inspection and enforcement.]

## E. Planning and Land Development Program

Post construction land development control requirements on new development and redevelopment offer the most cost-effective strategy to reduce pollutant loads to surface waters. Retrofit of existing development will be expensive and may be considered on a targeted basis, as needed. Studies on the economic impacts of watershed protection indicate that storm water quality management has a positive or at least neutral economic effect while greatly improving the quality of surface waters.[1]

The Federal Clean Water Act 402(p)(3)(B)(iii) requires, in part, that pollutants in storm water be reduced to MEP. The USEPA's definition is intentionally broad to provide maximum flexibility in MS4 permitting and to give municipalities the opportunity to optimize pollutant reductions on

[1] *The Economics of Watershed Protection*, T. Schueler (1999), Center for Watershed Protection, Endicott, MD. The article summarizes nationwide studies to support the statement that watershed planning and stormwater management provides positive economic benefits.

a program-to-program basis.[1] The State Board's Office of Chief Counsel has stated that 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 with the major emphasis on technical feasibility (Elizabeth Jennings, "Definition of Maximum Extent Practicable," OCC Memorandum dated February 11, 1993). Because storm water runoff rates can vary from storm to storm, the statistical probabilities of rainfall or runoff events become significant and are central to the control of pollutants through cost effective BMPs. Further, it is recommended that storm water BMPs be designed to manage both flows and water quality for best performance.[2] It is equally important that treatment control BMPs once implemented be routinely maintained.

Financing the MS4 program offers a considerable challenge for municipalities. A proven successful financing mechanism is the establishment of a storm water utility.[3] Utility fees, which are assessed on the property owner based on some estimate of storm water runoff generated for the site, are a predictable and dedicated source of funds. Utility fees can also provide a mechanism to provide incentives to commercial and industrial property owners to reduce impervious surface areas. Such incentives offer flexibility to property owners to choose the better economic option – paying more fees or making improvements to reduce runoff from the site.

Review of Design Standards

The American Society of Civil Engineers (ASCE) and the Water Environment Federation (WEF) have recommended a numerical BMP design standard for storm water that is derived from a mathematical equation to maximize treatment of runoff volume for water quality based on

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[1] *Storm Water Phase II Final Rule* – Pre-Federal Register Version, p 87 (USEPA 1999). See USEPA's discussion in response to challenges that the definition is sufficiently vague to be deemed adequate notice for purposes of compliance with the regulation.
[2] *Urban Runoff Pollution – Summary Thoughts* – The State of Practice Today and For the 21st Century. Wat. Sci. Tech. 39(2) pp. 353-360. L.A. Roesner (1999)
[3] *Preliminary Data Summary of Urban Storm Water Best Management Practices* (1999), Report No. USEPA-821-R-99-012, USEPA. The document reviews municipal financing mechanisms and summarizes experience in the U.S. to date.

rainfall/ runoff statistics and which is economically sound.[1] The maximized treatment volume is cut-off at the point of diminishing returns for rainfall/ runoff frequency. On the basis of this equation the maximized runoff volume for eighty-five percent treatment of annual runoff volumes in California can range from 0.08 to 0.86 inches depending on the imperviousness of the watershed area and the mean rainfall.[2]

Other methods of establishing numerical BMP design standards include: (i) Percent treatment of the annual runoff; (ii) Full treatment of runoff from rainfall event equal to or less than a predetermined size; and (iii) Percent reduction in runoff based on a rainfall event of standard size.[3] These numerical design standards have been applied to Development Planning in Puget Sound, WA; Alexandria, VA; Montgomery County, MD; Denver, CO; Orlando, FL; Portland, OR; and Austin, TX.

Some States have established numerical standards for sizing storm water post-construction BMPs for new development and significant redevelopment. The State of Maryland has established storm water numerical criteria for water quality of 0.9 to 1 inch, and BMP design standards in a unified approach combining water quality, stream erosion potential reduction, groundwater recharge, and flood control objectives.[4] The State of Florida has used numerical criteria to require treatment of storm water from new development since 1982, including BMPs sized for 80 percent reduction (95 percent for impaired waters) in annual TSS loads derived from the 90 percent (or greater for impaired waters) annual runoff treatment volume method for water quality.[5] The State of Washington has proposed at least six different approaches of establishing

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[1] *In Urban Runoff Quality Management, WEF Manual of Practice No. 23, ASCE Manual and Report on Engineering Practice No. 87.* WEF, Alexandria, VA; ASCE, Reston, VA. 259 pp. (1998).
[2] *Sizing and Design Criteria for Storm Water Treatment Controls, Presentation to California Storm Water Quality Task Force*, November 13, 1998, Sacramento, CA. L.A. Roesner, Camp Dresser McKee.
[3] *Sizing and Design Criteria for Storm water Quality Infrastructure, Presentation at California Regional Water Quality Control Board Workshop on Standard Urban Storm Water Mitigation Plans*, August 10, 1999, Alhambra, CA., R.A. Brashear, Camp Dresser McKee.
[4] *Maryland Storm Water Design Manual* - (Maryland Department of the Environment 2000).
[5] *Florida Development Manual: A Guide to Sound Land and Water Management* (Florida Department of Environmental Protection). The manual describes structural and non-structural construction and post construction BMPs design criteria.

storm water numerical mitigation criteria for new development, which add 10,000 square feet of impervious surface or more for residential development, and 5,000 square feet of impervious surface or more for other types of development.[1] Other mitigation criteria options include the 90th percentile 24-hour rainfall event (used by the State of Maryland) and the six month 24 hour rainfall event (used by the State of Washington).

On a national level, the USEPA is planning to standardize minimum BMP design and performance criteria for post-construction BMPs, and will likely build from the experience of effective state and local programs to establish national criteria.[2] The USEPA, based on the NURP, supports the first half-inch of rainfall as generating first flush runoff.[3] First flush runoff is associated with the highest pollutant concentrations, and not pollutant load. The USEPA considers the first flush treatment method, the rainfall volume method, and the runoff capture volume method as common approaches for sizing of water quality BMPs.

On April 22, 1999, the Los Angeles Regional Board approved a List of BMPs for MS4 Permittees to select from and required implementation of the most effective BMPs in their Development Planning and Development Construction programs.[4] The State Board issued a precedential decision[5] on the matter in Order WQ 2000-11, largely sustaining the new development requirements as approved by the LA Regional Board. The State Water Board articulated its support for regional solutions and the mitigation banking.

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[1] *Storm Water Management in Washington State Volumes 1 – 5*. (Washington Department of Ecology 2001). The volumes 1,3 and 5 are most relevant to new development standards and cover Hydrologic and Flow Control Designs, Minimum Technical Requirements and Treatment BMPs. The volumes were adopted as statewide standards in late 2001.

[2] *Storm Water Phase II Final Rule* – 64 Fed. Reg. 68759. See USEPA's discussion on construction and post-construction BMP requirements for Phase II.

[3] *A Watershed Approach to Urban Runoff: Handbook for Decisionmakers*, Terrene Institute and USEPA Region 5 (1996). See discussion on sizing rules for water quality purposes, p 36.

[4] (Board Resolution No. 99-03).

[5] *State Water Board Order WQ 2000-11*: SUSMP; Memorandum from Chief Counsel to Regional Board Executive Officers, (December 26, 2000) discusses statewide policy implications of the decision.

The post construction requirements for Ventura County were first adopted as Stormwater Quality Urban Impact Mitigation Plans in Board Order No. 00-108, in 2000. It established new development and significant redevelopment conditions for residential, commercial, and industrial new development and redevelopment projects in the following categories:

The SQUIMP included numerical design criteria for structural and treatment control BMPs. The criteria included were:

a) the 85th percentile 24-hour runoff event, determined as the maximized capture storm water volume for the area from the formula recommended by the WEF and ASCE study[1]; or

b) the annual runoff volume, based on unit basin storage water quality volume, to achieve 80 percent or more volume treatment by the method recommended in the BMP Handbook;[2]

c) the volume of runoff produced from each and every storm event up to and including a historical-record based reference 24-hour rainfall criterion for "treatment" that achieves approximately the same reduction in pollutant loads achieved by the 85th percentile 24-hour runoff event; and/or

d) the flow of runoff produced from a rain event equal to at least 0.2 inches per hour intensity; or

e) 10% of the 50-year design flow rate,

f) the flow of runoff produced from a rain event equal to at least two times the 85th percentile hourly rainfall intensity for Ventura County; or

g) the flow of runoff produced from a rain event that will result in treatment of the same portion of runoff as treated using volumetric standards above.

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[1] *In Urban Runoff Quality Management, WEF Manual of Practice No. 23, ASCE Manual and Report on Engineering Practice No. 87.* WEF, Alexandria, VA; ASCE, Reston, VA. (1998).
[2] *California Stormwater Best Management Practices Handbook– Industrial/ Commercial,* (1993)

The present Order integrates and advances the post-construction requirements in the Land Development and Planning Section as follows ----

**LOW IMPACT DEVELOPMENT (LID)**

The Ventura MS4 Order integrates and advances the post-construction requirements in the Land Development and Planning Section by incorporation of numeric metrics for Low Impact Development (LID). This Order promotes land development and redevelopment strategies that consider water quality and water management benefits associated with smart growth techniques. Such measures may include hydromodification mitigation requirements, minimization of impervious surfaces, integrated water resources planning, and low impact development guidelines. (Reference: *Protecting Water Resources with Smart Growth*, EPA 231-R- 04-002, U.S. EPA 2004; *Using Smart Growth Techniques as Storm Water Best Management Practices,* EPA 231-B-05-002, U.S. EPA 2005; *Parking Spaces/Community Places: Finding the Balance through Smart Growth Solutions*, EPA 231-K-06-001, U.S. EPA 2006; *Protecting Water Resources with Higher-Density Development*, EPA 231-R-06-001, U.S. EPA 2006.)

LID is an approach to land development (or re-development) that works with nature to manage stormwater as close to its source as possible. LID employs principles such as preserving and recreating natural landscape features, minimizing effective imperviousness to create functional and appealing site drainage that treat stormwater as a resource rather than a waste product. LID practices that have been used to adhere to these principles include bioretention facilities, rain gardens, vegetated rooftops, rain barrels, and permeable pavements.

LID integrates small-scale measures scattered throughout the development site. Constructed green spaces, native landscaping, and a variety of innovative bioretention and infiltration techniques capture and manage stormwater on-site. LID reduces peak runoff by allowing rainwater to soak into the ground, evaporate into the air, or collect in storage receptacles for irrigation and other beneficial uses. In areas with slow drainage or infiltration, LID captures the first flush before excess stormwater is diverted into traditional storm conveyance systems. The result is development that more closely maintains pre-development hydrology. Furthermore, LID has been shown to be cost effective, and in some cases, cheaper than using traditional stormwater management techniques.

Low Impact Development (LID) is an effective approach to minimizing the adverse effects of urbanization and development on waterbodies and their beneficial uses that has been endorsed by California and other states. The California Ocean Protection Council (OPC), in a resolution adopted on May 15, 2008, found that LID is a practicable and superior approach that new and redevelopment projects can implement to minimize and mitigate increases in runoff and runoff pollutants and the resulting impacts on downstream uses, coastal resources and communities. In its Strategic Plan Update 2008-2012, the State Water Resources Control Board reiterated sustainability as a key principle, stating its commitment to "enhancing and encouraging sustainability within the administration of Water Board programs and activities by promoting water management strategies such as low impact development…" (SWRCB 2008).

LID is a comprehensive source control strategy first pioneered by Prince George's County, Maryland in 1997 to help address the growing economic and environmental limitations of conventional stormwater management practices. As LID was developed by a local government, it is sensitive to addressing local government's unique environmental and regulatory needs in the most economical manner possible by reducing costs associated with stormwater infrastructure design, construction, maintenance and enforcement. LID also provides for local government's need for economic vitality through reasonable and continued growth and redevelopment. LID allows for greater development potential with less environmental impacts through the use of smarter designs and advanced technologies to achieve a better balance between conservation, growth, ecosystem protection and public health / quality of life. (Low Impact Development: Smart Technology For Clean Water Definitions, Issues, Roadblocks, and Next Steps, Coffman, Larry)

The implementation of Low Impact Development (LID) techniques across the United States and Canada has demonstrated that the proper implementation of LID techniques results in more benefits than single purpose stormwater and flood control infrastructure, including increased water quality protection, enhanced property values, improved aquatic and terrestrial habitat, aesthetic amenities, and improved quality of life (Reducing Stormwater Costs through Low Impact Development (LID) Strategies and Practices, USEPA Doc No. EPA 841-F-07-006, December 2007). Further, properly implemented LID techniques can help mimic the pre-project runoff volume and time of concentration, thus minimizing the adverse effects of hydromodification on stream habitat and biological condition (A Review of Low Impact Development Policies: Removing Institutional Barriers to Adoption, Low Impact Development Center and State of California, State Water Resources Control Board, December 2007). The requirements of this Order facilitate the implementation of LID strategies to protect water quality, reduce runoff volume, and to garner additional benefits.

The implementation of LID techniques have been associated with the following environmental benefits: improved air quality due to the increased use of trees and vegetation, reduced urban temperatures due to the shade offered by increased vegetation and the reduction of heat absorbing materials (concrete, etc.), the moderation of climate change due to reduced urban temperatures, increased energy efficiency due to lower ambient temperatures when LID practices are implemented on and around buildings, and aesthetic benefits due to the increased use of trees and vegetation (U.S. EPA Technical Guidance on Implementing the Storm Water Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act).

Furthermore, the implementation of LID not only benefits water quality, but also enhances water supply. LID is consistent with and supports the Governor's 20 x 2020 Water Conservation Plan (February 2010); the State Board's 2008-2012 Strategic Plan Update (i.e. to promote sustainable local water supplies); the State Board's Recycled Water Policy (Resolution No. 2009-0011) objective to increase [beneficial] use of stormwater; requirements of the Water Conservation in Landscaping Act of 2006 (AB 1881, Laird), which requires cities and counties to adopt landscape water conservation ordinances by January 1, 2010; and the Department of Water Resources' Water Efficient Landscape Ordinance (Cal. Code Regs. §492.15).

**Low Impact Development Principles and Practices** (Natural Resources Defense Council, Stormwater Strategies Community Responses to Runoff Pollution, Chapter 12 Low Impact Development)

LID is grounded in a core set of principles based on the paradigm that stormwater management should not be seen as stormwater disposal and that numerous opportunities exist within the developed landscape to control stormwater runoff close to the source. Underlying these principles is an understanding of natural systems and a commitment to work within their limits whenever possible. Doing so creates an opportunity for development to occur with low environmental impact. The principles are:

- integrate stormwater management early in site planning activities
- use natural hydrologic functions as the integrating framework
- focus on prevention rather than mitigation
- emphasize simple, nonstructural, low-tech, and low cost methods
- manage as close to the source as possible
- distribute small-scale practices throughout the landscape
- rely on natural features and processes
- create a multifunctional landscape

LID uses a systems approach that emulates natural landscape functions. A near limitless universe of runoff control strategies, combined with common sense and good housekeeping practices, are the essence of a LID strategy.

These basic strategies, also known as integrated management practices, rely on the earth's natural cycles, predominantly the water cycle, to reduce land development impacts on hydrology, water quality, and ecology. Integrated management practices combine a variety of physical, chemical, and biological processes to capture runoff and remove pollutants at the lot level.

Several strategies focus on disconnecting roofs and paved areas from traditional drainage infrastructure and conveying runoff instead to bioretention areas, swales, and vegetated open spaces. LID also strives to prevent the generation of runoff by reducing the impervious foot print of a site, thereby reducing the amount of water that needs treatment. The end hydrological results are a reduction in runoff volume, an increased time of concentration, reduced peak flow and duration, and improved water quality.

LID includes integrating land and infrastructure management. Activities such as street sweeping, toxic-free and low-impact landscaping, frequent cleaning of catch basins, sediment control, and downspout disconnection all reduce runoff contamination. LID works equally well in new development and redevelopment projects and is easily customized to complement local growth management, community revitalization, and watershed protection goals.

**Effective Impervious Area Principles (**California Stormwater Quality Association (CASQA), the Stormwater Monitoring Coalition (SMC), and the University of Southern California Sea

Grant (USC Sea Grant) *Managing Runoff to Protect Natural Streams: The Latest Developments on Investigation and Management of Hydromodification in California (2005)*)

The Tentative Ventura MS4 Order implements the LID provision by requiring new and redevelopment projects to disconnect Effective Impervious Area (EIA) by incorporating LID strategies into the site design. The increase in impervious cover has been shown to negatively impact water quality and increase runoff flow which can damage downstream habitat. Recent studies indicate that California's intermittent and ephemeral streams are more susceptible to the effects of hydromodification than streams from other parts of the United States (US). Physical degradation of stream channels in the central and eastern US can initially be detected when watershed impervious cover approaches 10%, although biological effects (which may be more difficult to detect) may occur at lower levels. In contrast, initial response of streams in the semi-arid portions of California appears to occur between 3% and 5% impervious cover.

