County of San Diego

LAND USE AND ENVIRONMENT GROUP

SARAH E. AGHASSI
DEPUTY CHIEF ADMINISTRATIVE OFFICER

1600 Pacific Highway, Room 212, San Diego, CA 92101
(619) 531-6256 • Fax: (619) 531-5476
www. sdcounty.ca.gov/lueg

June 23, 2011

David Gibson
California Regional Water Quality Control Board
San Diego Region 9
9174 Sky Park Court, Ste. 100
San Diego, CA 92123-4340

Dear Mr. Gibson:

MUNICIPAL STORMWATER PERMIT REISSUANCE DELIVERABLES

On behalf of the Copermittees of NPDES Order No. R9-2007-0001 (*Waste Discharge Requirements for Discharges of Urban Runoff from the Municipal Separate Storm Sewer Systems (MS4s) Draining the Watersheds of the County of San Diego, the Incorporated Cities of San Diego County, the San Diego Unified Port District, and the San Diego County Regional Airport Authority*), and in accordance with Permit Sections J.2.c-d and I.5, the County of San Diego would like to submit the following documents:

1. *Report of Waste Discharge (ROWD): Application for Renewal of NPDES Municipal Stormwater Permit for San Diego County*, and
2. *2011 Long-term Effectiveness Assessment (LTEA): San Diego Stormwater Copermittees Urban Runoff Management Programs*.

This ROWD serves as an application for issuance of a new waste discharge permit for the Copermittees in San Diego County. We are now nearing the end of a third Permit cycle and have conducted in-depth reviews of our management and monitoring programs with an eye toward continued improvement. The ROWD describes an adaptive, watershed-based framework for urban runoff management that is largely based on this review, but also on an extensive visioning process collaboratively conducted by the Copermittees in fall 2010. It reflects the following key principles:

- Simplified reporting;
- Streamlined and more meaningful assessment;
- Better coordinated water quality monitoring;
- Enhanced watershed and Total Maximum Daily Load (TMDL) focus; and
- Increased emphasis on strategic planning.

The Copermittees' LTEA is submitted under separate cover. It contains a comprehensive evaluation of the Copermittees' monitoring and management programs over the course of this Permit cycle. Its purpose is to provide a factual basis for the ROWD through a detailed assessment of the Copermittees' jurisdictional, watershed, and regional programs and activities, with an emphasis on watershed assessment.

I certify under penalty of law that this Report of Waste Discharge and Long-term Effectiveness Assessment and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment for knowing violations.

These documents were reviewed and approved by the Copermittees of Order R9-2007-0001, NPDES No. CAS0108758.

We look forward to continued interaction with you and your staff. If you have any questions regarding this submittal, please contact Jon Van Rhyn of our Watershed Protection Program at (858) 495-5133.

Sincerely,

Sarah E. Aghassi For

SARAH E. AGHASSI, Deputy Chief Administrative Officer
County of San Diego

REPORT OF WASTE DISCHARGE

Application for Renewal of NPDES Municipal Stormwater Permit for San Diego County

Submitted to the San Diego Regional Water Quality Control Board on behalf of the Copermittees to Order No. R9-2007-0001

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

June 24, 2011

Prepared with the Assistance of Larry Walker Associates

Executive Summary

Urban runoff from the municipalities in San Diego County is regulated by an NPDES Permit (Regional Board Order No. R9-2007-0001) which is typically renewed every five years. As part of the renewal process the Copermittees must prepare a Report of Waste Discharge (ROWD) that serves as an application for issuance of a new waste discharge permit. The ROWD must include the following:

- Updated Copermittee contact information;
- Proposed changes to the Copermittees' urban runoff management programs (see Sections 2 and 3);
- Proposed changes to the Copermittees' water quality monitoring programs (see Section 2.B and related attachments);
- Justification for proposed changes; and
- Any other information necessary for the reissuance of the Permit.

To support the development of the ROWD the Copermittees conducted numerous meetings to assess and identify changes to their urban runoff management programs. A core set of principles guided the Copermittees' development of the ROWD and recommendations for changes:

- Simplified reporting;
- Streamlined and more meaningful assessment;
- Better coordinated water quality monitoring;
- Enhanced watershed and Total Maximum Daily Load (TMDL) focus; and
- Increased emphasis on strategic planning.

The Copermittees identified a number of specific recommendations for changes to existing management and monitoring requirements. If adopted, these changes would be in effect on adoption of the new Order. They are identified and discussed in detail in ROWD Section 2.

Parallel to the evaluation of the current urban runoff management and monitoring programs, the Copermittees identified the need to develop an iterative, adaptive urban runoff management approach focused on watersheds. This approach would build on the changes to core requirements described in ROWD Section 2. It is introduced in Section 1 and expanded upon in Section 3. The central feature of the Copermittees' recommended Watershed Adaptive Management Strategy is the "Watershed Plan." A single plan for each watershed would help streamline and refocus efforts and make best use of limited resources. The watershed appears to be the appropriate scale at which to integrate the many programs and activities targeting water quality improvement. Furthermore, this scale is consistent with other regulatory programs and policies (e.g. TMDLs and Basin Plans). While it is critical that decision-making remain within the discretion of each jurisdiction, the creation of Watershed Plans would encourage each Copermittee to carefully consider the impact of its management decisions on priority watershed water quality conditions. The suggested content and framework for the Watershed Plan is presented in Section 3.

-- This page intentionally blank --

Table of Contents

ATTACHMENTS

-- This page intentionally blank --

Section 1 Introduction

1.A REPORT OF WASTE DISCHARGE PURPOSE AND ORGANIZATION

This Report of Waste Discharge (ROWD) serves as a legally required application[1] for issuance of a new waste discharge permit for the Copermittees in San Diego County. The permit will replace the current waste discharge Order No. R9-2007-0001 (2007 Order)[2]. Section J.2.d of the 2007 Order sets out a timeframe and minimum requirements for the development and submittal of a ROWD prior to the scheduled expiration of the 2007 Order. The ROWD must include the following:

1) Names, titles, and mailing addresses of primary Copermittee contacts (**Table 1.2**);

2) Proposed changes to the Copermittees' urban runoff management programs (see Sections 2 and 3);

3) Proposed changes to the Copermittees' water quality monitoring programs (see Section 2.B and related attachments);

4) Justification for proposed changes (see above as applicable); and

5) Any other information necessary for the reissuance of the Permit.

The organization and content of the ROWD are as follows:

Section 1: Introduction – Includes a general description of the Permit coverage area, relevant application information, background to ROWD development, and a brief discussion of general permitting issues, some of which are addressed in more detail in Sections 2 and 3.

[1] Section J.2.d of the 2007 Order mandates that the Copermittees submit this application and address the issues identified in the ROWD. The Copermittees therefore are legally mandated to submit this document and to make the recommended modifications set forth herein. Because the Copermittees are legally compelled to submit this application, nothing in this ROWD should be construed as an invitation to the RWQCB to regulate the Copermittees in any particular way. Please see Section 1.F.v of this ROWD for further discussion of this issue.

[2] California Regional Water Quality Control Board San Diego Region Order No. R9-2007-0001 NPDES No. CAS0108758, Waste Discharge Requirements for Discharges of Urban Runoff from the Municipal Separate Storm Sewer Systems (MS4s) Draining the Watersheds of the County of San Diego, the Incorporated Cities of San Diego County, the San Diego Unified Port District, and the San Diego County Regional Airport Authority.

Section 2: Recommended Modifications[3] to Order R9-2007-001 Management and Monitoring Programs – Provides background and recommendations for establishing updated core program requirements in the new Permit. This information and any new findings that the Copermittees acquire each year will be used to identify program enhancements as part of the Watershed Adaptive Management Strategy, which is discussed in Section 3.