Based on a study conducted by Horner (2007) in Ventura County, it was found that a 5% Effective Impervious Area (EIA) threshold can be met in typical developments. This result was reached assuming the use of native soils typical to Ventura County; soil enhancements can further increase onsite infiltration potential. Using six different development types, the Horner study tested the feasibility of draining all but 3% of impervious area to pervious land on the sites. Five of the six sites had adequate or greater capacity to infiltrate the full annual runoff volume from the "Not-Connected Impervious Area" (NCIA) and pervious areas where EIA is limited to 3% of the total site area. By showing that it is possible to retain all runoff from pervious areas where EIA is limited to 3% of the total site area under typical site conditions (i.e. native soils) and a wide range of development types, the study results provide support for the feasibility of the 5% EIA threshold.

**LID Techniques** (U.S.EPA, Low impact Development and Other Green Design Strategies)

LID can be simple and effective. Instead of relying solely on complex and costly collection, conveyance, storage and treatment systems, LID employs a range of economical devices that control runoff at the source.

- Bioretention cells, commonly known as rain gardens, are relatively small-scale, landscaped depressions containing plants and a soil mixture that absorbs and filters runoff.
- Cisterns and rain barrels harvest and store rainwater collected from roofs. By storing and diverting runoff, these devices help reduce the flooding and erosion caused by stormwater runoff. And because they contain no salts or sediment, they can provide "soft" chemical-free water for garden or lawn/landscape irrigation, reducing water bills and conserving municipal water supplies. Disconnections of rain gutters can effectively be implemented on existing properties with little change to present site designs. A number of cities in the Los Angeles Region, including Los Angeles, Long Beach and Santa Monica, have implemented successful rainwater harvesting incentive programs.

- Green roofs are roof-tops partially or completely covered with plants. Used for decades in Europe, green roofs help mitigate the urban "heat island" effect and reduce peak stormwater flows. The vegetated cover also protects and insulates the roof, extending its life and reducing energy costs.
- Permeable and porous pavements reduce stormwater runoff by allowing water to soak through the paved surface into the ground beneath. Permeable pavement encompasses a variety of mediums, from porous concrete and asphalt, to plastic grid systems and interlocking paving bricks suitable for driveways and pedestrian malls. Permeable pavement helps reduce runoff volumes at a considerably smaller cost than traditional storm drain systems.
- Grass swales are broad, open channels sown with erosion resistant and flood tolerant grasses. Used alongside roadways for years primarily as stormwater conveyances, swales can slow stormwater runoff, filter it, and allow it to soak into the ground. Swales and other biofiltration devices like grass filter-strips improve water quality and reduce in-stream erosion by slowing the velocity of stormwater runoff before it enters the stream. They also cost less to install than curbs, storm drain inlets, and piping systems.

**LID Cost Analysis** (U.S. EPA, Reducing Stormwater Costs through Low Impact Development (LID) Strategies and Practices Fact Sheet)

In terms of costs, LID techniques can reduce the amount of materials needed for paving roads and driveways and for installing curbs and gutters. LID techniques can be used to reduce the total amount of impervious surface, which results in reduced road and driveway lengths and reduced costs. Other LID techniques, such as grassed swales, can be used to infiltrate roadway runoff and eliminate or reduce the need for curbs and gutters, thereby reducing infrastructure costs. Also, by infiltrating or evaporating runoff, LID techniques can reduce the size and cost of flood-control structures (Reducing Stormwater Costs through Low Impact Development (LID) Strategies and Practices, U.S. EPA).

Seventeen case studies were reviewed and evaluated to compare the projected or known costs of LID practices with those of conventional development approaches. It concludes that applying LID techniques can reduce project costs and improve environmental performance. In most cases, LID practices were shown to be both fiscally and environmentally beneficial communities. In a few cases, LID project costs were higher than those for conventional stormwater management projects. However, in the vast majority of cases, significant savings were realized due to reduced costs for site grading and preparation, stormwater infrastructure, site paving, and landscaping. Total capital cost savings ranged from 15 to 80 percent when LID methods were used, with a few exceptions in which LID project costs were higher than conventional stormwater management costs.

The use of LID strategies also has the potential to create larger economic benefits, including but not limited to, reduced need for flood control, which could save up to $400 million; increased property values, which could amount to up to $5 billion; and creation of additional groundwater supplies worth up to $7.2 billion (Devinny et al. 2004; MacMullan, E., Assessing Low Impact Developments Using a Benefit-Cost Approach, 2nd National Low Impact Development Conference, March 12-14, 2007).

**Reference Numeric Standards for LID**

Numeric storm water standards are available from jurisdictions nationwide. Specific citations are included below.

**Pennsylvania:**

- Pennsylvania Stormwater Best Management Practices Manual: *"Capture at least the first two inches of rainfall from all impervious surfaces and retain onsite (through reuse, evaporation, transpiration, and/or infiltration) at least the first one inch of runoff" (Pennsylvania Stormwater Best Management Practices Manual).*

  As noted in the Pennsylvania Stormwater Best Management Practices Manual (PSBMPM), Pennsylvania laws and regulation do not directly manage storm water at the state level, although some state level management occurs through the Stormwater Management Act and the NPDES permitting program. However, the PSBMPM are required in the draft 2009 Pennsylvania Model Stormwater Management Ordinance (SMO) which then required in the draft March 2009 NPDES Stormwater Discharges from MS4s General Permit.

- Control Guideline 2 or the Simplified Method

  - The first 2" of runoff from NEW impervious surfaces be captured.
  - At least the first 1" of runoff from NEW impervious surfaces be permanently removed from the runoff flow through reuse, evaporation, transpiration and/or infiltration.
  - Where possible, all permanently removed runoff should infiltrated; however, it is suggested that in all cases at least 0.5" should be infiltrated.

**Anacostia, Washington, D.C.**

Final Environmental Standards June 2007: For all projects developed on

- AWC land or financed by AWC must implement enhanced stormwater management as follows *"Retain onsite the first one inch of rainfall and provide water quality treatment for rainfall up to the two-year storm volume"*

**West Virginia**

- Draft permit under consideration in West Virginia: *"Retain onsite the first one inch of rainfall from a 24-hour storm preceded by 48 hours of no measurable precipitation"*

**Georgia**

- Georgia Stormwater Management Manual: *"Treat the runoff from 85% of the storms that occur in an average year (i.e., provide treatment for the runoff that results from a rainfall depth of 1.2 inches)"*

**Central Coast, California (RWQCB)**

- Letter to small MS4s: *"Limit effective impervious area ("EIA") at development projects to no more than 5% of total project area (interim criteria); establish an EIA limitation between 3% and 10% in local stormwater management plans (permanent criteria)"*

## F. Development Construction Program

Introduction

Soil disturbing activities during construction and demolition exacerbate sediment losses. Sediment is a primary pollutant impacting beneficial uses of watercourses. Sediments, and other construction activity pollutants must be properly controlled to reduce or eliminate adverse impacts.

1. Enhanced BMPs

(a) Each permittee shall implement a program to control storm water discharges from construction activity at all construction sites within its jurisdiction.
(b) Each Permittee shall implement, or require implementation of, enhanced practices to address the threat to water quality posed by all construction sites on hillsides as defined in this Order and construction sites that directly discharge to a waterbody listed on the CWA § 303 (d) list for siltation or sediment, or that occur within or directly adjacent to an Environmentally Sensitive Area (ESAs). Construction sites located on hillsides, adjacent to CWA 303(d) listed waters for siltation or sediment, and directly adjacent to ESAs are termed "High risk sites."

(A) On hillsides with slopes 20% or steeper prior to land disturbance (If hillside development is not defined by a zoning ordinance, then the prohibition will apply to steep or long continuous slopes, or areas with silty soils, fine sands, or soils lacking vegetative cover.).
(B) Directly discharging to a waterbody listed on the CWA § 303 (d) list for siltation or sediment; or
(C) Within or adjacent to an environmentally sensitive area (ESAs)

(c) Depending on the project area, the developer shall implement the Erosion and Sediment control BMPs listed in the following Tables 6, 7, and 8.

2. Construction Sites Less than an Acre

This permit intends that each permittee shall require the implementation of an effective combination of the following BMPs at all construction sites (see Table 6-BMPs at Construction sites less than 1 acre) to prevent erosion and sediment loss, and

the discharge of construction wastes. The BMPs are from the California BMP Handbook, Construction, January 2003 and the Caltrans Stormwater Quality Handbooks, Construction Site Best Management Practices (BMPs) Manual, March 2003, and addenda. Where the Erosivity Factor (R) for the construction project is 50 or greater, erosion controls (erosion avoidance) are the preferred BMPs.[1].

Table 1 - BMPs at Construction sites less than 1 acre

| Minimum Set of BMPs for All Construction Sites | CASQA Handbook | Caltrans Handbook |
|---|---|---|
| **For Erosion Control** | | |
| **Scheduling** | **EC-1** | **SS-1** |
| **Preservation of Existing Vegetation** | **EC-2** | **SS-2** |
| **Sediment Controls** | | |
| **Silt Fence** | **SE-1** | **SC-1** |
| **Sand Bag Barrier** | **SE-8** | **SC-8** |
| **Stabilized Construction Site Entrance/Exit** | **TC-1** | **TC-1** |
| **Non-Storm Water Management** | | |
| **Water Conservation Practices** | **NS-1** | **NS-1** |
| **Dewatering Operations (Groundwater dewatering only under NPDES Permit No. CAG994004).[2]** | **NS-2** | **NS-2** |
| **Waste Management** | | |
| **Material Delivery and Storage** | **WM-1** | **WM-1** |
| **Stockpile Management** | **WM-3** | **WM-2** |
| **Spill Prevention and Control** | **WM-4** | **WM-4** |
| **Solid Waste Management** | **WM-5** | **WM-5** |
| **Concrete Waste Management** | **WM-8** | **WM-8** |
| **Sanitary/ Septic Waste Management** | **WM-9** | **WM-9** |

3. Construction Sites 1 acre or greater but Less than 5 acres

[1] Fact Sheet, *Construction Rainfall Erosivity Waiver* (2001) EPA 833-F-00-014; *Predicting Soil Erosion by Water: A Guide to Conservation Planning with the Revised Universal Soil Loss Equation (RUSLE)* (1997), USDA Agricultural Handbook No. 703.

[2] Ponded stormwater may be discharged at a concentration of Total Suspended Solids (TSS) of 100mg/L or less.

(a) Each permittee shall require the implementation of an effective combination of the following BMPs in Table 7 (BMPs at Construction sites 1acre or greater but less than 5 acres) in addition to the ones identified in Table 6 (BMPs at Construction sites less than 1 acre) at all construction sites 1 acre and greater but less than 5 acres to prevent erosion and sediment loss, and the discharge of construction wastes:

Table 2 - BMPs at Construction sites 1acre or greater but less than 5 acres

| **BMPs** | **CASQA Handbook** | **Caltrans Handbook** |
|---|---|---|
| **For Erosion Control** | | |
| **Hydraulic Mulch** | **EC-3** | **SS-3** |
| **Hydroseeding** | **EC-4** | **SS-4** |
| **Soil Binders** | **EC-5** | **SS-5** |
| **Straw Mulch** | **EC-6** | **SS-6** |
| **Geotextiles and Mats** | **EC-7** | **SS-7** |
| **Wood Mulching** | **EC-8** | **SS-8** |
| **Sediment Controls** | | |
| **Fiber Rolls** | **SE-5** | **SC-5** |
| **Gravel Bag Berm** | **SE-6** | **SC-6** |
| **Street Sweeping and/ or Vacuum** | **SE-7** | **SC-7** |
| **Storm Drain Inlet Protection** | **SE-10** | **SC-10** |
| **Additional Controls** | | |
| **Wind Erosion Controls** | **WE-1** | **WE-1** |
| **Stabilized Construction Entrance/ Exit** | **TC-1** | **TC-1** |
| **Stabilized Construction Roadway** | **TC-2** | **TC-2** |
| **Entrance/ Exit Tire Wash** | **TC-3** | **TC-3** |
| **Non-Storm Water Management** | | |
| **Vehicle and Equipment Washing** | **NS-8** | **NS-8** |
| **Vehicle and Equipment Fueling** | **NS-9** | **NS-9** |

4. Construction Sites 5 acres and Greater
   (a) Each permittee shall require the implementation of an effective combination of the following BMPs in Table 8 (BMPs at Construction sites 5 acres or greater) in addition to the ones identified in Table 6 (BMPs at Construction sites less than 1 acre) and Table 7 (BMPs at Construction sites 1acre or greater but less than 5 acres) at all construction sites 5 acres and greater to prevent erosion and sediment loss, and the discharge of construction wastes:

Table 3 - BMPs at Construction sites 5 acres or greater

| BMPs | CASQA Handbook | Caltrans Handbook |
|---|---|---|
| Sediment Controls | | |
| Sediment Basin | SE-2 | SC-2 |
| Check Dam | SE-4 | SC-4 |
| Tracking Control BMPs | | |
| Stabilized Construction Entrance/ Exit | TR-1 | TC-1 |
| Non-Storm Water Management | | |

| BMPs | CASQA Handbook | Caltrans Handbook |
|---|---|---|
| Vehicle and Equipment Maintenance | NS-10 | NS-10 |
| Waste Management | | |
| Material Delivery and Storage | WM-1 | WM-1 |
| Spill Prevention and Control | WM-4 | WM-4 |
| Concrete Waste Management | WM-8 | WM-8 |
| Sanitary/ Septic Waste Management | WM-9 | WM-9 |

**5.** Local Agency Requirements

(a) Each permittee shall require for all construction sites 1 acre or greater, compliance with all conditions identified in the preceding subparts F.1 - F.5, and the following requirements:

(1) Local Storm Water Pollution Prevention Plan (Local SWPPP),

(A) Each permittee shall require the preparation and submittal of a Local SWPPP, for the permittee's review and written approval prior to issuance of a grading or construction permit for construction projects. If the Local SWPPP is revised, the permittee shall review and approve those revisions. The permittees' approval signature shall be contained within the first pages of the Local SWPPP (with sufficient room for approval of revisions.)

(i) The permittee shall not approve any Local SWPPP unless it contains appropriate site-specific construction site BMPs, specific locations, and maintenance schedules.

(ii) The Local SWPPP must include the rationale used for selecting or rejecting BMPs. The project architect, or engineer of record, or authorized qualified designee, must sign a statement on the Local SWPPP to the effect:

(I) ***"As the architect/ engineer of record, I have selected appropriate BMPs to effectively minimize the negative impacts of this project's construction activities on storm water quality. The project owner and contractor are aware that the selected BMPs must be installed, monitored, and maintained to ensure their effectiveness. The BMPs not selected for implementation are redundant or deemed not applicable to the proposed construction activity."***

(2) Certification Statement

(A) Each permittee shall require that each landowner or the landowner's agent sign a statement on the Local SWPPP to the effect:

(i) *"I certify that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure 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, to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I am aware that submitting false and/or inaccurate information, failing to update the Local SWPPP to reflect current conditions, or failing to properly and/or adequately implement the Local SWPPP may result in revocation of grading and/or other permits or other sanctions provided by law."*

(B) The Local SWPPP certification shall be signed by the landowner as follows:

(i) Corporation - by a responsible corporate officer which means the following:

(I) President, secretary, treasurer, or vice president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or

(II) Manager of the construction activity if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

(ii) Partnership or sole proprietorship - by a general partner or the proprietor; or

(iii) Municipality or other public agency - by an elected official, a ranking management official (e.g., County/ City Administrative Officer, City Manager, Director of Public Works, or City Engineer).

6. Roadway Paving or Repaving Operations (For Private or Public Projects)

(a) Each permittee shall require that for any project that includes roadbed or street paving, repaving, patching, digouts, or resurfacing roadbed surfaces, that the following BMPs be implemented for each project.