Section 3: Watershed Adaptive Management Strategy – Provides a detailed discussion of an iterative, watershed-based adaptive management strategy for water quality protection. The strategy contains two primary processes for program improvement:

- *Watershed Plan Development*. Establishment of an overall management program for each watershed at the outset of the new Permit, including management objectives, assessment metrics, strategies and actions (i.e., BMPs), based on the recommended improvements to core programs presented in Section 2 and the Copermittees' understanding of pollutant sources in each watershed; and,

- *Adaptive Management*. As needed adjustments to management actions that will enhance effectiveness based on new BMP effectiveness data, source identification findings, monitoring data results, or in response to deficiencies in program assessment results.

1.B REGION AND MS4 DESCRIPTION

Bounded by the Pacific Ocean on the west and Mexico to the south, the San Diego region occupies more than 4,200 square miles in the southwest corner of the continental United States. At the beginning of 2010, the region had an estimated population of 3,224,432[4], an increase of more than 400,000 people (15 percent) from April 2000 Census figures. While the San Diego region is expected to grow at a slower pace in the coming decades, the impacts of increasing population and urbanization will continue to be felt. Within the region, each of the entities below owns or operates a municipal separate storm sewer system (MS4), through which it discharges urban runoff into waters of the United States.

1. County of San Diego (Principal Permittee)
2. City of Carlsbad
3. City of Chula Vista
4. City of Coronado
5. City of Del Mar
12. City of National City
13. City of Oceanside
14. City of Poway
15. City of San Diego
16. City of San Marcos

[3] This ROWD uses terms such as "recommended modifications", "proposed changes", "requests" etc. because the requirements of Section J.2.d of the 2007 Order mandate that the ROWD address such program improvements. The use of these and similar terms in the ROWD must be interpreted in accordance with footnote 1 above and Section 1.F.v of this document.

[4] SANDAG Regional Growth Forecast, 2011.

6. City of El Cajon
7. City of Encinitas
8. City of Escondido
9. City of Imperial Beach
10. City of La Mesa
11. City of Lemon Grove
17. City of Santee
18. City of Solana Beach
19. City of Vista
20. San Diego Unified Port District
21. San Diego County Regional Airport Authority

Municipal urban runoff management programs in the San Diego region were initiated with the July 1990 adoption of Regional Water Quality Control Board (RWQCB) Order No. 90-42, but in many respects started fresh when that Permit was reissued in February 2001. The current Permit was reissued in January 2007. It added a number of new and increasingly prescriptive requirements for jurisdictions to implement, including expanded requirements for low impact development BMPs, treatment control BMPs, and BMP maintenance tracking for new development; hydromodification management plans; specific street sweeping and MS4 maintenance requirements; and expanded water quality monitoring programs among others[5].

Also notable is the 2007 Order's increased emphasis on watershed management principles and practices. Unlike previous permits, it specifically requires the implementation of a minimum number of watershed activities that go above and beyond core management requirements to reduce pollutant discharges causing high priority water quality problems in each of the nine watersheds identified in **Table 1.1**. These activities are developed, implemented, and assessed within the context of Watershed Urban Runoff Management Program (WURMPs), which are required for each watershed. Since urban runoff does not conform to jurisdictional boundaries, watershed-based urban runoff management requirements are intended to help focus programs on the most important water quality problems in each watershed.

Collectively, these and other requirements represented a significant increase in effort over previous permit cycles. Copermittees are now nearing the end of a third Permit cycle, and have conducted in-depth reviews of their management programs with an eye toward continued program improvement. The results of this review are described as applicable throughout the remainder of this ROWD and in the Copermittees' Long-term Effectiveness Assessment (LTEA), which is submitted under separate cover.

[5] As discussed in Section 1.F.v of the ROWD, many of these new and increasingly prescriptive provisions are the subject of a successful Test Claim before the Commission on State Mandates which is currently being challenged in the California courts.

Table 1.1: Watersheds and Responsible Copermittees under Order No. R9-2007-001

Watershed	Area (sq. mi.)	Population (2000)	Responsible Copermittees
1. Santa Margarita	750 total; 197 in San Diego County	27,124 in San Diego County	• County of San Diego
2. San Luis Rey	562	148,515	• City of Oceanside (lead) • City of Vista • County of San Diego
3. Carlsbad	211	496,128	• City of Carlsbad (lead) • City of Encinitas • City of Escondido • City of Oceanside • City of San Marcos • City of Solana Beach • City of Vista • County of San Diego
4. San Dieguito	346	147,626	• City of Escondido (lead) • City of Del Mar • City of Poway • City of San Diego • City of Solana Beach • County of San Diego
5. Los Penasquitos	94	227,599	• City of Poway (lead) • City of Del Mar • City of San Diego • County of San Diego
6. Mission Bay	68	220,803	• City of San Diego
7. San Diego	434	505,032	• City of El Cajon (lead) • City of La Mesa • City of San Diego • City of Santee • County of San Diego
8. San Diego Bay	415	932,845	• San Diego Unified Port District (lead) • City of Chula Vista • City of Coronado • City of Imperial Beach • City of La Mesa • City of Lemon Grove • City of National City • City of San Diego • County of San Diego • San Diego County Regional Airport Authority
9. Tijuana	1,750 total; 467 in U.S.	1.4 million total; 77,344 in San Diego County	• County of San Diego (lead) • City of Imperial Beach • City of San Diego

1.C APPLICANT INFORMATION

The administrative and technical contact information for each Copermittee is provided in **Table 1.2**. The first 20 of these parties were initially named as Copermittees under Order No. 90-42 in July 1990. The San Diego County Regional Airport Authority was added as the 21st Copermittee on August 13, 2003. No additional Copermittees have been added since that time.

Table 1.2: Copermittee Contact Information

Copermittee	Primary Administrative Contact (Official Mailing Contact)	Primary Technical Contact (Day-to-day Contact)
1. County of San Diego (Principal Permittee)	Cid Tesoro LUEG Program Manager 5201 Ruffin Rd., Ste P. San Diego, CA 92123	Jon Van Rhyn Water Quality Program Manager 5201 Ruffin Rd., Ste P. San Diego, CA 92123
2. City of Carlsbad	Elaine Lukey Environmental Manager 1635 Faraday Avenue Carlsbad, CA 92008	Elaine Lukey Environmental Manager 1635 Faraday Avenue Carlsbad, CA 92008
3. City of Chula Vista	Khosro Aminpour Senior Civil Engineer 1800 Maxwell Road Chula Vista, CA 91911	Khosro Aminpour Senior Civil Engineer 1800 Maxwell Road Chula Vista, CA 91911
4. City of Coronado	Scott Huth Director of Public Services 101 B Avenue Coronado, CA 92118	Kimberly Godby Supervisor - Services 101 B Avenue Coronado, CA 92118
5. City of Del Mar	Kathleen Garcia Director, Planning & Community Development 1050 Camino Del Mar Del Mar, CA 92014	Mikhail Ogawa Clean Water Manager 1050 Camino Del Mar Del Mar, CA 92014
6. City of El Cajon	Dennis Davies Deputy Director of Public Works 200 Civic Center Way, 4th Floor El Cajon, CA 92020	Jaime Campos Associate Civil Engineer 200 Civic Center Way, 4th Floor El Cajon, CA 92020
7. City of Encinitas	Erik Steenblock Clean Water Program Manager 505 S. Vulcan Avenue Encinitas, CA 92024	Erik Steenblock Clean Water Program Manager 505 S. Vulcan Avenue Encinitas, CA 92024
8. City of Escondido	Lori Vereker Utilities Director 201 North Broadway Escondido, CA 92025	Cheryl Filar Env. Programs Manager 201 N. Broadway Escondido, CA 92025
9. City of Imperial Beach	Hank Levien Public Works Director 825 Imperial Beach Blvd. Imperial Beach, CA 91932	Chris Helmer Env. Programs Manager 825 Imperial Beach Blvd. Imperial Beach, CA 91932

Copermittee	Primary Administrative Contact (Official Mailing Contact)	Primary Technical Contact (Day-to-day Contact)
10. City of La Mesa	Joe Kuhn Storm Water Program Manager 8130 Allison Avenue La Mesa, CA 91941	Joe Kuhn Storm Water Program Manager 8130 Allison Avenue La Mesa, CA 91941
11. City of Lemon Grove	Cora Long Stormwater Policy Analyst 3232 Main Street Lemon Grove, CA 91945	Cora Long Stormwater Policy Analyst 3232 Main Street Lemon Grove, CA 91945
12. City of National City	Din Daneshfar Principal Civil Engineer 1243 National City Blvd. National City, CA 91950	Barby Tipton Storm-water Inspector 1243 National City Blvd. National City, CA 91950
13. City of Oceanside	Mo Lahsaie Clean Water Prog. Coordinator 300 N. Coast Highway Oceanside, CA 92054	Mo Lahsaie Clean Water Prog. Coordinator 300 N. Coast Highway Oceanside, CA 92054
14. City of Poway	Malik Tamimi Stormwater Program Administrator P.O. Box 789 Poway, CA 92074	Malik Tamimi Stormwater Program Administrator P.O. Box 789 Poway, CA 92074
15. City of San Diego	Kris McFadden Deputy Director City of San Diego Transportation & Stormwater Dept. 9370 Chesapeake Drive, Suite 100, MS 1900 San Diego, CA 92123	Drew Kleis Program Manager City of San Diego Transportation & Stormwater Dept. 9370 Chesapeake Drive, Suite 100, MS 1900 San Diego, CA 92123
16. City of San Marcos	Erica Ryan Stormwater Program Manager 1 Civic Center Drive San Marcos, CA 92069	Reed Thornberry Stormwater Analyst 1 Civic Center Drive San Marcos, CA 92069
17. City of Santee	Pedro Orso-Delgado Deputy City Manager/Development Services Director 10601 Magnolia Avenue Santee, CA 92071	Helen Perry Stormwater Program Manager 10601 Magnolia Avenue Santee, CA 92071
18. City of Solana Beach	Dan Goldberg Principle Civil Engineer 635 South Highway 101 Solana Beach, CA 92075	Taryn Dunbar Assistant Civil Engineer 635 South Highway 101 Solana Beach, CA 92075
19. City of Vista	Paul Hartman Storm Water Program Manager 200 Civic Center Drive Vista, CA 92084	Paul Hartman Storm Water Program Manager 200 Civic Center Drive Vista, CA 92084
20. San Diego Unified Port District	Karen Holman Manager, Environmental Programs P.O. Box 120488 San Diego, CA 92112-0488	Karen Holman Manager, Environmental Programs P.O. Box 120488 San Diego, CA 92112-0488

Copermittee	Primary Administrative Contact (Official Mailing Contact)	Primary Technical Contact (Day-to-day Contact)
21. San Diego County Regional Airport Authority	Paul Manasjan Director, Environmental Affairs P.O. Box 82776 San Diego, CA 92138-2776	Richard Gilb Manager, Environmental Affairs P.O. Box 82776 San Diego, CA 92138-2776

1.D BACKGROUND TO ROWD DEVELOPMENT

Prior to initiating work on the ROWD, the Copermittees recognized a need for dialogue on long-term strategic planning. Considerations included:

- In addition to the 2007 Order, Copermittees are faced with new and more stringent water quality mandates, including total maximum daily loads (TMDLs) and Areas of Special Biological Significance (ASBS). There is an urgent need to integrate and streamline the many programs and activities required by these different regulations so that limited resources can be prioritized and put to their best use.
- There is an increasing need for improved efficiency and effectiveness, and reduced redundancy in programs.
- There is a need to connect Copermittee activities to demonstrated improvements in water quality.
- There is an ever-increasing reality of diminishing resources at the local level.

It is in this context that spurred Copermittees to develop an overarching 20-year vision that would help guide watershed management decision-making that is both effective in improving water quality and efficient in the use of public funds. The results of the Copermittees' visioning process, which took place between September and November of 2010, are summarized in Section 1.E. Results from the visioning provide an important foundation upon which specific recommendations in this ROWD are based. The vision will continue to be used beyond the timeframe of this Permit reissuance.

In addition to visioning, the Copermittees conducted an extensive Permit review process between May 2010 and June 2011 that was wholly or partially dedicated to reissuance topics. Some of the more important forums for discussion are discussed below.

Reporting and Assessment Standards Evaluation Workshops. In February 2010, two Copermittee workgroups (the Regional WURMP Workgroup and the Fiscal, Reporting and Assessment Workgroup) jointly initiated a project to begin developing recommended reporting and assessment standards for Jurisdictional Urban Runoff Management Programs (JURMPs). Between May 25 and July 10, 2010, workshops were held to help promote consistency in how Copermittee programs are reported and assessed. The results of the workshops are reflected in the final recommendations of this ROWD.

Meetings with RWQCB Staff. Critical dialogue between Copermittees and RWQCB staff took place on the following dates:

- Feb. 8, 2011
- April 6, 2011
- April 19, 2011

The first meeting dealt with broad conceptual issues. During the meeting, RWQCB staff informed the Copermittees of its intention to issue a single municipal stormwater permit for the San Diego region. Under this scenario, the upcoming San Diego County reissuance would represent the first leg of a process that would eventually bring in south Orange and south Riverside Counties. RWQCB staff also expressed a desire for more emphasis on using water quality monitoring information to drive management actions under the new Permit, with a corresponding decrease in jurisdictional reporting.

The second meeting included an overview of results from the Copermittees' Watershed Visioning workshops, and how they are likely to inform the ROWD. The remainder of the meeting was dedicated to "brainstorming" ideas for a new permit, with much of the discussion focusing on: (1) an overall adaptive management permit framework, (2) watershed and TMDL integration, (3) the role of reporting and assessment, and (4) permit performance standards.

The third meeting focused solely on water quality monitoring issues and approaches. Copermittees presented preliminary results and recommendations from their ongoing extensive review of monitoring programs. That content, which has since undergone additional refinement, is reflected in this ROWD (Section 2.b. and related attachments) as well as the LTEA.

Permit Reissuance Workgroup Meetings. After the initial meeting with RWQCB staff, the Copermittees established a dedicated workgroup (subordinate to the Regional Program Planning Subcommittee) to oversee the development of the ROWD and LTEA. This workgroup was responsible for generating potential content, overseeing consultant support, interfacing with RWQCB staff, and keeping Copermittees informed and updated.

Regional Monitoring ROWD Sub-workgroup Meetings. A dedicated workgroup (subordinate to the Regional Monitoring Workgroup) was also formed to review existing monitoring approaches, develop recommendations for potential changes to monitoring programs, oversee consultant support related to monitoring content in the LTEA and ROWD, interface with RWQCB staff, and ensure Copermittee participation throughout the review process.

Copermittee Permit Reissuance Workshops. To ensure broad and inclusive input from all 21 Copermittees, four workshops were held to allow discussion among Copermittee representatives regarding reissuance topics and potential content.

- Workshop 1: March 29, 2011

- Workshop 2: April 26, 2011
- Workshop 3: May 31, 2011
- Workshop 4: June 16, 2011

The purpose of these workshops was to brief Copermittees on ongoing content development, to seek their input, and to validate and refine potential recommendations developed by the ROWD workgroups described above. The first two workshops addressed both monitoring and broader ROWD content. The third focused solely on monitoring issues. The last workshop provided an opportunity for Copermittees to comment on and discuss the draft ROWD and LTEA documents.