(1) Restrict paving and repaving activity to exclude periods of rainfall or predicted rainfall unless required by emergency conditions

(2) Install sand bags or gravel bags and filter fabric at all susceptible storm drain inlets and at manholes to prevent spills of paving products and tack coat

(3) Prevent the discharge of release agents including soybean oil, other oils, or diesel to the storm water drainage system or watercourses

(4) Minimize non storm water runoff from water use for the roller and for evaporative cooling of the asphalt

(5) Clean equipment over absorbent pads, drip pans, plastic sheeting or other material to capture all spillage and dispose properly

(6) Collect liquid waste in a container, with a secure lid, for transport to a maintenance facility to be reused, recycled or disposed off properly

(7) Collect solid waste by vacuuming or sweeping and securing in an appropriate container for transport to a maintenance facility to be reused, recycled or disposed of properly

(8) Cover the "cold-mix" asphalt (i.e., pre-mixed aggregate and asphalt binder) with protective sheeting during a rainstorm
(9) Cover loads with tarp before haul-off to a storage site, and do not overload trucks
(10) Minimize airborne dust by using water spray during grinding
(11) Avoid stockpiling soil, sand, sediment, asphalt material and asphalt grindings materials or rubble in or near storm water drainage system or watercourses
(12) Protect stockpiles with a cover or sediment barriers during a rain

7. Site Tracking System
(a) Each permittee shall use an site system to track grading permits, encroachment permits, demolition permits, building permits, or construction permits (and any other municipal authorization to move soil and/ or construct or destruct that involves land disturbance) issued by each permittee. To satisfy this requirement, the use of a database or GIS system is encouraged.

8. Inspections
(a) Each permittee shall inspect all construction sites for the implementation of storm water quality controls a minimum of once during the wet season. Concurrently, each permittee shall ensure that:
(1) The Local SWPPP is reviewed for compliance with local codes, ordinances, and permits.
(2) A follow-up inspection takes place within two weeks for inspected sites that have not adequately implemented their Local SWPPP.
(b) Each permittee shall take additional enforcement actions to achieve compliance as specified in municipal codes, if compliance with municipal codes, ordinances, or permits has not been attained.

(c) Each permittee can refer sites to the Regional Water Board for further joint enforcement actions for violation of municipal storm water ordinances and the Construction Activities Storm Water General Permit (CASGP), or Small Linear Underground/ Overhead Construction Projects General Permit (small LUPs), after conducting a minimum of 2 site inspections and issuing a minimum of 2 written notices to the operator regarding the violation (copied to the Regional Water Board). In making such referrals, permittees shall include, at a minimum, the following documentation:
(1) Name of the site
(2) WDID number
(3) Site developer
(4) Site owner
(5) Records of communication with the site operator regarding the violation(s), which shall include at least an inspection report
(6) Written notice of the violation copied to the Regional Water
(d) Prior to approving and/ or signing off for occupancy and issuing the Certificate of Occupancy for all construction projects subject to post-construction controls, each permittee shall inspect the constructed site design, source control and treatment

control BMPs to verify that they have been constructed in compliance with all specifications, plans, permits, ordinances, and this Order. The initial/ acceptance BMP verification inspection does not constitute a maintenance and operation inspection, as required in the preceding subpart E.IV.2(c).

9. State Conformity Requirements
   (a) Each permittee shall ensure that no grading permit, encroachment permit, demolition permit, building permit, electrical permit, or construction permit (or any other municipal authorization to move soil and/ or construct or destruct that involves land disturbance) is issued for any project requiring coverage under the CASGP or Small LUP General Permit[1] unless:
      (1) Proof of coverage under a State NPDES permit is demonstrated (a copy of a letter from the State Water Board showing a valid Waste Discharger Identification Number (WDID) for that site).
      (2) Demonstration or Certification that a SWPPP has been prepared by the project developer.
      (3) Proof of an updated NOI(s) and a copy of the modified SWPPP(s) at any time a transfer of ownership takes place for the entire development or portions of the common plan of development where construction activities are still on-going.

10. Interagency Coordination
   (a) Referral of Violations:
   A permittee may refer a violator of the municipal storm water ordinance and CWC § 13260 to the Regional Water Board provided that the permittee has made a good faith effort at progressive enforcement consistent with the preceding subpart F.8(c). At a minimum, the permittee's good faith effort shall be documented with:

[1] NPDES Permit No. CAS000005, Waste Discharge Requirements For Discharges of Storm Water Runoff Associated with Small Linear Underground/ Overhead Construction Projects (Small LUP General Permit) for any linear land disturbing activity or activities (cumulatively) that will cause one acre or more of land disturbance but not more than 5 acres.

(1) A minimum of 2 follow-up inspection reports (inspections completed within 3 months).
(2) A minimum of two warning letters or NOVs.

(b) Referral of Non-filers under the CASGP or the Small LUP General Permit: Each permittee shall refer non-filers (i.e., those projects which cannot demonstrate that they have a WDID number) under the CASGP or Small LUP General Permit, to the Regional Water Board, no later than 15 days after making a determination of failure to file. In making such referrals, permittees shall include, at a minimum, the following documentation:
(1) Project location address
(2) Project description
(3) Developer or owners name with complete mailing address
(4) Project size
(5) Records of communication with the developer or owner regarding filing requirements

(c) Investigation of Complaints Regarding Facilities – Transmitted by the Regional Water Board Staff:
(1) Each permittee shall initiate, within one business day,[1] an initial investigation of complaint(s) (other than non-storm water discharges) on the construction site(s) within its jurisdiction.
(A) The initial investigation shall include, at a minimum, an inspection on the facility and its perimeter to confirm the complaint and to determine if the site operator is effectively complying with the municipal storm water/ urban runoff ordinances, and to oversee corrective action.

(d) Support of Regional Water Board Enforcement Actions – As directed by the Regional Water Board Executive Officer:
(1) Each permittee shall support Regional Water Board enforcement actions by:
(A) Assisting in identification of current owners, operators, and lessees of properties and sites.

[1] Permittees may comply with the Permit by taking initial steps (such as logging, prioritizing, and tasking) to "initiate" the investigation within that one business day. However, the Regional Water Board would expect that the initial investigation, including a site visit, to occur within four business days.

(B) Providing staff, when available, for joint inspections with Regional Water Board inspectors.
(C) Appearing to testify as witnesses in Regional Water Board enforcement hearings.

Providing copies of inspection reports and other progressive enforcement documentation.

## G. Public Agency Activities Program

I. Each permittee shall implement a Public Agency Activities Program to minimize storm water pollution impacts from public agency activities. Public Agency requirements consist of:
   i. Public Construction Activities Management.
   ii. Vehicle Maintenance/ Material Storage Facilities/ Corporation Yards Management/ Municipal Operations.
   iii. Vehicle and Equipment Wash Areas
   iv. Landscape and Recreational Facilities Management
   v. Storm Drain Operation and Management
   vi. Streets and Roads Maintenance
   vii. Infrastructure Maintenance - Long-term
   viii. Public Industrial Activities Management
   ix. Emergency Procedures
   x. Employee Training

1. Public Construction Activities Management
   (a) Each permittee shall implement and comply with the Planning and Land Development Program requirements in part 5.E. of this Order at permittee owned or operated public construction projects for project types identified in part 5.E of this Order.

(b) Each permittee shall implement and comply with the Planning and Land Development Program requirements in part 5.E. for streets, roads, and highways construction of 10,000 square feet or more of surface area

(c) Each permittee shall implement and comply with the appropriate Development Construction Program requirements in part 5.F. of this Order at permittee owned or operated construction projects.

(d) For public projects that disturb less than one acre of soil the permittees shall require the development and implementation of a Storm Water Pollution Control Plan. The SWPCP shall include BMPs as identified in Table 5.

2. Vehicle Maintenance/ Material Storage Facilities/ Corporation Yards Management/ Long Term Maintenance Programs

(a) Each permittee shall implement the following BMPs[1] at all permittee owned, leased facilities and job sites including but not limited to vehicle/ equipment maintenance facilities, material storage facilities, and corporation yards, and at any area that includes the activities as described in the following Tables. Additionally, for any activity or area described in the footnote below,[2] each permittee shall also implement the BMPs in the Caltrans Storm Water Quality Handbook Maintenance Staff Guide described as B-4 in Table 9 (BMPs at Vehicle Maintenance/ Material Storage Facilities/ Corporation Yards).

Table 4 - BMPs at Vehicle Maintenance/ Material Storage Facilities/ Corporation Yards

**From the Caltrans Storm Water Quality Handbook Maintenance Staff Guide Appendix B**

| **Activity Specific BMPs** | **Page** |
|---|---|
| **General BMPs** | B-4 |
| **Flexible Pavement** | B-9 |
| Asphalt Cement Crack and Joint Grinding/ Sealing | B-9 |

[1] These BMPs are identified in Appendix B of the *Caltrans Storm Water Quality Handbook Maintenance Staff Guide, May 2003*, and its addenda.

[2] Scheduling and Planning; Spill Prevention and Control; Sanitary/ Septic Waste Management; Material Use; Safer Alternative Products; Vehicle/ Equipment Cleaning, Fueling, and Maintenance; Illicit Connections Detection, Reporting and Removal; Illegal Spill / Discharge Control and Maintenance Facility Housekeeping Practices.

3. Vehicle and Equipment Wash Areas
   (a) Each permittee shall eliminate discharges of wash waters from vehicle and equipment washing no later than (365 days after Order adoption date) by implementing any of the following measures at existing facilities with vehicle or equipment wash areas:
      (1) Self-contain, and haul off for disposal
      (2) Equip with a clarifier
      (3) Equip with an alternative pre-treatment device; or
      (4) Plumb to the sanitary sewer
   (b) Each permittee shall ensure that any municipal facilities constructed, redeveloped, or replaced has all vehicle and equipment wash areas plumbed to the sanitary sewer or be self contained and all wastewater/ washwater hauled for legal disposal.

4. Landscape, Park, and Recreational Facilities Management
   (a) Integrated Pest Management (IPM)
   IPM is an ecosystem-based strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties. Each permittee shall implement a jurisdiction-wide IPM program and includes the following:

(1) Pesticides are used only if, after monitoring indicates they are needed according to established guidelines.
(2) Treatments are made with the goal of removing only the target organism.
(3) Pest controls are selected and applied in a manner that minimizes risks to human health, beneficial, non-target organisms, and the environment.
(4) Its use of pesticides, including Organo-phosphates and Pyrethroids do not threaten water quality.
(5) Partner with other agencies and organizations to ensure that pesticide use within their jurisdiction does not threaten water quality.
(6) Adopt and verifiably implement policies, procedures, and/ or ordinances requiring the minimization of pesticide use and encouraging the use of IPM techniques (including beneficial insects) in the permittees' overall operations and on municipal property.
(7) Policies, procedures, and ordinances shall include commitments and timelines to reduce the use of pesticides that cause impairment of surface waters by implementing the following procedures:
(A) Quantify pesticide use by its staff and hired contractors.
(B) Prepare and annually update an inventory of pesticides used by all internal departments, divisions, and other operational units.
(C) Demonstrate reductions in pesticide use.

(b) Each permittee shall implement the following requirements no later than (180 days after Order adoption date):
(1) Use a standardized protocol for the routine and non-routine application of pesticides (including pre-emergents), and fertilizers.
(2) Comply with the provisions and the monitoring requirements for application of aquatic pesticides to surface waters (WQ Order No. 2004-0008-DWQ).
(3) Ensure no application of pesticides or fertilizers are applied to an area immediately prior to, during, or immediately after a rain event, or when water is flowing off the area.
(4) Ensure that no banned or unregistered pesticides are stored or applied.
(5) Ensure that all staff applying pesticides are certified in the appropriate category by the California Department of Pesticide Regulation, or are under the direct supervision of a pesticide applicator certified in the appropriate category.
(6) Implement procedures to encourage the retention and planting of native vegetation to reduce water, pesticide and fertilizer needs; and
(7) Store pesticides and fertilizers indoors or under cover on paved surfaces or use secondary containment.
(A) Reduce the use, storage, and handling of hazardous materials to reduce the potential for spills.
(B) Regularly inspect storage areas.

5. Storm Drain Operation and Management
(a) Catch Basin Cleaning
(1) Each Permittee shall designate catch basin inlets within its jurisdiction as one of the following:

Priority A: Catch basins that are designated as consistently generating the highest volumes of trash.
Priority B: Catch basins that are designated as consistently generating moderate volumes of trash.
Priority C: Catch basins that are designated as generating low volumes of trash.

Within one year of Order adoption, Permittees shall submit a map or list of Catch Basins with their GPS coordinates and their designations. The map or list shall contain the rationale or data to support designations.

(2) Each Permittee shall inspect catch basins according to the following schedule:

Priority A: A minimum of 3 times during the wet season and once during the dry season every year.
Priority B: A minimum of once during the wet season and once during the dry season every year.
Priority C: A minimum of once per year.

Catch basins shall be cleaned as necessary on the basis of inspections. Permittees shall maintain inspection records for Regional Board review.

(3) In addition to the preceding schedule, Permittees shall ensure that any catch basin that is determined to be at least 25% full of trash shall be cleaned out.

(b) Trash Management at Public Events

(1) Each Permittee shall require for any event in the public right of way or wherever it is foreseeable that substantial quantities of trash and litter may be generated, the following measures:
(A) Proper management of trash and litter generated; and
(B) Arrangement for temporary screens to be placed on catch basins; or
(C) Provide clean out of catch basins, trash receptacles, and grounds in the event area within 24 hours subsequent to the event.

(c) Trash Receptacles

(1) Each Permittee shall install trash receptacles, or equivalent trash capturing devices in areas subject to high trash generation within its jurisdiction no later than (one year after Order adoption date).
(2) Each Permittee shall ensure that all trash receptacles are cleaned out and maintained as necessary to prevent trash overflow.

(d) Catch Basin Labels

(1) Each Permittee shall inspect the legibility of the catch basin stencil or label nearest each catch basin and inlet before the rainy season begins.
(2) Each Permittee shall record and re-stencil or re-label within 15 days of inspection, catch basins with illegible stencils.

(e) Additional Trash Management Practices

(1) Each Permittee shall install trash excluders, or equivalent devices on or in catch basins or outfalls to prevent the discharge of trash to the storm drain system or receiving water no later than two years after Order adoption date in areas defined as Priority A (Provision 1a(2)) except in sites where the application of such BMP(s) alone will cause flooding. Lack of maintenance that causes flooding is not an acceptable exception to the requirement to

install BMPs. Alternatively the Permittee may implement alternative or enhanced BMPs beyond the provisions of this permit (such as but not limited to increased street sweeping, adding trash cans near trash generation sites, prompt enforcement of trash accumulation, increased trash collection on public property, increased litter prevention messages or trash nets within the MS4) that provide substantially equivalent removal of trash. Permittees shall demonstrate that BMPs, which substituted for trash excluders provide equivalent trash removal performance as excluders. When outfall trash capture is provided, revision of the schedule for inspection and cleanout of catch basins in task (a) may be proposed by the Permittee for approval by the Executive Officer.

(f) Storm Drain Maintenance
  (1) Each Permittee shall implement a program for Storm Drain Maintenance no later than (180 days after Order adoption date) that includes the following:
    (A) Visual monitoring of Permittee-owned open channels and other drainage structures for debris at least annually.
    (B) Remove trash and debris from open channel storm drains a minimum of once per year before the storm season.
    (C) Eliminate the discharge of contaminants during MS4 maintenance and clean outs.
    (D) Quantify the amount of materials removed using techniques appropriate for quantifying solid waste and ensure the materials are properly disposed of.

(g) Spill Response Plan
  (1) Each permittee shall implement a response plan for spills to the MS4 within their respective jurisdiction. The response Plan shall clearly identify agencies responsible and telephone numbers and e-mail address for contact and shall contain at a minimum the following:
    (A) Investigation of all complaints received within 24 hours of the incident report.
    (B) Response within 2 hours to spills for containment upon notification.
    (C) Notification to appropriate public health agencies and the Office of Emergency Services (OES).

(h) Permittee Owned Treatment Control BMPs
  (1) Each permittee shall implement an inspection and maintenance program for all permittee owned treatment control BMPs, including post-construction treatment control BMPs.
  (2) Each permittee shall ensure proper operation of all treatment control BMPs and maintain them as necessary for proper operation, including all post-construction treatment control BMPs.
  (3) Any residual water within a treatment control BMP when being maintained shall be:
    (A) Hauled away and legally disposed of;
    (B) Discharged to the sanitary sewer system (with permits or authorization); or

(C) Treated or filtered to remove bacteria, sediments, nutrients, and meet the limitations set in Table 10 (Discharge Limitations for Dewatering Treatment BMPs) prior to discharge to the MS4.

Table 5 - Discharge Limitations for Dewatering Treatment BMPs[1]

| Parameter | Units | Limitation |
|---|---|---|
| Total Suspended Solids | mg/L | 100 |
| Turbidity | NTU | 50 |
| Oil and Grease | mg/L | 10 |

6. Streets and Roads
   (a) Maintenance
      (1) Each permittee shall perform street sweeping of curbed streets in commercial areas and areas subject to high trash generation to control trash and debris at least two times per month.
   (b) Road Construction and Reconstruction
      (1) Each permittee shall implement the following BMPs for road reconstruction:
         (A) Drain Inlet protection from sediments.
         (B) Dewatering of below grade construction areas.
         (C) Secondary containment for cold mix.
         (D) Sheeting underneath cold mix (during storage) to prevent discharge of spray release, and
         (E) Sheeting to cover cold mix (during storage).
         (F) If street material is to be concrete, then provide a vehicle wash off area that is isolated from the MS4.

7. Emergency Procedures
   (a) Each permittee may conduct repairs of essential public service systems and infrastructure in emergency situations with a self-waiver of the provisions of this Order.

[1] Technology based effluent limits.

(1) Where the self-waiver has been invoked, the permittee shall submit to the Regional Water Board Executive Officer a statement of the occurrence of the emergency, an explanation of the circumstances, and the measures that were implement to reduce the threat to water quality, no later than 30 business days after the situation of emergency has passed.
(2) Minor repairs of essential public service systems and infrastructure in emergency situations (can be completed in less than one day) are not subject to the notification provisions. Appropriate BMPs to reduce the threat to water quality shall be implemented.

8. Municipal Employee and Municipal Contractor Training
(a) Each permittee shall, no later than (12 months after Order adoption date and annually thereafter before June 30), train all of their employees and contractors in targeted positions (whose interactions, jobs, and activities affect storm water quality) on the requirements of the overall storm water management program to:
(1) Promote a clear understanding of the potential for activities to pollute storm water.
(2) Identify opportunities to require, implement, and maintain appropriate BMPs in their line of work.
(b) Each permittee shall, no later than (12 months after Order adoption date and annually thereafter before June 30), train all of their employees and contractors who use or have the potential to use pesticides or fertilizers (whether or not they normally apply these as part of their work). Training programs shall address:
(1) The potential for pesticide-related surface water toxicity.
(2) Proper use, application, handling, and disposal of pesticides.
(3) Least toxic methods of pest prevention and control, including IPM.
(4) Reduction of pesticide use.
(c) Each permittee shall, no later than (12 months after Order adoption date) and annually thereafter before June 30, train all of their employees and contractors who are responsible for illicit connections and illicit/ illegal discharges. Training programs shall address:
(1) Identification
(2) Investigation
(3) Termination
(4) Cleanup
(5) Reporting of Incidents
(6) Documentation of Incidents

## H. Illicit Connections and Illicit Discharges Elimination Program

Introduction

During dry weather, much of the discharge to storm drain systems consists of wastes and wastewater from non-storm water sources. A significant amount of such discharges may be from illicit discharges or connections, or both. Illicit discharges may occur either through direct connections, such as deliberate or mistaken piping, or through indirect connections, such as dumping, spillage, subsurface infiltration, and wash-downs.

Monitoring data from MS4 programs across the nation have shown that dry weather discharges can contribute significant pollutant loads to receiving waters. *The Illicit Discharge Detection and Elimination A Guidance Manual for Program Development and Technical Assessments* finds, if these (dry weather discharges) are ignored by only focusing on storm water runoff (wet weather discharges), little improvements in receiving water quality may occur.

The objective of a municipality's illicit connection/illicit discharge (IC/ID) elimination program should be to detect illicit connections and illicit discharges to the storm drain system, and to promptly remove such discharges and connections. Municipalities typically employ the approaches listed below to achieve this objective:

- Permitting connections to the municipal storm drain.
- Mapping the storm drain system, locations of catch basins, outfalls, permitted connections, and the names and locations of all waters of the U.S. that receive discharges from the outfalls.
- Adopting a storm water/ urban runoff ordinance to prohibit unauthorized non-storm water discharges into the MS4, and implementing appropriate enforcement procedures and actions.
- Implementing a program to detect and eliminate non-storm water discharges to the MS4, including illegal dumping.
- Educating public employees, businesses, and the general public about the dangers associated with illegal discharges and improper disposal.
- Establishing a public reporting hotline or other mechanism to report illicit discharges and illegal dumping.
- Establishing measurable goals to evaluate successful program implementation.

Discussion of New Requirements

1) The Draft Ventura MS4 Permit requires Permittees to develop and submit to the Principal Permittee, a map showing the length and location of underground pipes 18 inches and greater in diameter, and channels within their jurisdiction within a specified time frame. The intent of this provision is to enhance the Permittees ability to identify, locate, and eliminate sources of pollutants identified by monitoring results and spill/complaint notifications.

2) The Draft Ventura MS4 Permit requires Permittees to screen storm pipes greater than 36" in diameter, that have not been screened within 3 years of adoption of the Order, high priority areas identified during the mapping of illicit connections and discharges, that have not been screened within 3 years of adoption of the Order, and portions of the storm drain system 50 years or older in age that have not been screened within 3 years of adoption of the Order. The Illicit Discharge Detection and Elimination A Guidance Manual for Program Development and Technical Assessments states, "The average age of development in a

subwatershed may predict the potential for illicit discharge problems. For example, a subwatershed where the average age of development is more than 100 years was probably constructed before sewer service was widely available, and many of the pipes and connections may have changed over the years as a result of modernization and redevelopment. Presumably, the risk of potential discharges would be higher in these older subwatersheds. By contrast, a recently developed subwatershed may have a lower discharge risk due to improved construction materials, codes and inspections. Therefore, high Illicit Discharge Potential (IDP) may be indicated when subwatershed development is more than 50 years old, with medium IDP for 20 to 50 year old development, and low IDP if fewer than 20 years old". The intent of this requirement is to identify and eliminate potential significant source of pollutants contributing to poor dry weather water quality.

3) The Draft Ventura MS4 Permit requires Permittees to conduct field screening of their storm drain systems in accordance with procedures described in, The Illicit Discharge Detection and Elimination A Guidance Manual for Program Development and Technical Assessments. The manual was developed as part of a cooperative agreement with the USEPA, to serve as a comprehensive up to date guidance manual for illicit connection/illicit discharge elimination programs. The manual was developed from surveys of Phase 1 MS4s serving multiple population sizes with the goal of coming up with cost effective methods for screening and eliminating illicit connections/illicit discharges. The goal of specifying the manual is to provide guidance and ensure effective methods are used for screening storm drain systems. The provision is not meant to exclude Permittees from using equally effective alternative methods not listed in the manual.

4) The Draft Ventura MS4 Permit requires Permittees to upon discovery or upon receiving a report of a suspected illicit connection, to complete an investigation within 21 days, to determine the source of the connection, the nature and volume of discharge through the connection, and identify the responsible party for the connection. The Order requires Permittees upon confirmation of an illicit storm drain connection, to ensure the termination of the connection within 180 days of completion of the investigation, using formal enforcement authority to eliminate the illicit connection. The intent of this requirement is to ensure the timely elimination of illicit connections upon discovery and their contributions to the degradation of storm water quality.

5) The Draft Ventura MS4 Permit requires Permittees to maintain records of all illicit/ illegal discharge discoveries, reports of suspected illicit/ illegal discharges, their response to the illicit/ illegal discharges and suspected illicit/ illegal discharges, and the formal enforcement taken to eliminate all illicit/ illegal discharges. The intent of this documentation provision is to facilitate the recognition of trends to assist in the discovery of unidentified illicit connections and identify areas where illicit connections and discharges have a greater probability of occurring.

## I. Reporting Program

The Reporting Program requires an Annual Report that is a Public Document Required under Federal Regulations

The Annual Report is composed of:

1) A Monitoring Report that contains the results that are to be used to refine BMPs for the reduction of pollutant loading, & for the protection & enhancement of the beneficial uses of the receiving waters within Ventura County.

2) A Program Report to track and oversee the progress each Permittee is making towards full compliance with the various requirements of the MS4 Permit.

# VI. MONITORING PROGRAM

Background

Board based monitoring data collected through the Countywide Storm Water Monitoring Program provides a quantitative, statistically valid estimate of the impaired water segments within Ventura County. This water quality monitoring program has become a high priority, because of the number of water segments not supporting their beneficial uses due to constituent exceedances and therefore being placed on the State's 303(d) list of impaired waters. Monitoring has taken on a large role in determining compliance with the Total Maximum Daily Loads (TMDLs) developed within the Ventura waterbodies. Water quality issues have become more complex than in the past were monitoring focused mainly on conventional, bacteriological, and nutrient constituents. Now monitoring focuses on legacy pollutants, new and complex constituents such as synthetic organic compounds like pesticides and volatile organic compounds (VOCs) in solvents, which have been introduced into the environment and were not water quality issues in the past.

Water quality monitoring and assessments help prioritize water segments within a watershed that have the most degraded waters and to assess which stressors such as nutrients, sedimentation, and habitat disturbances are the most important in that watershed. Monitoring is a useful and cost-effective method for getting a broad picture of whether there is a problem and how big the problem is within a watershed. From this board based monitoring follows targeted monitoring that focuses on the associations between water quality conditions and the natural and human factors that contribute to the impaired conditions. Targeted monitoring establishes relations between water quality, and the natural and human factors that affect water quality. In general, a comprehensive monitoring program (board based and targeted) can supply a wealth of data that can be used in a wide range of applications for improving water quality.

Storm Water Monitoring History

The Ventura County Watershed Protection District has been conducting storm water monitoring within Ventura County pursuant to the 2000 Board Order No. 00-108. Over the last 8 years, the storm water monitoring program has consisted of 2 main components: water chemistry and

aquatic toxicity monitoring at Mass Emission, Receiving Water (tributaries), and Land Use stations. It also has had a bioassessment monitoring component within the Ventura River. The pertinent parts of the Storm Water Monitoring Program include the following:

Mass Emission stations were designed to identify pollutant loads to the ocean, and long term trends in pollutant concentrations, and characterize surface water quality in major receiving waters. The 3 Mass Emission stations are located in the major Ventura County watersheds: Calleguas Creek (ME-CC), Ventura River (ME-VR), and Santa Clara River (ME-SCR). Stations ME-CC and ME-VR were installed and monitored for the first time during the 2000/01 monitoring season, while ME-SCR was first installed and monitored during the 2001/02 monitoring season. High flows during January and February of 2005 resulted in the relocation of the ME-VR due to landslide activity and associated safety concerns to approximately one mile downstream from the historical ME-VR site to the Ojai Valley Sanitation District's Treatment Plant above the POTW outfall. The relocated station on the Ventura River (ME-VR2) was first monitored using portable sampling equipment in May 2005; and by September 2005 a permanent station was established. Stations ME-CC, ME-SCR, and ME-VR/ ME-VR2 were required to sample 6 station events per year, including a minimum of 2 dry weather samples during the permit term. The stations ME-CC and ME-VR/ ME-VR2 samples are composed of flow-based composite and toxicity grab samples, and station ME-SCR samples are composed of time-based composite samples and toxicity grab samples. All 3 Mass Emission stations collected wet and dry weather water quality samples and analyzed for chronic toxicity.

Land Use stations were designed to characterize storm water runoff (discharges to receiving waters) from 3 specific land use types: agricultural, industrial, and residential. The 3 Land Use stations are located at: Wood Road (A-1, agricultural), Ortega Street (I-2, industrial), and Swan Street (R-1, residential). Monitoring at these sites was first implemented during the 1992-93 monitoring season and was designed to capture storm water runoff from a specific type of land use. Station A-1 was required to sample a maximum of 5 storm events during the permit term, stations I-2 and R-1 were required to sample 3 storm events during the permit term. The stations' samples are composed of time-based composite samples and toxicity grab samples. All 3 Land Use stations collected wet weather water quality samples and analyzed for acute toxicity.

Receiving Water (tributaries) stations were designed to characterize the quality of receiving waters rather than discharges to receiving waters. This monitoring evaluated smaller tributaries to the main river systems. The 2 Receiving Water stations are located in the Revolon Slough watershed at: La Vista (W-3), upper Revolon Slough, and Revolon Slough (W-4), lower Revolon Slough. Monitoring at these sites was first implemented during the 1997-98 season and captures storm water runoff from the Revolon Slough sub basin. Stations W-3 and W-4 were required to sample a maximum of 5 storm events during the permit term. The stations' samples are composed of time-based composite samples and toxicity grab samples. All 2 Receiving Water stations collected wet weather water quality samples and analyzed for acute toxicity.

Biological assessment (bioassessment) monitoring of the Ventura River watershed was designed to analyze the community structure of the in-stream benthic macroinvertebrate (BMI) assemblages in urban runoff-impacted stream segments at experimental sites. In bioassessment monitoring, a set of biological measurements (metrics), each representing a different aspect of

the community, was calculated for each monitoring site. A total score was then calculated for the monitoring site, as the sum of the individual metric scores. Monitoring sites were then ranked according to their score, and then classified into groups (poor, fair, good and very good). The system of scoring and ranking sites is an Index of Biotic Integrity (IBI). The IBI used during 2001/02 though 2003/04 was the San Diego IBI; and the IBI used during 2004/05 through 2006/07 was the Southern California IBI (So CA IBI). There were fifteen BMI monitoring sites located in the Ventura River watershed, monitoring at these sites was implemented from the Fall of 2001 through 2005. A biological and physical/habitat assessment program within the Ventura River watershed was developed during the Spring of 2001.

New requirements

The new provisions of the monitoring program consist of:

1) Outfall monitoring (12 major outfalls)
2) Submittal of monitoring data electronically within 90 days from sample collection date & transmitted in standardized formats.
3) MS4 TMDL WLA Monitoring that incorporates the adopted storm water WLAs
4) Mass Emission stations' monitor storms that produce a 20% or greater increase in baseflow
5) Expanded toxicity testing
6) Special Studies
   (a) Expanded Bio-assessment monitoring (Southern California Regional Bioassessment)
   (b) Pyrethroid Insecticide
   (c) Hydromodification Control
   (d) Low Impact Development
   (e) Beach Water Quality Monitoring
7) Shoreline monitoring (10 stations)

# ECONOMIC CONSIDERATIONS OF THE PROPOSED ORDER (February 25, 2008)

## STATE OF CALIFORNIA
## CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
## LOS ANGELES REGION

## ORDER 08-xxx
## NPDES PERMIT NO. CAS004002
## WASTE DISCHARGE REQUIREMENTS
## FOR
## STORMWATER (WET WEATHER) AND NON-STORMWATER (DRY WEATHER) DISCHARGES FROM
## THE MUNICIPAL SEPARATE STORM SEWER SYSTEMS WITHIN THE VENTURA COUNTY WATERSHED PROTECTION DISTRICT, COUNTY OF VENTURA AND THE INCORPORATED CITIES THEREIN

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**Final Report**
**6/18/2008**

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# EXECUTIVE SUMMARY

This report considers the economic impacts of not implementing, and implementing, the proposed Ventura County Stormwater Municipal Separate Storm Sewer Systems (MS4) Permit.

By not implementing the permit, stormwater pollution will degrade the water quality of rivers, coastal shorelines, beaches, lakes, reservoirs, bays, harbors, estuaries, groundwater, wildlife habitats and wetlands in Ventura and Los Angeles counties. Many of these waterbodies do not meet established water quality standards and are included on US EPA's 303(d) List of Water Quality Limited Segments. Many of these listed waterbodies are close to developed urban areas that are prone to stormwater pollution that will be the objective of this permit.

The 2006 303(d) list includes 488 miles of rivers and streams, 30 miles of coastal shorelines and beaches, 148,000 acres of bays, harbors, estuaries, lakes and reservoirs, and 12,000 acres of sensitive ocean habitat (Areas of Special Biological Significance). Also, the county overlies 527,000 acres of critical groundwater basins. All of these features and areas are subject to degradation from stormwater pollution that the Stormwater MS4 Permit is designed to reduce. The economic impact of not implementing the Permit was not quantified because the type and amount of stormwater pollution, and the extent and effectiveness of the permit conditions were not known.

The economic considerations of implementing the MS4 Stormwater Permit include the effect on public agencies, residents and commercial interests. This study focused on the economic effects on the public agencies responsible for implementing and complying with the conditions of the Permit. Estimating the economic impacts on residents and commercial interests would require that dischargers be identified and located. Residential and commercial development would also have to be projected to determine the costs of implementing and complying with the Industrial/Commercial Business Program, the Planning and Land Development Program and the Development Construction Program. These tasks were outside of the limits of this study.