Additional Input from Regional Workgroups. On April 7, 2011, the County of San Diego requested that all Copermittee workgroups provide subject area input on reissuance. Workgroups were specifically asked to identify anything within their respective subject areas that should be modified in, removed from, or added to, the current Permit. Input provided by these workgroups is reflected as applicable in ROWD Section 2.

The recommendations and discussion presented in this ROWD represent a consensus of Copermittees as developed through this extended dialogue. However, it should also be understood that consensus is not always unanimity. Individual jurisdictions reserve the right to dissent from, or address issues not reflected in, the content of this ROWD during the remainder of the permit reissuance process.

1.E A VISION FOR URBAN RUNOFF MANAGEMENT IN SAN DIEGO

The San Diego region continues to face many challenges associated with protecting its precious and finite water resources. Urban runoff has been identified as impacting the water quality of the region's ocean, bays, streams, and other water bodies. Local jurisdictions have important responsibilities to implement programs to protect and improve the quality of these watersheds and water bodies, but often find that progress is hampered by resource limitations and a lack of knowledge or consensus on how best to move forward. This desire for additional clarity and coordination led the Copermittees to pursue a series of visioning workshops in Fall 2010. Over the course of five workshops, the Copermittees identified a consensus-based strategy for protecting water quality and local watersheds in a long-term, sustainable manner. While this strategy addresses some issues that are beyond the scope of the Copermittees' responsibilities under the2007 Order, it provides a comprehensive, iterative, and adaptive strategy that the Copermittees wish to pursue in the next and future permit terms.

1.E.i Visioning Effort

Five regional Copermittee workshops were held to develop consensus-based vision, goals, and objectives for the future state of urban runoff and surface water protection in the San Diego region:

- Workshop 1: September 2, 2010

- Workshop 2: September 14, 2010
- Workshop 3: October 4, 2010
- Workshop 4: October 14, 2010
- Workshop 5: November 30, 2010

Each workshop was professionally facilitated to ensure that all objectives were completed within the projected scope of the workshops, and that all participants had sufficient opportunity to provide input. Ground rules were agreed upon at the first meeting. All workshops were attended by a majority of Copermittees. A planning workgroup also met extensively between the workshops to review and document results, and to prepare materials for ensuing discussion.

1.E.ii Vision, Goals, Objectives

A vision statement and supporting goals were crafted by the Copermittees (**Table 1.3**) to guide the planning of specific activities and programs over a 20-year horizon.

Table 1.3: Watershed Vision, Goals, and Objectives

Vision	Our vision is for the protection of water quality in our streams, bays, ocean, and other water bodies that benefits wildlife, recreation, the environment, and other community needs as supported by sustainable stormwater management.
Goal 1	Protect and restore appropriate beneficial uses for prioritized water bodies impacted by stormwater. Objectives • Establish source, constituent, and water body priorities for each watershed • Promote beneficial use designation and water quality objectives that are scientifically valid • Reduce flows and pollutant loads from stormwater that adversely impact receiving water integrity • Promote watershed stewardship as a social standard • Support the identification and development of sustainable projects that provide diverse habitats and water quality benefits
Goal 2	Achieve sustainable stormwater management that balances social, economic, and environmental needs. Objectives • Promote public policy that supports sustainable stormwater management • Obtain public support for long-term and reliable funding for stormwater programs • Involve the public in understanding and defining sustainable stormwater management
Goal 3	Focus stormwater management on sources and practices that jurisdictions have the ability to affect or control. Objectives • Identify the pollutant of concern loads that are attributable to stormwater • Work with regulatory agencies and other parties to ensure that pollutant sources are re-assigned to the appropriate regulatory process (air, water, and waste) • Promote public policy that reduces pollutants of concern through source product

	replacement/substitution/application
Goal 4	Support development of a regulatory framework and establish an organizational structure that facilitates implementation of the most effective and efficient stormwater management program. Objectives • Focus assessment on information needed to implement the most effective control strategies and adaptive management • Establish and organizational and workload structure that focuses stormwater program implementation at the watershed or other appropriate scale • Streamline program implementation, reporting, and assessment • Develop TMDL implementation plans that integrate sustainable stormwater management.

Although each goal in the Copermittees' Vision is relevant to the programs and activities required under the 2007 Order, Goal 4 is particularly relevant to the reissuance process*. To achieve Goal 4 – Support development of a regulatory framework and establish an organizational structure that facilitates implementation of the most effective and efficient stormwater management program* – the Copermittees have identified a watershed adaptive management framework that should serve as the basis for the Permit renewal process. The framework is described in detail in Section 3.

1.E.iii Key Concepts from the Copermittees' Vision

The following five key concepts were distilled from the visioning workshops. These concepts establish a set of guiding principles for permit reissuance, and inform the remainder of this ROWD.

- *Simplified reporting* (e.g., JURMP checklist, integrating multiple reports into a single watershed-based report)
- *Streamlined and more meaningful assessment* (e.g., collaborative efforts to assess the efficiency of BMPs and pollutant-generating activities)
- *Better coordinated water quality monitoring* (increased regional / watershed efficiencies)
- *Enhanced TMDL focus* (e.g., better integration of WURMP and TMDL programs)
- *Increased emphasis on strategic planning* (e.g., regionally coordinated efforts on addressing program funding, regulatory changes, and true source control initiatives)

1.F GENERAL PERMITTING ISSUES

This section introduces some of the general issues that should be explored in more depth during the Permit reissuance process. Some of these issues are explored in further detail in ROWD Sections 2 and 3.

1.F.i Adoption of a Region-wide Permit

During the south Orange and south Riverside County Permit hearing processes, and in meetings with San Diego Copermittees to date, RWQCB staff has expressed its intention to adopt a single, region-wide

Permit covering the portions of all three Counties within Region 9 boundaries. Under this scenario, San Diego would be the first in, and the others would follow on their next scheduled reissuances (December 2014 and October 2015, respectively), or sooner.

While a single, region-wide Permit might present some potential process efficiencies, there a number of issues that warrant additional discussion with Copermittees and RWQCB staff. Among the outstanding questions to be addressed are the following:

- How would the Permit be structured?
- What other permitting authorities in the U.S. have considered or adopted region-wide permits? Is staff reviewing those permits and re-issuance processes? If so, what were the key issues and concerns raised, and how were they resolved?
- Would all three regions have identical conditions, or would some requirements be unique to individual regions?
- Could specific conditions in any of the individual Permits be omitted from the region-wide Permit, or would the starting point be the sum of all existing conditions in the three Permits?
- Would the three regions be required to collaborate? If so, how?
- Would there be a single region-wide "principal" Copermittee? If so, what would its responsibilities be?

The ideas and recommendations presented in this ROWD can be addressed either within or outside of a consolidated, region-wide Permit structure. It is, however, critical that the details of a proposed Permit structure be put forth as early as possible. We therefore recommend that a dialogue dedicated solely to Permit structure be initiated with RWQCB staff and representatives of all three Permit regions, and that these discussions initially be held independently of those involving other permitting issues.

1.F.ii Watershed-Based Adaptive Management

The Copermittees feel strongly that a reissued Permit must be predicated on an adaptive management framework. Moreover, the watershed appears to be the appropriate scale at which to integrate the many programs and activities targeting water quality improvement. Watershed-based adaptive management will help ensure that programs and activities are effectively addressing the pollutant-generating sources and activities causing each watershed's priority water quality problems. This is critical to ensuring the best use of limited resources. The Watershed Adaptive Management Strategy described in ROWD Section 3 is also in line with the desire expressed by RWQCB staff to issue a watershed-based Permit that is more strategic and less prescriptive.

1.F.iii Timeline for Establishing and Updating Watershed-Based Programs

Under the reissued Permit, it is inevitable that program modifications will initially be necessary in response to new requirements, and also as part of an ongoing adaptive management process. In both cases, it is critical that consistency and quality of effort be foremost considerations, and that Copermittees be provided the time necessary to carry these changes through. Rather than setting out generic schedules for program updates, the reissued Permit should realistically reflect all of the intermediate steps necessary to fully implement each new or modified mandate, and the time needed to complete it. This is particularly true as we transition from the existing JURMP/WURMP structure to a Watershed Plan approach (see Section 3). Among the process considerations that may be relevant to each are the following:

- Collaborative or individual development and approval of new programs, collaborative standards, or Watershed Plans;
- RWQCB review and/or approval of new or modified core programs, Watershed Plans, annual reports, or other key work products;
- Development of reporting and assessment standards to ensure consistency amongst Copermittees, and to allow watershed and regional consolidation of results;
- Development and adoption of ordinances or other legal authorities;
- Modification of individual Copermittee programs in accordance with new Permit requirements, group standards, program implementation results, monitoring results, or other feedback;
- Adoption of modified budgets to support increased implementation costs; and
- Development of new or modified monitoring programs.

1.F.iv MS4 Action Levels

Action Levels, as applied in the south Orange and south Riverside County permits that were recently adopted by the RWQCB, are triggers used to define specific follow up actions to be undertaken by Copermittees when results of monitoring at MS4 outfalls exceed prescribed limits. Both permits incorporate two forms of Action Levels, non-stormwater dry weather action level (NALs) for dry weather discharges and Stormwater Action Levels (SALs) for wet weather discharges.

The Copermittees recognize the presence of NALs and SALs in the Orange and Riverside permits, and acknowledge the stated intention of RWQCB staff to utilize them in the Region-wide Permit. At the same time, RWQCB staff has expressed a desire to issue a Permit that is more strategic, less prescriptive, watershed-based, and more oriented to the evaluation of changes in MS4 discharge quality. While it is

unclear how RWQCB staff propose to use Action Levels to support this updated approach, it is clear that MS4 outfall monitoring would be a critical component of it. Prior to the adoption of the reissued Permit, Copermittees wish to explore with RWQCB staff an appropriate application of Action Levels that would make best use of limited resources and contribute to actual improvements in water quality. Some of the Copermittees' initial considerations for discussion are summarized below. The following is based on the Copermittees' review of the south Orange and south Riverside County Permits, and is intended to further discussions with RWQCB staff.

Potential Use of Action Levels as Triggers for Immediate Investigations

Comparison of MS4 outfall monitoring results to NALs and SALs is not likely to improve the Copermittees' ability to identify and abate illegal connections and illicit discharges (IC/IDs) to the storm drain system. ROWD Section 2.B and Attachment 1-1 discuss how implementation of a similar IC/ID program under the 2007 Order has had a very low success rate in identifying IC/IDs. Since NALs and SALs are assessed at the "end of pipe", an even lower success rate would be expected since the point of monitoring is further downstream and therefore further removed from potential upstream sources. In addition, samples submitted for laboratory analysis can often take weeks to return results. This further reduces the usefulness of NALs and SALs as tools to abate IC/IDs, particularly for discharges that are transient in nature. As explained in ROWD Section 2.B., the Copermittees suggest that a more appropriate trigger for immediate IC/ID investigations would be observations at the time of a field visit.

Potential Use of Action Levels for Long-Term Program Planning

Though limited in their ability to help Copermittees detect IC/IDs, Action Levels could be more useful in guiding the review, analysis, and refinement of Copermittees' programs over a longer-term period. For example, a statistically valid analysis of change in MS4 results over time could be explored as a determinant of program success. However, if sample sizes or analytical timeframes are too limited, the usefulness and validity of results would be compromised. Given the significant cost of water quality monitoring, consideration may need to be given to pooling and analyzing results over broader geographic scales (e.g., regionally) and longer time frames than those envisioned in the south Orange and south Riverside Permits. Moreover, to remain consistent with a strategic and watershed-based approach, Action Levels should be limited to constituents identified as watershed priorities. Information on MS4 outfall results for non-priority constituents could be utilized at periodic intervals to assess the appropriateness of watershed priorities, but follow-up action in the form of programmatic response to results should be limited to firmly established watershed priorities. Finally, the possibility of relief from some prescriptive Permit requirements based on demonstrated progress toward compliance with NALs and/or SALs should be explored. In instances where a Copermittee can demonstrate that core requirements are unrelated to priority water quality problems in the watershed, NAL and SAL results might be used to support a reduction in, or removal of, certain core requirements. This should be further discussed as part of the development of a watershed adaptive management strategy.

1.F.v Unfunded Mandates

The 2007 Order imposes a number of requirements that the Copermittees allege constitute an unfunded state mandate under Government Code Title 2, Division 4, Part 7 (State-Mandated Local Costs). A test claim was filed by the County of San Diego on June 20, 2008, and 19 other Copermittees were added in August 2008. The State Mandates Commission conducted a hearing on March 26, 2010, and issued a final Statement of Decision on March 30, 2010. In it, the Commission partially approved the Copermittees' test claim, finding that the following activities required under the 2007 Order constitute a reimbursable state-mandated new program or higher level of service:

- Street sweeping / reporting [Permit Sections D.3.a.(5) and J.3.a.(3)(c)(x-xv)]
- MS4 cleaning / reporting [Permit Sections D.3.a.(3) andJ.3.a.(3)(c)(iv)-(viii)]
- Educational component [Permit Sections D.5.a.(1)-(2); D.5.b.(1)(c)-(d); D.5.b.(3)]
- Watershed activities [Permit Sections E.2.f and E.2.g]
- Regional URMP [Permit Sections F.1, F.2, and F.3]
- All Copermittee collaboration [Permit Section L.1.a.(3)-(6)]
- Program effectiveness assessment [Permit Sections I.1 and I.2]
- Long-term effectiveness assessment [Permit Section I.5]

The Commission also found that the Low Impact Development and Hydromodification Plan development requirements were new programs or increased levels of service that exceeded the requirements of federal law, but concluded that the Copermittees had adequate fee authority to fund those two program elements. On July 20, 2010, the Department of Finance filed a Petition for Writ of Administrative Mandamus to overturn the Commission's decision. In August 2010, the Copermittees filed a cross-petition also challenging the Commission's decision with respect to the Copermittees' fee authority for Low Impact Development and Hydromodification Plan development, and the use of SB 310 Fee Authority for developing Watershed Management Plans. It is uncertain when a final judicial resolution of this lawsuit will be obtained, but the Copermittees anticipate that a final decision may be issued in 2012.

Assuming that the Commission's decision is at least partially upheld by the courts, some requirements of the 2007 Order, if carried through to the new Permit, will continue to constitute unfunded mandates. As such, the State legislature would either be required to appropriate funding to reimburse Copermittees for these costs, or the mandates would have to be suspended.

This also has bearing on the content of this ROWD. While the Copermittees have worked in good faith to identify and describe potential improvements to existing programs and Permit approaches, it must be

emphasized that the content of this document has not been evaluated against the requirements of Government Code Title 2, Division 4, Part 7. It is our expectation that in developing specific Permit requirements, RWQCB staff will conduct such analysis as they determine necessary, and that responsibility for doing so is entirely with the RWQCB. This position is supported by the Commission's March 2010 Statement of Decision, wherein they specifically contradicted State Board claims that a ROWD can be considered a "proposal" by dischargers, i.e., that ideas put forth by the Copermittees do not constitute unfunded mandates because they suggested them.

The Copermittees maintain that the specific content and suggestions put forth in this ROWD are intended solely to advance ongoing dialogue with RWQCB staff, and to identify potential options to be explored in a reissued permit. As such, the development and adoption of specific permit provisions remain solely the responsibility of the RWQCB and its staff. In addition, as noted in footnote 1 on page 1 of this ROWD, the Copermittees are legally required to submit this ROWD and to address the program changes as set forth in Section J.2.d of the 2007 Order; thus, the content and suggestions in this ROWD are legally mandated and should not be construed as being voluntary.