Engineers from the California State University, Sacramento (CSUS), University of Southern California (USC), and the University of California at Los Angeles (UCLA) conducted a study funded by the State Water Resources Control Board to estimate the cost of implementing stormwater MS4 permits in six cities. Data from that study was used as a basis for this study. The CSUS study surveyed five municipalities and one metropolitan area that have implemented a MS4 permit. Cost data was collected and organized using a set of programs defined by US EPA that served as a basis for transferring the results to other cities.

Three cost scenarios based on the CSUS survey were selected to estimate the cost of implementing the Ventura County MS4 Stormwater Permit. They ranged from $27.60 to $42.00 (2008$)[1] per household annually. Total annual cost ranged from $7.1 million to $10.9 million (2008$). The Public Agency Program, which includes street cleaning and storm drain cleaning, is projected to comprise 62 percent of the total cost to public agencies for implementing and complying with the proposed permit.

# INTRODUCTION

The purpose of this analysis is to consider the economic effects of, not implementing, and implementing, the proposed Ventura County Stormwater permit. Considering economic effects allow evaluation of proposed actions in terms of economic values. This report presents a qualitative, and where possible, a quantitative evaluation of the positive and negative economic effects of the proposed permit.

This report is organized into two sections. The first section identifies the areas and activities that are affected by stormwater pollution if the Permit was not implemented. The second section contains a

[1]Indicates the year the dollar value was indexed.

discussion of the data sources and methodology used to estimate the cost of implementing the permit, descriptions of the Principal Permittee and Permittees, and an estimation of the cost of implementing and complying with the proposed permit.

# ECONOMIC CONSIDERATIONS OF NOT REGULATING STORMWATER

Not regulating Ventura County stormwater will result in greater contamination of rivers, streams, lakes, reservoirs, bays, harbors, estuaries, groundwater, coastal shorelines and wetlands. The benefit of the Stormwater Permit is to improve water quality, enhance beneficial uses and increase employment, income and satisfaction from environmental amenities. Most of the benefits of the permit can be identified and, in some cases, quantified in monetary terms. Others cannot be expressed in dollar terms and can only be described. This report compiles the information and data that exists on areas and activities that will be covered by the permit. It does not attempt to value the improvements that will result from the permit because activities subject to the permit has not been identified, and the relationship between stormwater discharges and water quality levels is not known.

The Los Angeles Regional Board's Basin Plan designates beneficial uses for surface and groundwater, and sets narrative and numerical objectives that must be attained or maintained to protect the designated use. These data serve to identify the activities that will benefit as a result of pollution reductions but they are not sufficient to estimate economic values.

## Waterbodies Affected by Stormwater Pollution

This section contains the identification of waterbodies that exceed established water quality objectives and reduce the value of identified beneficial uses. The quality of these waterbodies will be improved by implementing the Ventura County Stormwater Permit.

Under Section 303(d) of the 1972 Clean Water Act, states are required to develop a list of water quality limited segments. These waters on the list do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology. The law requires that these jurisdictions establish priority rankings for water on the lists and develop action plans, called Total Maximum Daily Loads (TMDL), to improve water quality.

The TMDL is a number that represents the assimilative capacity of receiving waters to absorb a pollutant. The TMDL is the sum of the individual wasteload allocations for point sources, load allocations for nonpoint sources plus an allotment for natural background loading, and a margin of safety. TMDLs can be expressed in terms of mass per time (the traditional approach) or in other ways such as toxicity or a percentage reduction or other appropriate measure relating to a state water quality objective. A TMDL allocates the total allowable pollution among the different pollutant sources (through the permitting process or other regulatory means) to ensure that the water quality objectives are achieved.

On June 28, 2007, USEPA gave final approval to California's 2006 Section 303(d) List of Water Quality Limited Segments. Presented here are the 303(d) listed areas subject to stormwater pollution and will therefore benefit from implementing the Ventura County Stormwater permit.

### Rivers and Streams

Beneficial uses of rivers and streams generally include recreation and wildlife habitat and commercial and sport fisheries. In a few cases, they are used as a source of drinking water. Many regional streams are primary sources of replenishment for major groundwater basins that supply water for drinking and other uses, and as such must be protected as groundwater recharge. Improving water quality that enhances beneficial uses is a benefit to the Ventura County Stormwater Permit. Estimating the economic benefit in

monetary terms is only possible after linking discharges and water quality, and determining the extent and effectiveness of the required BMPs.

Under federal law, all surface waters must have water quality standards designated in the Basin Plans. Most of the inland surface waters in the Los Angeles Regional have beneficial uses designated for them. Those waters not listed (generally smaller tributaries) are designated with the same beneficial uses as the streams, lakes, or reservoirs to which they are tributary. This is referred to as the "tributary rule." They do not appear on any of the following maps or included in any of the area totals.

Figure 1 depicts the major watersheds, and the 303(d) listed rivers and streams in Ventura County. Stormwater runoff from developed areas affect, not only waterbodies that are located in Ventura County, but also in Los Angeles County. 303(d) listed rivers originating in southern Ventura County (Santa Monica Bay watershed) flow through the western part of Los Angeles County and into the 303(d) listed Santa Monica Bay.

Table 1 contains the 303(d) listed rivers and streams by major watershed, their lengths, identified pollutant and the sources of pollution. There are 488 miles of rivers and streams that are listed for various pollutants.

Figure 2 includes the urban areas under the Stormwater Permit and indicates their spatial relationship to the 303(d) listed rivers and streams. The Calleguas Creek river system has 119 miles that are 303(d) listed. Calleguas Creek is located in southern Ventura County in close proximity to the cities of Thousand Oaks, Moorpark, Simi Valley and Camarillo. These urban areas have a combined population of 172,000.


**Figure 1. Ventura County Watersheds and 303(d) Listed Rivers and Streams, 2006.**

**Table 1. Ventura County 303(d) Listed Rivers and Streams Lengths, Pollutant, and Sources, 2006.**

| Watershed: Beneficial Uses | | | |
|---|---|---|---|
| River/Stream | Miles | Pollutant/Stressor | Sources |
| Santa Clara Watershed: Recreation, Habitat, Muncipal, Agriculture, Groundwater, Freshwater Replenishment | | | |
| Piru Creek | 77 | Chloride, pH | Nonpoint Source |
| Santa Clara River | 54 | Toxicity, Total Dissolved Solids, Coliform Bacteria, Pesticides | Nonpoint/Point Source |
| Sespe Creek | 54 | Chloride, pH | Nonpoint Source |
| Hopper Creek | 13 | Sulfates, Total Dissolved Solids | Nonpoint/Point Source |
| Wheeler Canyon/Todd Barranca | 10 | Sulfates, Total Dissolved Solids | Nonpoint Source |
| Pole Creek | 9 | Sulfates, Total Dissolved Solids | Nonpoint Source |
| Brown Barranca/Long | 3 | Nitrate and Nitrite | Nonpoint Source |
| Total | 220 | | |
| Calleguas-Conejo Creek Watershed: Industrial, Recreation, Muncipal, Agriculture, Habitat, Groundwater, Freshwater Replenishment | | | |
| Calleguas Creek | 98 | Bacteria, Pesticides, Lubricants, Sedimentation, Trash, Total Dissolved Solids, Fecal Coliform | Agriculture, Natural Sources, Nonpoint/Point Source |
| Fox Barranca | 7 | Boron, Sulfates, Total Dissolved Solids | Nonpoint Source |
| 2 | 12 | Indicator bacteria | Source Unknown |
| Rio De Santa Clara/Oxnard Drain No. 3 | 2 | Pesticides, Chemicals, Nitrogen, PCBs, Sediment | Nonpoint Source |
| Total | 119 | | |
| Ventura River Watershed: Habitat, Municipal, Recreation, Agriculture, Industrial, Groundwater, Freshwater Replenishment | | | |
| Ventura River | 27 | Total Coliform, Nutrients, Trash | Nonpoint/Point Source |
| Matilija Creek | 15 | Fish Barriers (Fish Passage) | Dam Construction |
| San Antonio Creek | 10 | Nitrogen | Nonpoint Source |
| Canada Larga | 8 | Fecal Coliform, Low Dissolved Oxygen | Nonpoint Source, Confined Animals |
| Ventura River Estuary | 1 | Total Coliform, Nutrients, Trash | Nonpoint/Point Source, Confined Animals |
| Rincon Creek | 8 | Boron, Toxicity | Source Unknown |
| Total | 69 | | |
| Cuyama Watershed: Muncipal, Recreation, Agriculture, Habitat, Groundwater, Freshwater Replenishment | | | |
| Cuyama River | 21 | Boron | Source Unknown |
| Santa Monica Bay Watershed: Muncipal, Industrial, Recreation, Agriculture, Habitat, Groundwater | | | |
| Las Virgenes Creek | 12 | Nutrients (Algae), Low Dissolved Oxygen, Sedimentation, Trash | Nonpoint Source |
| Lindero Creek | 7 | Nutrients (Algae), Selenium, Trash | Nonpoint Source |
| Malibu Creek | 12 | Nutrients, Sedimentation, Selenium, Sulfates, Trash | Nonpoint/Point Source |
| Medea Creek | 8 | Nutrients, Sedimentation, Selenium, Trash | Nonpoint Source |
| Triunfo Canyon Creek | 11 | Lead, Mercury, Sedimentation | Nonpoint Source |
| Total | 50 | | |
| Los Angeles River Watershed: Muncipal, Industrial, Recreation, Agriculture, Habitat, Groundwater, Freshwater Replenishment | | | |
| Bell Creek | 9 | Coliform Bacteria | Nonpoint/Point Source |
| Grand Total | 488 | | |

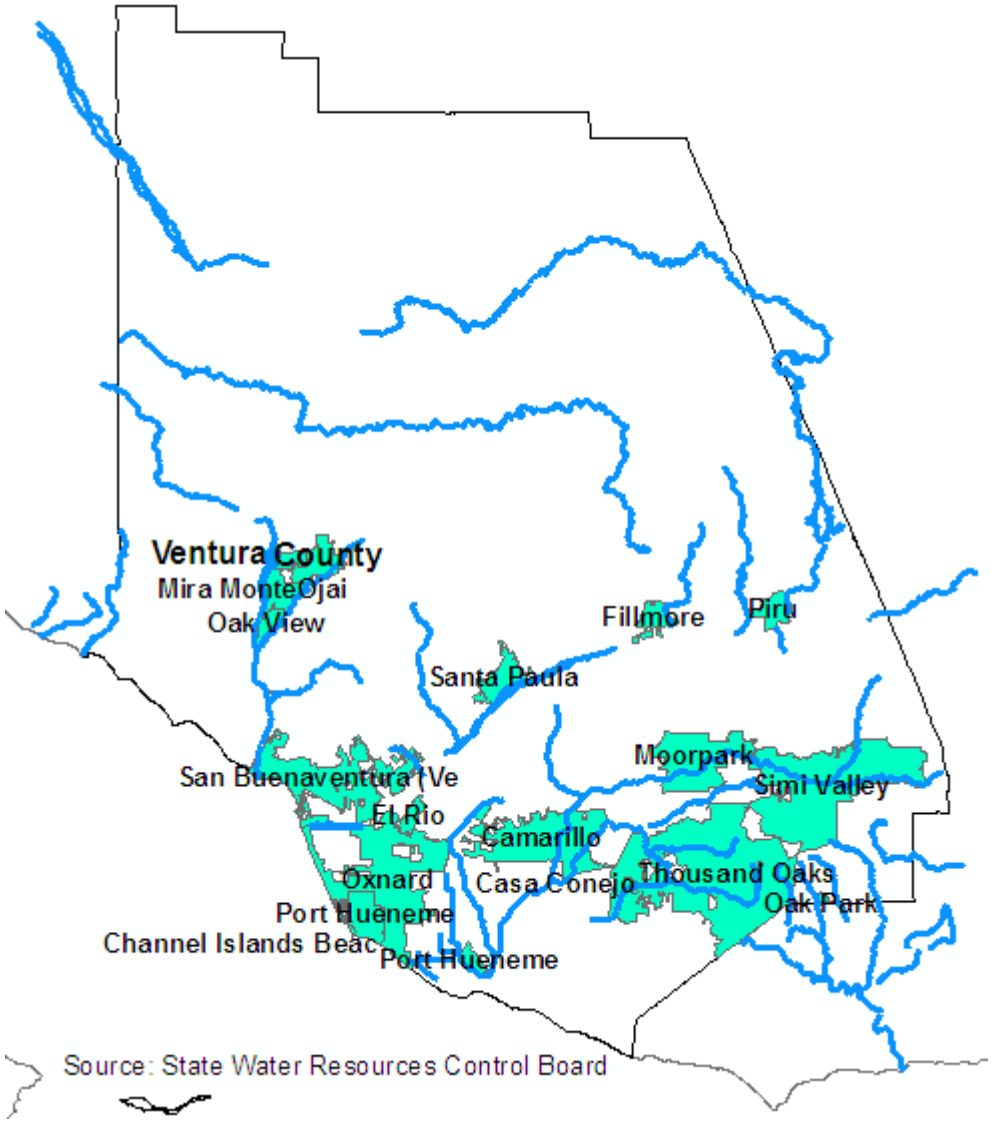


**Figure 2. Ventura County Urban Areas and 303(d) Listed Rivers and Streams, 2006.**

## Coastal Shorelines and Beaches

Coastal waters in the Los Angeles Region include bays, estuaries, lagoons, harbors, beaches, and ocean waters. The Ventura Coast is the terminus of most of the rivers and streams listed in the previous section. Figure 3 shows those rivers and streams, and the 303(d) listed coastal shorelines and beaches. Beneficial uses for these coastal waters are habitat for marine life, recreation, boating, shellfish harvesting, and commercial and sport fishing.

A total of 29.65 miles of Ventura and Los Angeles County coastal shorelines and beaches are affected by Ventura County stormwater pollution (Table 2).

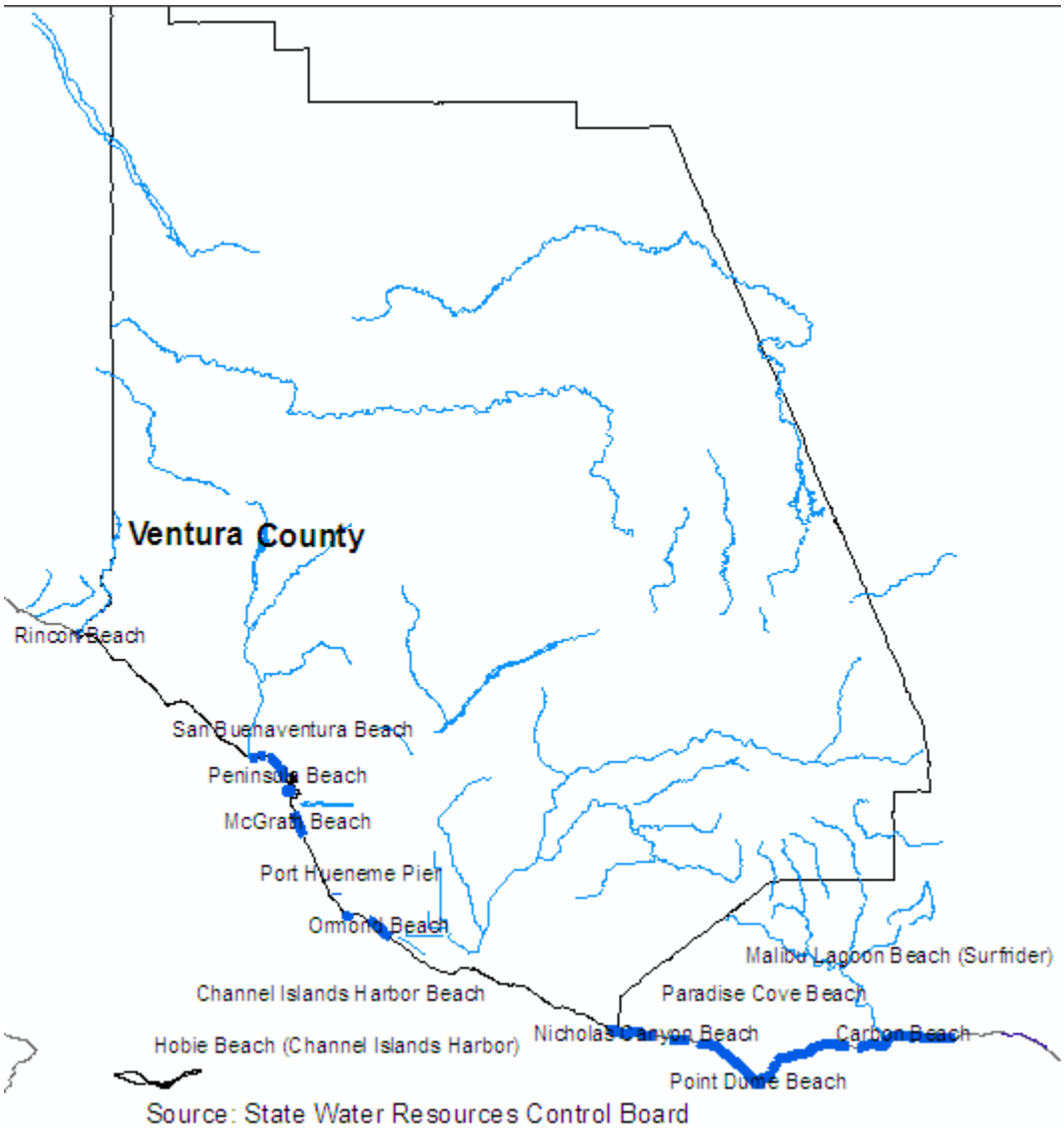


**Figure 3. Ventura County 303(d) Listed Coastal Shorelines and Beaches, 2006.**

**Table 2. Length of Ventura County and a Portion of Los Angeles County 303(d) Listed Coastal Shorelines and Beaches, 2006**

| Feature | Miles |
|---|---|
| Point Dume Beach | 2.50 |
| Dan Blocker Memorial (Coral) Beach | 2.05 |
| Leo Carillo Beach (South of County Line) | 1.77 |
| San Buenaventura Beach | 1.75 |
| Paradise Cove Beach | 1.66 |
| Nicholas Canyon Beach | 1.65 |
| Ormond Beach | 1.64 |
| Zuma Beach (Westward Beach) | 1.59 |
| McGrath Beach | 1.51 |
| Carbon Beach | 1.46 |
| Trancas Beach (Broad Beach) | 1.26 |
| Escondido Beach | 1.21 |
| Robert H. Meyer Memorial Beach | 1.17 |
| Las Flores Beach | 1.12 |
| Malibu Lagoon Beach (Surfrider) | 1.01 |
| Big Rock Beach | 1.01 |
| Malibu Beach | 0.78 |
| La Costa Beach | 0.74 |
| Ventura Marina Jetties | 0.69 |
| Amarillo Beach | 0.64 |
| Surfers Point at Seaside | 0.53 |
| Puerco Beach | 0.50 |
| Promenade Park Beach | 0.37 |
| Port Hueneme Pier | 0.33 |
| Sea Level Beach | 0.22 |
| Peninsula Beach | 0.20 |
| Rincon Beach | 0.09 |
| Channel Islands Harbor Beach | 0.08 |
| Hobie Beach (Channel Islands Harbor) | 0.06 |
| Pacific Ocean at Point Rincon | 0.06 |
| Total | 29.65 |

Stormwater pollution also affects beach posting and closings. The following table presents the Ventura County beach postings and closing from the year 2000 through 2007 in terms of beach-mile-days. Beach-mile-days is an index that characterizes beach posting and closures in extent (miles) and duration (days). Although beach postings and closures have diminished because of efforts to reduce beach pollution, these data indicate the potential damage that can occur. Stormwater pollution is one cause of beach postings and contributes to beach closures. The Los Angeles County beaches affected by Ventura County pollution is not included in the posting and closure totals listed in the following table because time did not permit individual beach data to be identified and totaled.

| Year | Posting | Closure |
|---|---|---|
| 2000 | 45.31 | - |
| 2001 | 98.30 | 37.67 |
| 2002 | 14.62 | 2.69 |
| 2003 | 199.43 | - |
| 2004 | 25.00 | - |
| 2005 | 21.70 | - |
| 2006 | 3.50 | - |
| 2007 | 2.10 | - |

Source: State Water Resources Control Board, Beach Watch.
http://beachwatch.waterboards.ca.gov/BeachWatch/cla_common/BmdComparedCriteria.jsp

### Lakes, Reservoirs, Bays, Harbors and Estuaries

Beneficial uses of lakes, reservoirs, bays, harbors and estuaries affected by stormwater pollution are municipal water supply, recreation and wildlife habitat. Figure 4 shows the location of those 303(d) listed waterbodies and their proximity to the 303(d) listed rivers and streams of Ventura County.

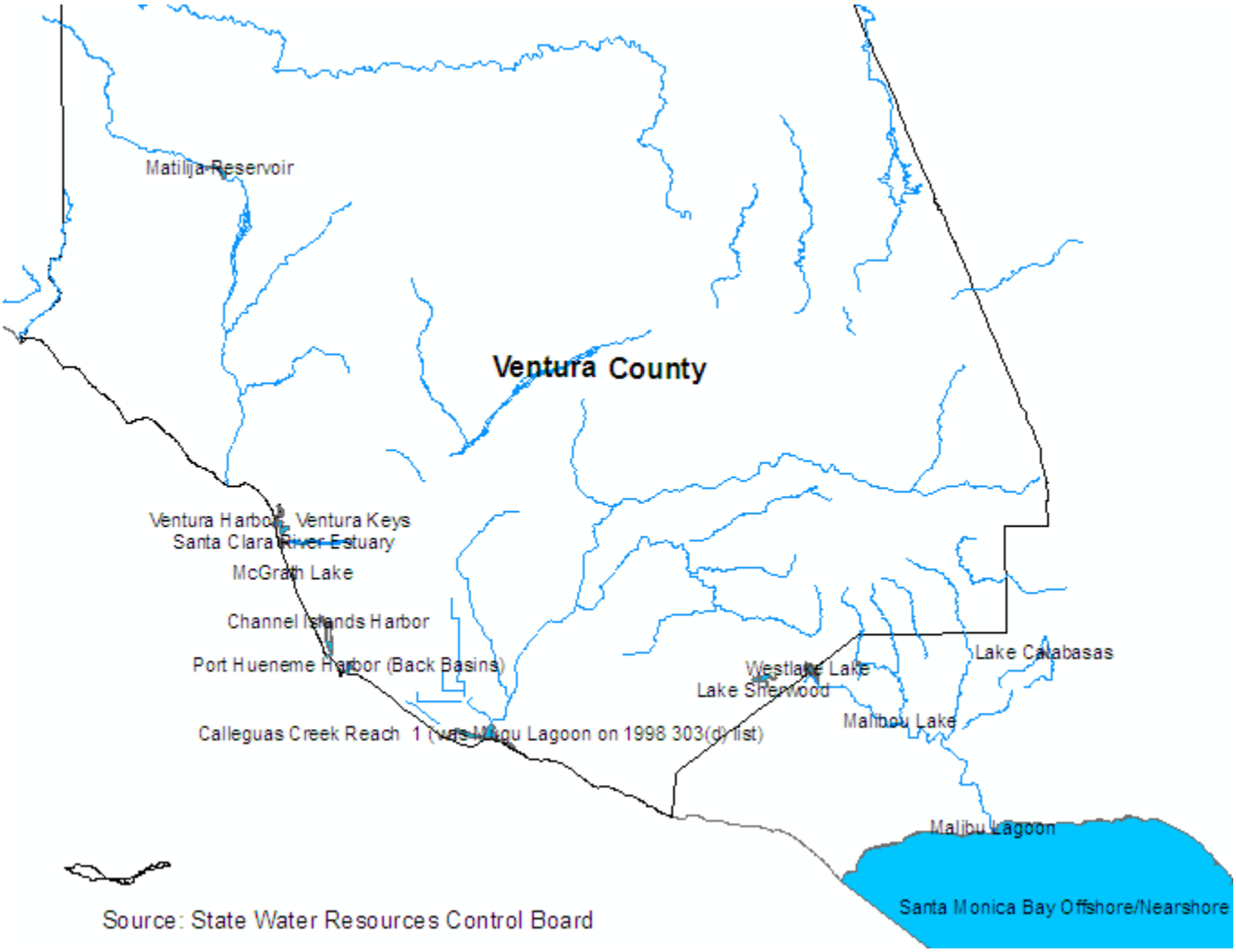


**Figure 4. Ventura County 303(d) Listed Lakes, Reservoirs, Bays, Harbors and Estuaries, 2006.**

A total of 148,030 acres of Ventura County bay, harbors, estuaries, lakes and reservoirs are 303(d) listed (Table 3). The largest listed waterbody is the 146,642 acre Santa Monica Bay that is the terminus of the southern Ventura County rivers and streams. The Ventura and Channel Islands harbors, the Calleguas Creek reach, and the Sherwood and Westlake lakes are vulnerable to Ventura County stormwater because of their proximity to urban areas.

**Table 3. Acreage of Ventura County 303(d) Listed Lakes, Reservoirs, Bays, Harbors and Estuaries, 2006.**

| Bays and Harbors | Acres |
|---|---|
| Port Hueneme Harbor (Back Basins) | 65 |
| Ventura Harbor: Ventura Keys | 179 |
| Channel Islands Harbor | 209 |
| Santa Monica Bay Offshore/Nearshore | 146,642 |
| Total | 147,095 |
| **Estuaries** | |
| Santa Clara River Estuary | 49 |
| Malibu Lagoon | 15 |
| Calleguas Creek Reach | 344 |
| Total | 408 |
| **Lakes/Reservoirs** | |
| Matilija Reservoir | 121 |
| Lake Calabasas | 18 |
| Malibou Lake | 40 |
| Westlake Lake | 60 |
| Lake Sherwood | 135 |
| McGrath Lake | 20 |
| Lake Lindero | 15 |
| Westlake Lake | 119 |
| Total | 527 |
| Grand Total | 148,030 |

Source: State Water Resources Control Board

## Groundwater

Beneficial uses for Ventura County groundwater basins include municipal, industrial and agricultural water supply. Occasionally, groundwater is used in aquaculture operations at the Fillmore Fish Hatchery. The 242,114 acre Cuyama Valley groundwater basin is the largest aquifer in the county but it is located in the rural area of the County (Table 4, Figure 5). The Santa Clara River Valley groundwater basins are located under a number of urban areas and total 125,702 acres. The designated groundwater basins underlie 526,993 acres of Ventura County.

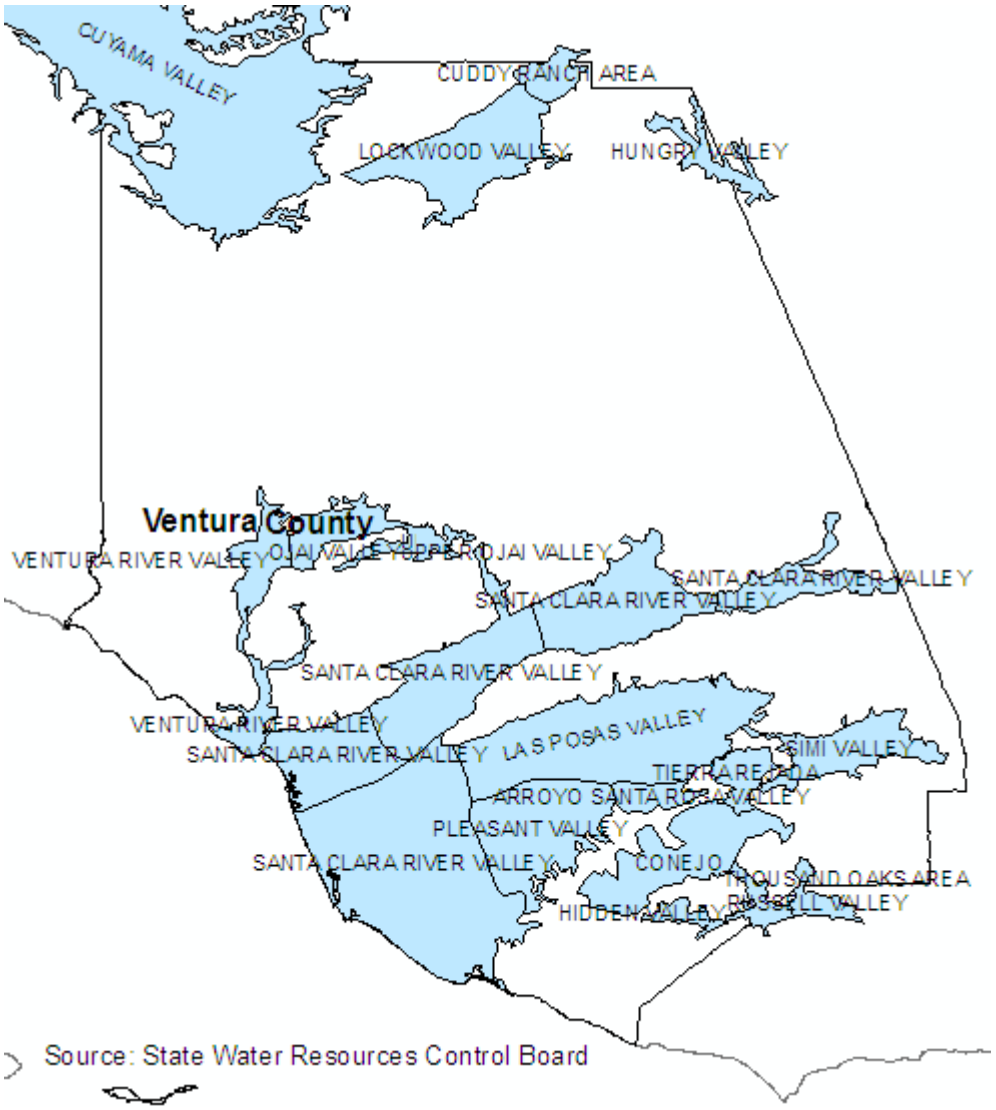


**Figure 5. Ventura County Groundwater Basins**

**Table 4. Acreage of Ventura County Groundwater Basins**

| Groundwater Basin | Acreage |
|---|---|
| Arroyo Santa Rosa Valley | 3,747 |
| Conejo | 18,848 |
| Cuddy Ranch Area | 4,213 |
| Cuyama Valley | 242,114 |
| Hidden Valley | 2,217 |
| Hungry Valley | 5,324 |
| Las Posas Valley | 42,353 |
| Lockwood Valley | 21,841 |
| Ojai Valley | 6,851 |
| Pleasant Valley | 21,654 |
| Russell Valley | 3,087 |
| Santa Clara River Valley | 125,702 |
| Simi Valley | 12,192 |
| Thousand Oaks Area | 3,115 |
| Tierra Rejada | 4,611 |
| Upper Ojai Valley | 3,815 |
| Ventura River Valley | 5,312 |
| Total | 526,993 |

Source: State Water Resources Control Board

## Areas of Special Biological Significance

The Laguna Point to Latigo Point ASBS is located on the shoreline of Ventura and Los Angeles County and it is affected by Ventura County stormwater runoff (Figure 6). The ASBS is 11,842 acres.

A study completed by the Los Angeles Regional Water Quality Control Board in 1979 concluded that this ASBS is one of the least affected because of steep mountainous terrain, offshore currents and a publicly owned shoreline. However, the report mentioned the potential effect of outflows from Mugu Lagoon which contains stormwater runoff.