Section 2 Recommended Modifications to Order R9-2007-0001 Management and Monitoring Programs

Copermittees are currently implementing comprehensive stormwater management programs consistent with the 2007 Order. As part of the development of this Report of Waste Discharge (ROWD) they have carefully evaluated their current programs to identify opportunities for improvement.

ROWD Section 2.A discusses each of the primary jurisdictional program components ("core programs") contained in sections D, I, and J of the 2007 Order , first by providing an brief overview of the current Permit-defined effort and then providing recommendations for modifying the core program. Modifications to Permit Section E (Watershed Urban Runoff Management Program) are not addressed. The Copermittees' recommendations for watershed-based adaptive management contained in ROWD Section 3 should be considered a recommended alternative to Permit Section E. However, given that the Watershed Plans discussed in ROWD Section 3 represent an iterative process whereby specific strategies would be developed and modified over time, it is likely that Copermittees would require, with justification, additional flexibility to modify core programs within a watershed.

Regional Urban Runoff Management Program (Permit Section F) requirements are not addressed here. As discussed in ROWD Section 3.C, the Copermittees recommend that the reissued Permit not contain prescriptive regional implementation requirements, but that they be allowed to use regional activities and programs as an option for partially or wholly satisfying specific Watershed Plan requirements.

ROWD Section 2.B discusses alternatives to the existing monitoring program. Attachments 2.1-2.3 provide detailed analysis to justify these proposed changes.

2.A MODIFICATIONS TO CORE JURISDICTIONAL STORMWATER MANAGEMENT PROGRAMS

This section describes specific recommended modifications to core jurisdictional programs that, if adopted, would be effective on issuance of the new Order. As described in ROWD Section 3, these core requirements would also be subject to modification as part of the development and updating of Watershed Plans.

The Copermittees recommend that, with justification and RWQCB staff approval, the Order allow the future modification of jurisdictional core requirements during the development and updating of the Watershed Plans described in ROWD Section 3. Under the Watershed Plans, Copermittee efforts would increasingly be directed to the constituents and sources of most importance to each Watershed Management Area. Corresponding modifications to core requirements must be allowed to ensure that Copermittee resources can be used where they're most needed.

The remainder of this section applies only to those core requirements effective upon Permit reissuance. This content should be considered to represent a starting point and informational basis for considering and developing the updated core program requirements that will be identified in the new Permit.

During the development of Watershed Plans after the adoption of the new Permit, each Copermittee would optimize the implementation of the various core programs in order to target watershed priorities and maximize the efficiency of its overall implementation efforts in the watershed. These adjustments would need to meet clearly-defined criteria designed to provide reasonable assurance that the adjustments, when considered cumulatively, would enhance the overall efficiency and effectiveness of a Copermittee's actions in a watershed.

In subsequent years after the Watershed Plan has begun implementation, the Copermittees would continue to consider and implement modifications to core programs as part of an iterative, watershed-based adaptive management process that should also be clearly defined in the new Permit.

2.A.i Development Planning Component (Permit Section D.1)

Existing Core Program

Each Copermittee implements a Development Planning Component to minimize the short- and long-term impacts on receiving water quality from new development and redevelopment. Jurisdictions are currently implementing the following general control measures associated with this Component:

- Assessing and modifying general plans to ensure that land use decisions are adequately guided by water quality and watershed protection principles.
- Revising environmental review processes to include requirements for evaluation of water quality effects and identification of appropriate mitigation measures.
- Educating municipal staff and affected parties to ensure their understanding of applicable water quality laws and requirements and methods for minimizing the impact of development on water quality.
- Implementing a development project approval procedure so that priority projects are required to implement: source control BMPs; site design/landscape characteristics, where feasible; structural treatment control BMPs; and buffer zones for natural water bodies, where feasible.
- Requiring the development a Standard Urban Storm Water Mitigation Plan (SUSMP) for all new development and significant redevelopment projects falling under specified priority project categories.
- Requiring all priority projects to mitigate the water quality storm volume or flow through the use of infiltration, filtration or other treatment control BMPs.
- Developing and implementing a hydromodification management plan (HMP). The HMP requires that post-project runoff flow rates and durations do not exceed pre-project flow rates and durations where the increased flow rates and durations result in increased potential for erosion or other adverse impacts on beneficial uses.
- Developing a monitoring program to assess the impacts of the recently adopted Regional HMP.

Recommendations for Program Modification

Limits on Further Updates to Existing SUSMP and HMP Programs

The Copermittees recommend that existing SUSMP and HMP programs be evaluated over the next 5-10 years, and that future Permit modifications not be considered until results have been observed and monitoring data have been collected to provide a sufficient basis to validate and refine existing approaches. Other than allowing minor modifications needed to improve programs and realize efficiencies, changes to SUSMP and HMP requirements should not be considered until such time, i.e., not sooner than the 2017 Permit reissuance.

The 2007 Order required multiple updates to Copermittee SUSMP and HMP initiatives, each of which required an extensive effort on behalf of the Copermittees, e.g., to take documents through their respective adoption processes, to update technical reference manuals, and to re-train staff and the regional consulting community. Copermittees have spent considerable time and money to develop and update these approaches. SUSMP changes under the 2007 Order were substantive and incorporated a whole new LID approach that requires time to validate. These programs need time to mature and for Copermittees and the development community to gain experience in implementing them. They should not be substantively modified in the new Permit. Instead, results should be collected for a minimum of 5-10 years. Any future modifications to the programs should be based on observations made from implementing the SUSMP and HMP programs rather than incorporation of new or different requirements for which such analysis has not yet been conducted.

Limits on the Applicability of SUSMP and HMP Requirements

The Copermittees recommend that the applicability of all existing SUSMP and HMP requirements be evaluated during the reissuance process. We suggest the following principles inform this review and deliberation:

- *Requirements for all projects (small "mom and pop," road widening, etc.) should reflect relative risk and cost-effectiveness. Small projects often do not present the same threat to water quality as larger developments, but the financial burden of meeting Permit requirements can be proportionally much greater than for large developers. Likewise, significant limitations and constraints exist for incorporating HMP requirements into new linear projects (e.g., road widening). The tiering of requirements should be explored, e.g., based on size (for projects between 5000 square feet and 1 acre versus projects greater than an acre) or location (less risk if project is not near an impaired water body). Lower risk projects might be limited to meeting general source control and/or LID requirements, and HMP and TCBMP requirements introduced only above defined thresholds.*
- *Impracticability provisions should apply to HMP facilities. These provisions in the 2007 Order apply only to treatment control BMPs (TCBMPs). However, the same considerations that could make TCBMP placement impracticable also apply to HMP facilities. The Permit should allow impracticability determinations for HMP facilities. As an example, the San Francisco Municipal*

Regional Permit has an impracticability provision that includes considerations of space limitations and reasonable cost.

The Copermittees also believe that additional focused discussions on the applicability of specific SUSMP and HMP requirements would help to better focus the Permit where it will have the greatest impact and cost-efficiency.

Baseline Requirements for HMP Projects

The Copermittees recommend that the "pre-project" baseline used in the 2007 Order for HMP projects be retained in the reissued Permit.

The 2007 Order requires that Copermittee HMP requirements be implemented through local SUSMPs so that post-project runoff discharge rates and durations do not exceed estimated pre-project discharge rates and durations where the increased discharge rates and durations will result in increased potential for erosion or other significant adverse impacts to beneficial uses. Copermittees have put forth considerable effort and expense in meeting these requirements, which is especially difficult for road improvements and redevelopment projects in particular.