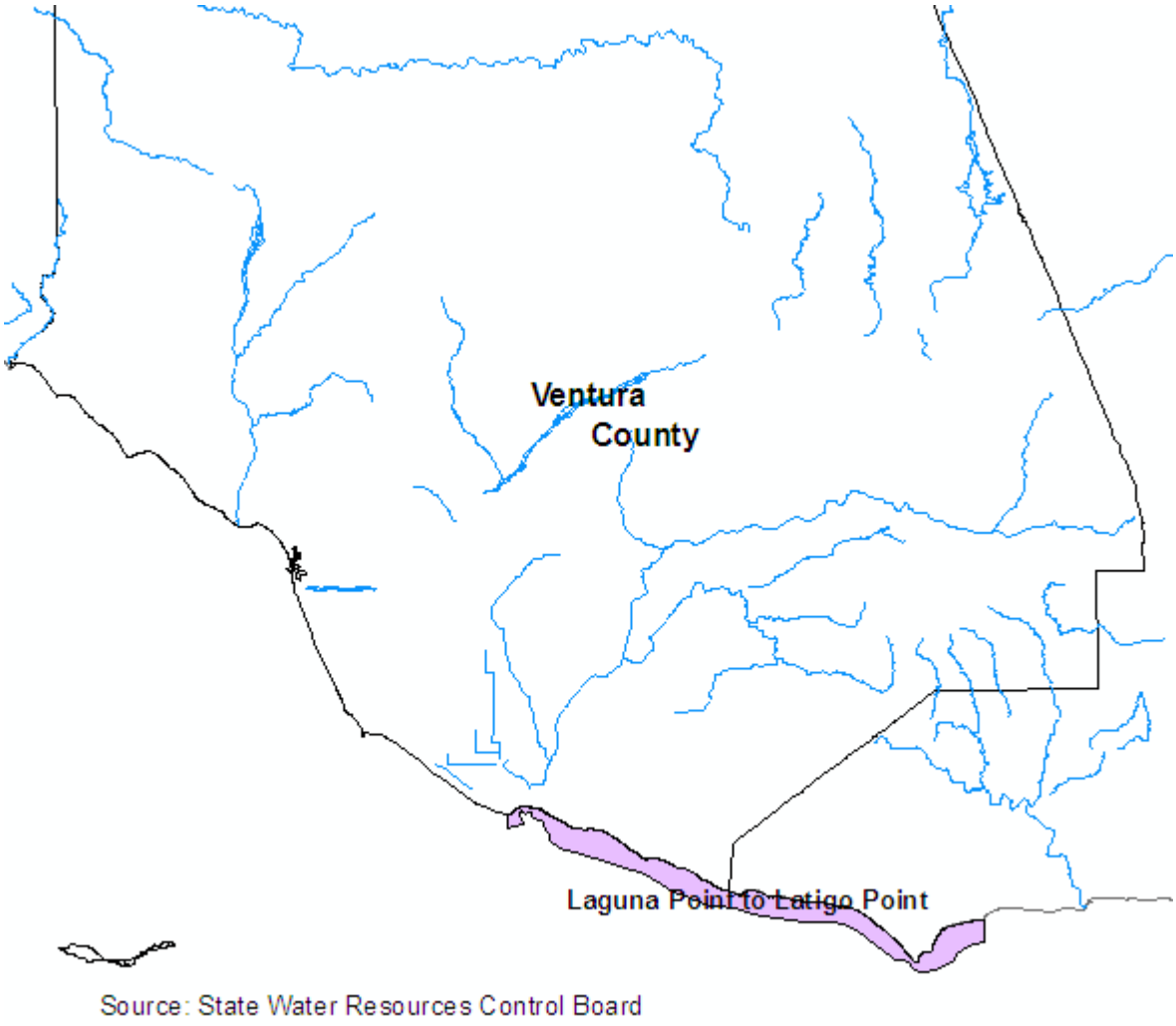


**Figure 6. Ventura County Areas of Special Biological Significance**

## Wetlands

Wetlands include freshwater, estuarine, and saltwater marshes, swamps, mudflats, and riparian areas. As the California Water Code (§13050[e]) defines "waters of the state" to be "any water, surface or underground, including saline waters, within the boundaries of the state," natural wetlands are entitled to the same level of protection as other waters of the state.

Wetlands also are protected under the Clean Water Act (CWA), which was enacted to restore and maintain the physical, chemical, and biological integrity of the nation's waters, including wetlands. Regulations developed under the CWA specifically include wetlands "as waters of the United States" and defines them as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." Although the definition of wetlands differs widely among federal agencies, the US EPA and the U.S. Army Corps of Engineers use this definition in administrating the 404 permit program.

Recently, both state and federal wetlands policies have been developed to protect these valuable waters. Executive Order W-59-93 (signed by Governor Pete Wilson on August 23, 1993) established state policy guidelines for wetlands conservation. The primary goal of this policy is to ensure no overall net loss and

to achieve a long-term net gain in the quantity, quality, and permanence of wetland acreage in California. The federal wetlands policy, representing a significant advance in wetlands protection, was unveiled by nine federal agencies on August 24, 1993. This policy represents an agreement that is sensitive to the needs of landowners, more efficient, and provides flexibility in the permit process. The US EPA has requested that states adopt water quality standards (beneficial uses and objectives) for wetlands as part of their overall effort to protect the nation's water resources. The 1975 Basin Plan identified many waters which are known to include wetlands; these wetlands, however, were not identified as such. In the 1995 Basin Plan, a wetlands beneficial use category has been added to identify inland waters that support wetland habitat as well as a variety of other beneficial uses. The wetlands habitat definition recognizes the uniqueness of these areas and functions they serve in protecting water quality.

Beneficial uses of wetlands include many of the same uses designated for the rivers, lakes, and coastal waters to which they are adjacent, and include recreation, wildlife habitat and groundwater replenishment.

As some wetlands can not be easily identified in Southern California because of the hydrologic area, the Regional Board identifies wetlands using indicators such as hydrology, presence of hydrophytic plants (plants adapted for growth in water), and/or hydric soils (soils saturated during the growing season). The Regional Board contracted with Dr. Prem Saint, et al. (1993a and 1993b), to inventory and describe major regional wetlands. Information from this study will be incorporated in the next Basin Plan.

# ECONOMIC CONSIDERATIONS OF REGULATING STORMWATER

Implementing and maintaining the conditions of the proposed MS4 Stormwater Permit will economically impact the principal permittee, permittees, residents, commercial entities and real estate developers. This report presents the economic impact on the principal permittee and permittees only. The economic impacts to others although important was not estimated because of the lack of data and the limited amount of time.

This section of the report describes the methodology, data sources and estimated cost of implementing the permit.

## Ventura Stormwater Permit Cost Categories

The proposed Stormwater Permit designates seven special provisions. The provisions and data sources are summarized in the following sections.

### Public Information and Participation Program (PIPP)

The public will be made aware of the benefits of a stormwater pollution prevention program. Target groups include residential and business. The CSUS cost survey was used to determine the cost to permittees. The CSUS study estimated that approximately five percent of the total stormwater costs should be in the Public Information and Participation Program.

### Industrial and Commercial Facilities Program

Each permittee shall require pollutant reduction and control measures at industrial and commercial facilities, with the objective of reducing pollutants in stormwater. This program requires an inventory of commercial and industrial sources of stormwater pollution. Inspections will ensure that each facility has implemented the required BMPs and they will be completed twice during the five-year permit. The first inspection will be made during the first two years.

The cost to the permittees of implementing this program is assumed to be included in the CSUS cost survey. The cost of implementing the BMPs by commercial and industrial firms was not estimated. US Census indicates that there are 2,009 commercial firms located in Ventura County subject to this

program. This total includes 1,198 restaurants, 427 automotive service facilities, 180 retail gasoline outlets and 204 nurseries.

The number of industrial firms subject to this program are identified by US EPA in 40 CFR 122.2(c) but no readily accessible data source of those firms currently exists.

The CSUS study estimated that approximately three percent of the total stormwater costs were used in the Industrial and Commercial Facilities Program.

### Planning and Land Development Program

The objective of this program is to minimize the effects from stormwater runoff on the biological integrity of natural drainage systems and the beneficial uses of waterbodies by minimizing the percentage of impervious surfaces on land developments to support the percolation and infiltration of stormwater into the ground.

Almost all development and redevelopment projects are subject to the provisions of this program. Those projects will reduce the percentage of Effective Impervious Area (EIA) to less than 5 percent of total project area.

All new development and redevelopment projects shall also integrate Low Impact Development (LID) principles into project design. LID is a stormwater 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 predevelopment hydrologic functions.

All new development and redevelopment projects shall implement hydrologic control measures, to prevent accelerated downstream erosion and to protect stream habitat in natural drainage systems. The purpose of the hydrologic controls is to minimize changes in post-development hydrologic stormwater runoff discharge rates, velocities, and duration. This shall be achieved by maintaining the project's pre-development stormwater runoff flow rates and durations.

The Southern California Stormwater Monitoring Coalition (SMC) is developing a regional methodology to eliminate or mitigate the adverse effects of hydromodification from urbanization, including hydromodification assessment and management tools.

Until the completion of the SMC HCS, Permittees shall implement the Interim Hydromodification Control Criteria, to control the potential adverse impacts of changes in hydrology that may result from new development and redevelopment projects. Land development project of less than 50 acres shall implement hydromodification controls such that the two-year 24-hour storm event post development hydrograph peak flow and volume will match within one percent of the two-year 24-hour storm event pre-development peak flow and volume hydrograph. Projects of 50 acres or greater shall develop and implement a Hydromodification Analysis Study (HAS) that demonstrates that post-development conditions are not expected to alter the duration of sediment transporting flows in receiving waters. The HAS must demonstrate that the selected hydromodification control BMPs will maintain an Erosion Potential value of 1 unless an alternative value can be shown to be protective of the natural drainage systems from erosion, incision, and sedimentation that can occur as a result of flow increases from impervious surfaces and damage stream habitat in natural drainage systems.

The Permittees shall develop and implement watershed specific Hydrologic Control Plans (HCP) no later than 180 days after the completion of the SMC Hydrologic Control Study (HCS).

This Program will require permittees to start a tracking system, and an inspection and enforcement program for new development and redevelopment post-construction stormwater BMPs no later than one year after the Order adoption date.

The CSUS study estimated that approximately two percent of the total stormwater costs were used in the Planning and Land Development Program.

### Development Construction Program

Each Permittee shall start a program to control stormwater discharges from construction activity at all construction sites within its jurisdiction. During the wet season, the program shall ensure that all no grading will be done on areas that have high soil erosive potential.

Each Permittee shall require the implementation of a minimum set of BMPs at all construction sites to prevent erosion and sediment loss, and the discharge of construction wastes. Roadway paving or repaving operations will be subject to a set of BMPs to reduce site erosion. An electronic site-tracking system will be used to track grading permits, encroachment permits, demolition permits, building permits, or construction permits (and any other municipal authorization to move soil and/ or construct or destruct that involves land disturbance) issued by each permittee.

The CSUS study estimated that approximately four percent of the total stormwater costs were used in the Development Construction Program.

### Public Agency Activities Program

Each Permittee shall minimize stormwater pollution impacts from storm drain operations which is primarily catch-basin cleaning, and streets and roads maintenance. Other public agency activities such as public construction, vehicle maintenance, material storage and operations, landscape and recreational facilities are also included in this program.

The CSUS study estimated that approximately 62 percent of total stormwater costs were used in the Public Agency Activities program.

### Illicit Connections and Illicit Discharges Elimination Program

Each Permittee shall eliminate all illicit connections and discharges to the storm drain system, and shall document, track, and report all such cases in accordance with the permit.

The CSUS study estimated that approximately two percent of total stormwater costs were used in this Program.

### Reporting Program

The Principal Permittee, VCWPD, in consultation with the Permittees and Los Angeles Regional Waterboard staff shall develop an electronic reporting program to assist in managing the requirements of this Order no later than six months after the Order adoption date.

The Principal Permittee shall submit by December 15th of each year beginning the year of 2008, an annual report to the Los Angeles Regional Water Board Executive Officer documenting the status of the Municipal Stormwater Program and the results of analysis of the monitoring program.

The Permit also recommends that a spatially oriented database (GIS) be developed to manage the provisions mandated in this permit.

Part 5.B of the permit designates an activity entitled Watershed Initiative Participation. For the purposes of cost comparison with the CSUS study, this was aggregated with the Reporting Program. The Reporting Program requires participation in Southern California Stormwater Monitoring Coalition activities and other watershed planning group programs.

The CSUS study estimated that approximately 22 percent of total stormwater costs were used in overall stormwater program management (14 percent) watershed management (two percent), and water quality monitoring (six percent).

## CSUS Stormwater Cost Survey

In 2004, the State Water Resources Control Board (SWRCB) funded a study to survey the costs to develop, implement, maintain and monitor municipal separate storm sewer system (MS4) management

and control programs.[2] The objectives of the CSUS study were to: 1) document stormwater program costs and; 2) assess alternative approaches to stormwater quality control. The six cities selected for the study were judged by SWRCB staff as having good stormwater management programs, adequate accounting systems, and represented a variety of geographic locations, hydrologic areas, populations and incomes. The cities selected were Corona, Encinitas, Fremont, Fresno-Clovis Metropolitan Area, Sacramento and Santa Clarita and the cost per household ranged from $18 to $46. These results were used to estimate the costs of complying with the Ventura MS4 Stormwater Permit.

Stormwater program expenditures by the six cities were compiled and normalized to be able to transfer the results to other cities. Factors considered for normalization of the data were size, location, tourism, and the degree of integration of programs. The compliance costs of construction, commercial, business and industrial firms were not considered in the study. An attempt to include private costs in this cost analysis was hindered by the limited timeframe to complete the study.

Table 5 contains demographic and economic data collected from the cities for 2002/2003 which in the case of city cost data, was the most recent. Population, household and income data are from the US Census for the year 2000.

Annual total cost per household ranged from $18 to $46. The average cost is $35 and the median is $36. The true mean which is derived by dividing the total sample costs by the total sample number of households, is $29.

The CSUS study attempted to quantitatively associate costs with income, population, annual rainfall, years of incorporation, area and curb swept miles but due to the small sample size, correlation was statistically insignificant in almost all cases. However, a number of qualitative explanations were offered by the authors. The Fresno-Clovis cost estimate of $18 may be low because of low land costs, climate, topography, soils and an integrated program approach. However, the latter factor was identified in the study as an important factor in permit costs.

> An integrated program is one in which an overseeing agency establishes a common approach in implementing stormwater activities. Certainly in the case of Fresno-Clovis Metropolitan Area, an integrated program seems to be an important factor. No other city surveyed had a program in which a single agency implemented a comprehensive plan for post-construction stormwater control for all permittees as did Fresno Metropolitan Flood Control District for the Fresno-Clovis Metropolitan Area. This integration may contribute to relatively low cost per household; however, on the other extreme of the cost range was Fremont, who participates in the Alameda County Clean Water Program. (Source: CSUS, NPDES Stormwater Cost Survey, page 52)

The important factor is that permits that cover large numbers of households have the opportunity to achieve lower costs per household by applying a common approach to stormwater activities. Due to the large number of households, The Ventura County MS4 has the potential for applying an integrated approach.

[2]Currier, Brian K., Joseph M. Jones, Glenn L. Moeller. "NPDES Stormwater Cost Survey, Final Report", Prepared for California State Water Resources Control Board, California State University Sacramento, Office of Water Programs, January, 2005

**Table 5. Stormwater Cost Sample Cities Demographic and Cost Data**

| | Corona | Encinitas | Fremont | Fresno-Clovis | Sacramento | Santa Clarita |
|---|---|---|---|---|---|---|
| Mean Income Per Person, | $ 21,001 | $ 34,336 | $ 31,411 | $ 15,495 | $ 18,721 | $ 26,841 |
| Area, (sq. miles) | 35 | 20 | 97 | 122 | 99 | 48 |
| Curb Miles Swept | 20,877 | 5,832 | 31,405 | 142,411 | 26,450 | 46,800 |
| Active Construction Sites | 41 | 40 | 24 | | 417 | 64 |
| Average cost per inspection | $ 29 | $ 423 | | | $ 29 | |
| Average cost per active construction site | $ 1,302 | $ 4,244 | $ 738 | | $ 628 | $ 1,172 |
| Industrial and Commercial Sites | 3,050 | 417 | 1,028 | | | 1,071 |
| Households | 39,271 | 23,843 | 69,452 | 195,311 | 163,957 | 52,442 |
| City Actual General Fund Revenue, | $ 78,413,063 | $ 42,592,755 | $ 98,456,011 | $ 216,089,323 | $ 267,464,000 | $ 61,659,874 |
| Annual Rainfall (cm) | 29 | 26 | 37 | 28 | 46 | 33 |
| Years Since Incorporation | 108 | 20 | 48 | 119 | 154 | 17 |
| Construction Site Stormwater Runoff Control | $ 53,382 | $ 169,751 | $ 17,715 | $ 81,800 | $ 261,716 | $ 74,998 |
| Illicit Discharge Detection and Elimination | $ 20,628 | $ 49,378 | $ 5,917 | $ 13,176 | $ 37,507 | $ 114,831 |
| Average cost per inspection | $ 157 | $ 287 | | | | $ 311 |
| Industrial and Commercial Management Programs | $ 89,916 | $ 65,596 | $ 210,027 | $ 47,780 | $ 42,318 | $ 12,600 |
| Average cost of inspection | $ 134 | $ 247 | $ 334 | | | $ 115 |
| Overall Stormwater Program Management | $ 317,800 | $ 128,159 | $ 453,872 | $ 570,495 | $ 281,502 | $ 515,352 |
| Pollution Prevention and Good Housekeeping for Municipal Operations | $ 720,222 | $ 528,252 | $ 2,128,175 | $ 2,240,605 | $ 3,510,806 | $ 859,754 |
| Average cost per curb mile swept | $ 20 | $ 20 | $ 61 | $ 15 | $ 50 | $ 12 |
| Post Construction Management in New Development and Redevelopment | $ 13,509 | $ 15,344 | $ 35,083 | $ 57,539 | $ 38,517 | $ 106,925 |
| Public Education, Outreach, Involvement, and Participation | $ 28,409 | $ 41,898 | $ 101,717 | $ 210,716 | $ 361,440 | $ 49,130 |
| Water Quality Monitoring | $ 7,000 | $ 76,262 | $ 131,326 | $ 252,918 | $ 494,577 | $ 3,300 |
| Watershed Management | $ - | $ 12,400 | $ 17,610 | $ - | $ 31,591 | $ 332,949 |
| Total Permit Cost | $ 1,251,285 | $ 1,087,614 | $ 3,101,885 | $ 3,475,163 | $ 5,060,178 | $ 2,070,294 |
| Cost per Household | $ 31.86 | $ 45.62 | $ 44.66 | $ 17.79 | $ 30.86 | $ 39.48 |

Source: CSUS NPDES Stormwater Cost Survey

## Ventura Stormwater Permit Costs

The cost categories used in the CSUS study are different than the categories specified in the Ventura County permit. To be able to translate costs from the CSUS study to the Ventura County permit, the categories needed to be compatible. The CSUS study had nine categories based on the US EPA six minimum measures for Phase II stormwater programs plus additional categories that were based on the permits held by the six selected cities. The activities mandated by the permit, the comparable CSUS cost category, and the percent of total surveyed stormwater costs attributed to each category are presented in the Table 6.

**Table 6. Stormwater Permit and CSUS Cost Categories, and Percent of Total Cost**

| Permit | | CSUS Cost Study | |
|---|---|---|---|
| Sections | Title | Cost Category | Percent of Total Cost |
| Part 5.C | Public Information and Participation Program (PIPP) | Public Education, Outreach, Involvement, and Participation | 5.00% |
| Part 5.D | Industrial/ Commercial Facilities Program | Industrial and Commercial Management Programs | 3.00% |
| Part 5.E | Planning and Land Development Program | Post Construction Stormwater Management in New Development and Redevelopment | 2.00% |
| Part 5.F | Development Construction Program | Construction Site Stormwater Runoff Control | 4.00% |
| Part 5.G | Public Agency Activities Program | Pollution Prevention and Good Housekeeping for Municipal Operations | 61.00% |
| Part 5.H | Illicit Connections and Illicit Discharges Elimination Program | Illicit Discharge Detection and Elimination | 2.00% |
| Part 5.I | Reporting Program | Watershed Management | 2.00% |
| Part 5.B | Watershed Initiative Participation | Water Quality Monitoring | 6.00% |
| | | Overall Stormwater Program Management | 14.00% |

### Ventura County Watershed Protection District

The VCWPD is responsible for coordinating and facilitating activities to comply with the requirements of the proposed Permit. The VCWPD conducts the Ventura Countywide Stormwater Quality Management Program. Their mission statement is:

> Enhance, protect and preserve water quality in Ventura County water bodies using proactive and innovative ideas for preservation of biodiversity, ecological viability and human health. Work as a countywide team with public agencies, private enterprise, the environmental community and the general public to locally implement Clean Water Act requirements, balancing the actions taken with social and economic constraints. (source: http://www.vcstormwater.org/)

They have initiated the basic programs required by NPDES regulations and probably meet some, if not most, of the requirements of the MS4 permit. A review of their Web site indicates that VCWPD has prepared a number of educational programs and materials to urge compliance with reducing stormwater pollution.

Businesses are encouraged to carry out Best Management Practices (BMPs) to reduce pollutants to stormwater runoff. BMPs are defined as general good housekeeping practices, schedules of activities, pollution prevention techniques, educational practices, maintenance procedures, prohibitions of practices and other management practices. BMPs also include treatment practices, operating procedures, and practices to control site runoff, spillage or leaks, sludge or water disposal, or drainage from raw materials storage.

Fact sheets have been made available to provide clear guidance. The BMPs described on these fact sheets are generally inexpensive to implement and may save money and resources. The fact sheets cover various topics and are available on their Web site.

Publications are also available on the Stormwater Pollution Control Plan and on various aspects of the complying with the State General Construction Activities Stormwater Permit.

### Ventura Stormwater Permittees

The individual permittees are responsible for implementing activities specified in the permit. Ten cities and Ventura County have been designated as Permittees. Area, population and the number of households

for those Permittees are presented in Table 7. Population and the number of households are 2006 US Census estimates.

Table 7. Ventura County Municipal Separate Stormwater System Permittees

| PLACE_NAME | Permittee | Sq Mile* | Population** | Households** |
|---|---|---|---|---|
| Oxnard | City | 24.8 | 169,649 | 46,443 |
| Thousand Oaks | City | 49.2 | 125,875 | 43,939 |
| Simi Valley | City | 33.4 | 124,653 | 39,899 |
| San Buenaventura (Ventura) | City | 20.4 | 99,969 | 39,723 |
| Camarillo | City | 18.4 | 57,077 | 21,438 |
| Moorpark | City | 12.5 | 31,415 | 8,994 |
| Santa Paula | City | 4.5 | 28,598 | 8,136 |
| Port Hueneme | City | 5.9 | 21,845 | 7,268 |
| Fillmore | City | 2.7 | 13,643 | 3,762 |
| Ojai | City | 4.4 | 7,862 | 3,088 |
| *Mira Monte* | *Ventura Co.* | *4.3* | *7,177* | *2,619* |
| *El Rio* | *Ventura Co.* | *1.6* | *6,193* | *1,467* |
| *Oak View* | *Ventura Co.* | *1.7* | *4,199* | *1,430* |
| *Meiners Oaks* | *Ventura Co.* | *1.4* | *3,750* | *1,288* |
| *Casa Conejo* | *Ventura Co.* | *0.5* | *3,180* | *985* |
| *Channel Islands Beach* | *Ventura Co.* | *0.5* | *3,142* | *1,362* |
| *Oak Park* | *Ventura Co.* | *0.3* | *2,320* | *747* |
| *Piru* | *Ventura Co.* | *2.8* | *1,196* | *308* |
| Rest of County | Ventura Co. | 1,668.0 | 87,977 | 26,197 |
| Principal Permittee | VCWPD | 1,857.3 | 799,720 | 259,093 |

*US Census, 2000
**US Census, 2006

As stated above, the CSUS study cost estimates for the six surveyed permittees range from $18 to $46 (2002$) per household per year. The number of households ranged from 23,843 to 195,311. A linear relationship was estimated between the annual cost per household and the number of households. The resulting equation was:

Cost/Household = 44.29 - .000109(Number of Households)

This relationship is depicted in Figure 7. Extending this relationship to a permit with 200,000 households would result in a per household cost of $22.46 per year (2002$). Ventura County exceeds the number of Fresno-Clovis Metropolitan Area households by 33 percent and should be able to capture the economies of size when implementing the permit. Therefore a total annual cost of $23 (2002$) per household was judged to be applicable to the cost of implementing the Ventura County permit.

Two additional cost scenarios were considered to illustrate the range of the CSUS data (Table 8). The first is based on the true sample mean of the aggregate stormwater cost for all cities surveyed divided by the aggregate number of households which was $29 per household (2002$). The second is based on the mean of the six values for each city which is $35 per household (2002$). When adjusted for inflation, the annual cost estimates range from $27.60 to $42.00 (2008$) per household (Table 9).

The estimated total annual cost to public agencies of implementing the Ventura County Stormwater MS4 permit range from $7,148,400 to $10,878,000 (2008$).

**Figure 7. Annual Stormwater Permit Costs by Number of Households**

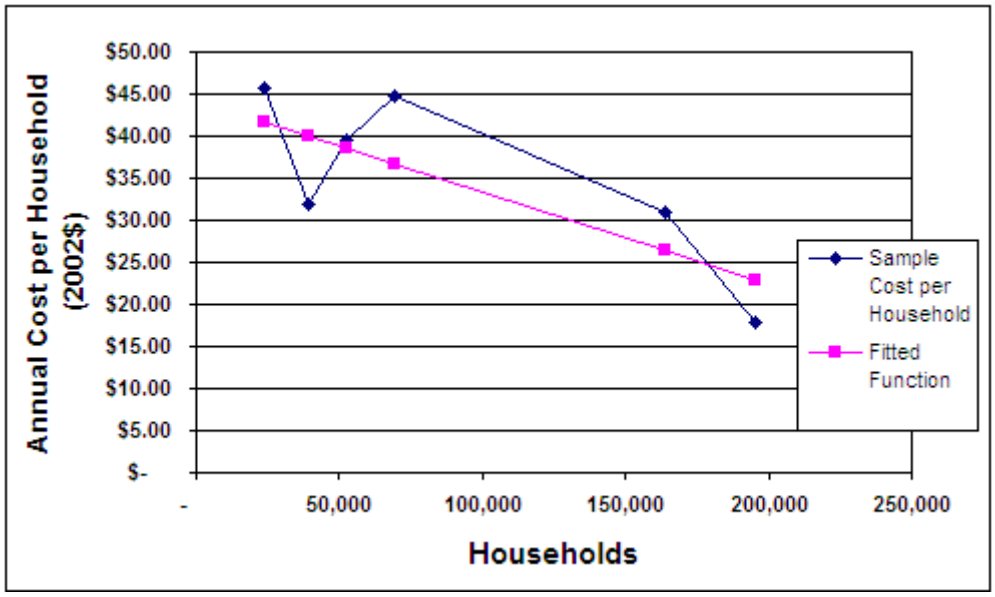


**Table 8. Summary of CSUS Normalized Stormwater Costs for Sample Municipalities, 2002$.**

| Municipalities | Municipality Description | Cost/Household ($) |
|---|---|---|
| City of Encinitas | Coastal tourism, small city | 46 |
| City of Fremont | Bay Area, moderately integrated countywide program | 45 |
| City of Santa Clarita | Tourism and industrial | 39 |
| City of Corona | Industrial | 32 |
| City of Sacramento | Pumped stormwater, large city | 29 |
| Fresno-Clovis Metropolitan Area | 65-90% infiltration, fully integrated multi-city program | 18 |
| **Summary Statistics** | | |
| Mean of the six values for each city | | 35 |
| Median of the six values for each city | | 36 |
| Standard Deviation of the six values for each city | | 11 |
| True Mean[1] | | 29 |

1. The "true" mean is the aggregate stormwater cost for all cities surveyed divided by the aggregate number of households

**Source: CSUS NPDES Stormwater Cost Survey, page 50.**

**Table 9. Annual Cost per Household and Total Annual Cost of Implementing the Ventura County MS4 Stormwater Permit by Program for Three Cost Scenarios.**

| Cost Category | Based on Relationship of Number of Households to Cost | | Based on True Sample Mean | | Based on the Mean of the Six Values for Each City | |
|---|---|---|---|---|---|---|
| | Cost per Household | Total Cost* | Cost per Household | Total Cost* | Cost per Household | Total Cost* |
| Public Information and Participation Program (PIPP) | $ 1.38 | $ 357,420 | $ 1.74 | $ 450,660 | $ 2.10 | $ 543,900 |
| Industrial/ Commercial Facilities Program | $ 0.83 | $ 214,452 | $ 1.04 | $ 270,396 | $ 1.26 | $ 326,340 |
| Planning and Land Development Program | $ 0.55 | $ 142,968 | $ 0.70 | $ 180,264 | $ 0.84 | $ 217,560 |
| Development Construction Program | $ 1.10 | $ 285,936 | $ 1.39 | $ 360,528 | $ 1.68 | $ 435,120 |
| Public Agency Activities Program | $ 17.11 | $ 4,432,008 | $ 21.58 | $ 5,588,184 | $ 26.04 | $ 6,744,360 |
| Illicit Connections and Illicit Discharges Elimination Program | $ 0.55 | $ 142,968 | $ 0.70 | $ 180,264 | $ 0.84 | $ 217,560 |
| Reporting Program & Watershed Initiative Participation | $ 6.07 | $ 1,572,648 | $ 7.66 | $ 1,982,904 | $ 9.24 | $ 2,393,160 |
| Totals | $ 27.60 | $ 7,148,400 | $ 34.80 | $ 9,013,200 | $ 42.00 | $ 10,878,000 |

*2008$. Based 259,000 households.

The Public Agency Activities Program comprises 62 percent of the estimated total annual costs. Street cleaning and storm drain cleaning operations are the main activities of the Program (Figure 8). These activities are being conducted at the municipal or county level, however the proposed Permit specifies the frequency of the operations. The cost of this program is not expected to benefit from economies of size and per household costs will be similar for small and large permittees.

The Reporting and Watershed Initiative Participation Program comprises 22 percent of annual costs. This program includes overall management, planning, monitoring and reporting activities mandated by the Permit. Because of the potential for sharing resources among permittees such as analyst's time, and computer hardware and software, the per household cost of this Program can benefit substantially from economies of size. Since the allocation of costs among categories is based on the CSUS cost survey which did not have cities with these attributes, the cost of this program could be less than reported here.

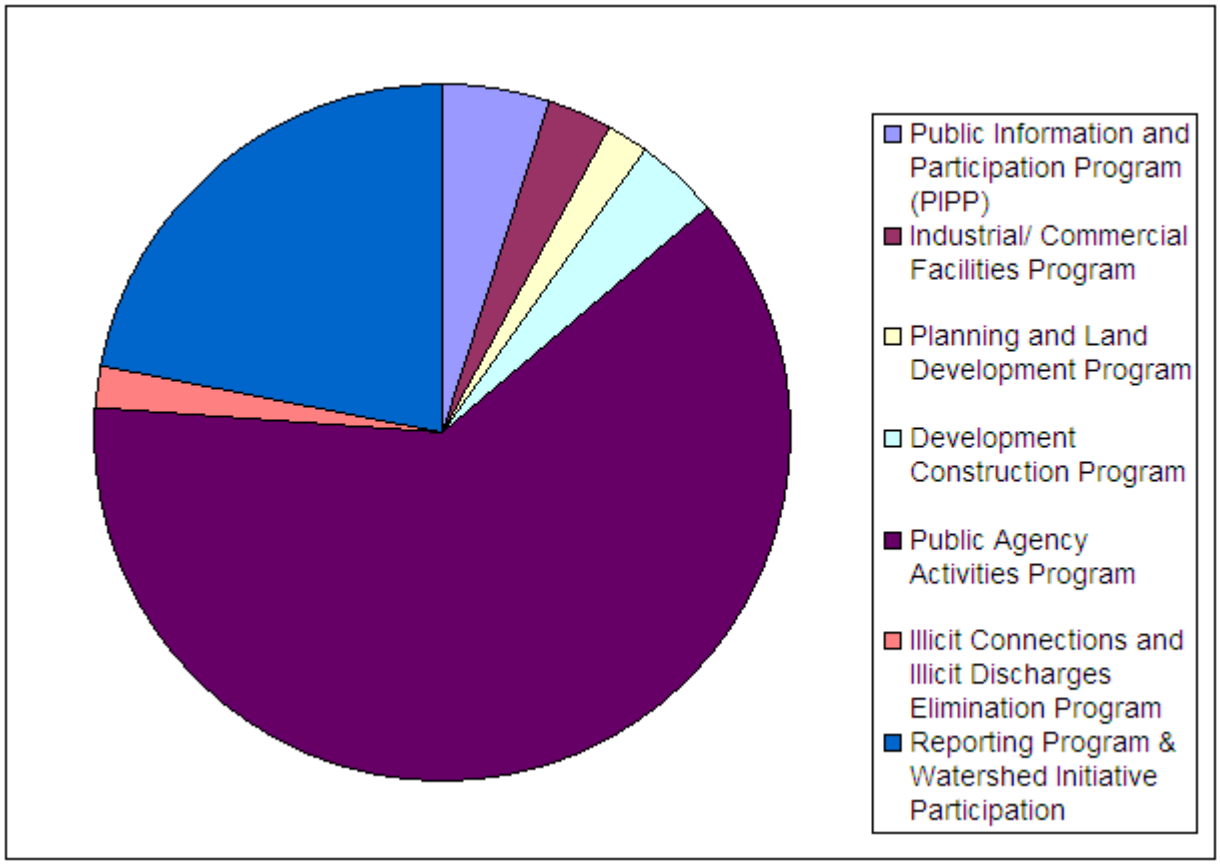


**Figure 8. Distribution of Total Permit Implementation Cost among Cost Categories**

## F. References for Economic Considerations
## Attachment F. Section XIV. SOCIOECONOMIC CONSIDERATIONS


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