Under the south Orange and south Riverside Orders, HMP requirements must be implemented so that estimated post-project runoff discharge rates and durations do not exceed pre-development discharge rates and durations (i.e., naturally occurring conditions). Copermittees are concerned about the potential imposition of this more restrictive standard for the San Diego Region.

Changing the baseline to "pre-development" will make it impracticable for cities to meet increased traffic capacity demands for existing roads and will greatly hamper plans to densify existing urban areas through redevelopment and infill projects as an alternative to continued urban sprawl. Moreover, there is an existing, unanswered legal question about whether the Copermittees' police power authority would provide them with sufficient legal authority to regulate runoff based upon pre-development, as opposed to pre-project, discharge rates and durations. Until there is sufficient legal clarity on the authority of Copermittees to so regulate, the language in the 2007 Order should be maintained. The Copermittees believe that any substantive modifications to current HMP requirements should be based on analysis of data and implementation experience over the next 5-10 years, as well as a thorough analysis of the legal authority needed to support them.

TCBMP Maintenance Inspection Requirements

The Copermittees recommend that the TCBMP maintenance verification requirements of the 2007 Order be modified to reduce duplication, and to increase flexibility in allocating staffing resources.

The 2007 Order requires annual verification of the effective operation and maintenance of each approved treatment control BMP by responsible parties. Moreover, it requires that Copermittees conduct independent inspections of all high priority TCBMPs, 50% of projects with drainage inserts, and a minimum of 20% of the total number of projects with approved treatment control BMPs.

Under the south Orange and south Riverside Orders, Copermittees are given greater flexibility in the selection of methods to verify effective TCBMP operation. In particular, these Copermittees must verify maintenance and effective operation of TCBMPs through a combination of "inspections, self-certifications, surveys, or other equally effective approaches." While both Permits contain minimum inspection requirements for projects with high priority TCBMPs, they do not independently require that the effective operation and maintenance each inventoried TCBMP be annually certified by the responsible party. Moreover, the south Riverside Permit does not require that at least 50 percent of projects with drainage insert treatment control BMPs be inspected annually, as do the San Diego and south Orange County Permits. Clearly, the conditions of the south Orange and south Riverside Permits are more flexible, and allow a more efficient use of Copermittee resources than does the 2007 Order. Moreover, differences in approaches between the three permits should be more fully explored and better aligned in the future.

2.A.ii Construction Activities Component (Permit Section D.2)

Existing Core Program

Each Copermittee implements a Construction Component to minimize the near-term impacts of construction activities on receiving water quality. Jurisdictions are currently implementing the following general control measures associated with this Component:

- Implementing a plan review processes to incorporate jurisdictional requirements.
- Creating a prioritized watershed-based inventory of all construction sites prior to the rainy season.
- Requiring minimum BMPs for high, medium, and low priority construction sites during all phases of construction.
- Inspecting construction sites at defined frequencies during the wet and dry seasons.
- Obtaining legal authority through the jurisdictional construction ordinances and permits to regulate all construction sites.
- Notifying the RWQCB of non-compliant sites via a reporting system.

Recommendations for Program Modification

The Copermittees recommend that they be given greater flexibility in implementing their Construction Components. At a minimum, this should include greater discretion in determining appropriate construction site inspection frequencies.

The 2007 Order establishes both priorities and mandated minimum inspection frequencies for regulated construction sites. This leaves Copermittees very little room in adjusting site requirements or inspection strategies for individual sites. For example, the current Permit does not allow a Copermittee to reduce inspection frequencies on inactive sites that have been stabilized. Moreover, construction sites disturbing greater than one acre of land area are concurrently subject to oversight and inspection by RWQCB staff under the State Construction General Permit (CGP), which has been reissued since the adoption of the 2007 Order . Copermittees should have the ability to take these and other relevant

considerations into account when establishing specific requirements and oversight strategies for these sites. In contrast, Permit Section D.3.b identifies industrial and commercial source types that must be addressed by the program, but leaves critical details such as site prioritization and inspection priorities up to individual Copermittees. Construction program requirements should be structured in a way that similarly allows Copermittees the discretion to best use the resources available to them.

2.A.iii Municipal (Existing Development; Permit Section D.3.a)

The Existing Development Component of the 2007 Order encompasses several sub-components which are addressed in further detail below.

Existing Core Program

Each Copermittee implements a Municipal sub-component to minimize pollutants in runoff from municipal facilities and activities. Municipal operations encompass a wide variety of activities and facility types (i.e., sources), some of which have the potential to generate pollutant loads in runoff. Jurisdictions are currently implementing the following general control measures associated with this sub-component:

- Developing a prioritized, watershed-based inventory of municipal sources, including at least the following high priority sources and activities:
    - Roads, streets, highways, and parking facilities;
    - Flood management projects and flood control devices;
    - Areas and activities tributary to a CWA Section 303(d) impaired water body segment, where an area or activity generates pollutants for which the water body segment is impaired. Areas and activities within or adjacent to or discharging directly to coastal lagoons or other receiving waters within environmentally sensitive areas;
    - Municipal waste facilities (active or closed landfills; publicly-owned treatment works; solid waste transfer facilities; land application sites; corporate yards; and household hazardous waste collection facilities);
    - Municipal airfields;
    - Parks and recreation facilities;
    - Special event venues following special events;
    - Power washing; and
    - Other sources determined to be significant by the Copermittee.
- Requiring and implementing BMPs at these and other specified sources or facilities (MS4s and structural controls; application, storage, and disposal of pesticides, herbicides and fertilizers at municipal areas and activities; and municipal sanitary sewers).
- Inspecting facilities for compliance, including annual inspections at high priority municipal sources.
- Enforcing stormwater ordinances as necessary.

Recommendations for Program Modification

The Copermittees recommend that the reissued Permit provide a mechanism either to entirely avoid the inclusion in their inventories of facilities and activities not considered to contribute a significant pollutant load to the MS4, or to remove them when determined appropriate. Additionally, the new Permit should not establish minimum inspection frequencies for any source or source type.

The 2007 Order prescribes the types of municipal facilities and activities that must be addressed by Copermittee programs, including those that must be considered high priority (and therefore inspected at least annually). In practice, many factors determine the threat-to-water-quality of an individual activity or site. Copermittees have multiple years of experience and inspection data that would often justify a decrease in priority or inspection frequency of an individual site. However, since the prescriptive language of the 2007 Order does not allow them this flexibility, facilities and activities not posing a significant threat-to-water-quality continue to be inventoried and inspected, often tying up limited resources.

As is already the case with Section D.3.b.(1) of the 2007 Order (industrial and commercial source identification), municipal inventories should include only those activities and facilities "that could contribute a significant pollutant load to the MS4" rather than requiring that all sources be addressed regardless of threat-to-water-quality. These changes would allow limited Copermittee resources to be better aligned with actual priorities and needs.

2.A.iv Industrial and Commercial (Existing Development; Permit Section D.3.b)

Existing Core Program

Each Copermittee implements an Industrial and Commercial sub-component to reduce the discharge of pollutants in runoff from business sites and activities. Commercial and industrial operations encompass a wide variety of activities and facility types (i.e., sources), many of which have the potential to generate pollutant loads in runoff. Jurisdictions are currently implementing the following general control measures associated with this sub-component:

- Compiling and prioritizing a watershed-based inventory of industrial sites and all high priority commercial sites "that could contribute a significant pollutant load to the MS4". At a minimum, this includes the business types listed in **Table 2.1**.
- Requiring businesses to implement minimum BMPs.
- Inspecting 100% of high priority sites annually, and 25% of all inventoried sources annually.
- Enforcing ordinances at non-compliant sites.
- Reporting industrial sites that may require coverage under the General Industrial Permit to the RWQCB.
- Participating in the development and implementation of a program to reduce the discharge of pollutants from mobile businesses.

Recommendations for Program Modification

The Copermittees recommend that they be given more flexibility in implementing their Industrial and Commercial Components, at a minimum to include greater discretion in determining appropriate inspection frequencies.

The Copermittees believe it is important to utilize their limited resources to focus on the highest threat to water quality sources. While the 2007 Order provides the Copermittees some flexibility in prioritizing sites and inspections, it does not encourage an efficient use of inspection resources.

For example, the 2007 Order requires that the Copermittees develop an inventory (with minimum facility types prescribed by the Permit) and within that inventory identify and annually inspect all high priority facilities. It further requires that each Copermittee perform inspections at 25% of all of its inventoried sites. In many cases, Copermittee resources would be better spent by increasing their focus on the facilities they consider the highest threat to water quality. For instance, if a Copermittee chooses to re-inspect a high priority facility, subsequent inspections should count toward their total inspection obligations (currently to inspect 25% of the total inventory). This is, however, not allowed under the 2007Order. To address such inefficiencies, it makes more sense to allow Copermittees greater discretion in setting their inspection priorities.

Table 2.1: Minimum requirements for Commercial and Industrial Source Inventories

Commercial Sources
• Automobile/Airplane/Boat/Equipment mechanical repair, maintenance, fueling, cleaning • Auto or other vehicle parking lots and storage facilities • Auto and other vehicle body repair or painting • Painting and coating • Mobile auto or other vehicle washing • Botanical or zoological gardens and exhibits • Retail or wholesale fueling • Nurseries and greenhouses • Pest control services • Masonry • Eating or drinking establishments • Cemeteries • Mobile carpet, drape or furniture cleaning • Pool and fountain cleaning • Cement mixing or cutting • Marinas • Landscaping • Port-a-potty servicing • Other commercial sites/sources that the Copermittee determines may contribute a significant pollutant load to the MS4 • Golf courses, parks and other recreational areas/facilities • Any commercial site or source tributary to a Clean Water Act section 303(d) impaired water body, where the site or source generates pollutants for which the water body is impaired • Any commercial site or source within or directly adjacent to or discharging directly to a coastal lagoon or other receiving water within an environmentally sensitive area
Industrial Sources
• Facility that contributes a significant pollutant load to the Copermittee's MS4 • Industrial facility is subject to section 313 Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA) • Industrial site is tributary to a 303(d)-listed water body and generates pollutants for which the water body is impaired • Industrial facilities subject to the statewide General Industrial Permit (SIC codes 0211 through 5171 in particular, although full SWRCB list should be considered • Industrial facilities located within or adjacent to (i.e., within 200 feet) of a coastal lagoon or a receiving water body within an environmentally sensitive area (ESA) or discharges directly to a receiving water body.

2.A.v Residential (Existing Development; Permit Section D.3.c)

Existing Core Program

Copermittees implement a Residential Component to prevent and reduce pollutants in runoff from residential land use areas and activities. Jurisdictions are currently implementing the following general control measures associated with this sub-component:

- Identifying high priority sources. The following activities have been identified as high priority sources of pollutants:
    - Automobile repair, maintenance, washing, and parking;
    - Home and garden care activities and product use (pesticides, herbicides, and fertilizers); and
    - Disposal of household hazardous waste, pet waste, and green waste.
- Additional criteria for identifying minimum high priority residential sources include:
    - Residential sources the Copermittee determines may contribute significant pollutant loads to the MS4;
    - Any residence tributary to a 303(d)-impaired water body, where the residence generates pollutants for which the water body is impaired; and
    - Any residence within or directly adjacent to or discharging directly to a coastal lagoon or other receiving waters within an environmentally sensitive area.
- Requiring BMP implementation.
- Educating residents.
- Responding to complaints.
- Enforcing jurisdictional ordinances, as necessary.

Recommendations for Program Modification

Except as indicated under Education below, the Copermittees do not have recommendations for modification of the residential requirements of the 2007 Order at this time.

2.A.vi Illicit Discharge Detection and Elimination Component (Permit Section D.4)

Existing Core Program

Each Copermittee implements an Illicit Discharge Detection and Elimination Component to eliminate illicit connections and illegal discharges into and from the MS4. Jurisdictions are currently implementing the following general control measures associated with this Component:

- Implementing a program to actively seek and eliminate illicit discharges and connections into its MS4.

- Developing and updating MS4 maps.
- Implementing dry weather field screening and analytical monitoring of MS4 outfalls and other portions of its MS4 to detect illicit discharges and connections.
- Investigating and inspecting potential IC/IDs based on monitoring results and other information.
- Eliminating identified IC/IDs.
- Preventing and responding to sewage and other spills.
- Using public hotlines and other methods to facilitate IC/ID reporting.

Recommendations for Program Modification

As described in Section 2.B.v, the Dry Weather Field Screening and Analytical Monitoring Program, intended to support IC/ID investigations, is not an efficient use of resources, is no longer necessary given other more effective measures that are implemented by the Copermittees (e.g., facility inspections, complaint hotline responses, and public employee surveillance). This program should therefore be discontinued in its current form (see analysis, Attachment1-1) The Copermittees do not have additional recommendations for modification of the IDDEC requirements of the 2007 Order at this time.

2.A.vii Education Component (Permit Section D.5)

Existing Core Program

Each Copermittee implements an Education Component to measurably increase the knowledge of target audiences within its jurisdiction regarding MS4s, the impacts of urban runoff on receiving waters, and potential BMPs. The education component also seeks to provide measurable changes in the behavior of these entities so as to reduce pollutant releases to MS4s and the environment.

The Education Component addresses the following six target audiences:

- Municipal Departments and Personnel
- Construction Site Owners and Developers
- Industrial Owners and Operators
- Commercial Owners and Operators
- Residential Community, General Public, and School Children
- Quasi-Governmental Agencies/Districts (i.e., educational institutions, water districts, sanitation districts)

In addition to these individual efforts, Copermittees implement a Regional Residential Education Program under Section F.1 of the 2007 Order, and within each Watershed Management Area (WMA) develop and implement watershed-based education strategies (Permit Section E.2.f.(4)). For each Permit year, no less than two Watershed Water Quality Activities and two Watershed Education Activities must be in an active implementation phase.

Recommendations for Program Modification

The core educational requirements of the 2007 Order Section D.5 should not be substantially modified at this time. However, the Copermittees recommend that the watershed education requirements of Section E.2.f.(4) and the Regional Residential Education Program required under Section F.1 be removed, and that Copermittees instead be allowed to develop and implement educational activities as needed to support the Watershed Plan strategies described in Section 3 of this ROWD. As described, Copermittees should identify and implement the jurisdictional and regional education activities that they determine to be necessary to support established Watershed Plan objectives.

2.A.viiiPublic Participation (Permit Section D.6)

Existing Core Program

Each Copermittee implements a Public Participation Component to incorporate public participation in the development of its JURMP.

Recommendations for Program Modification

The Copermittees do not have recommendations for modification of the public participation requirements of the 2007 Order at this time.

2.A.ix Reporting and Assessment (Permit Sections I and J)

Existing Core Program

Per Sections I and J of the 2007 Order, Copermittees annually report on and assess the progress and effectiveness of their JURMP, WURMP, and RURMP elements. Annual assessments, which are part of the JURMP Annual Report, typically include:

- Assessment of the effectiveness of:
    - Significant jurisdictional activities and BMPs;
    - Implementation of each major JURMP component (Development Planning, Construction, Municipal, Industrial/Commercial, Residential, Illicit Discharge Detection and Elimination, and Education); and
    - Implementation of the Jurisdictional Urban Runoff Management Program as a whole.
- Identification and utilization of measurable targeted outcomes, assessment measures, and assessment methods for each of the above items.
- Utilization of outcome levels 1-6.
- Utilization of monitoring data and analysis from the Receiving Waters Monitoring Program.

Recommendations for Program Modification

The Copermittees recommend that the reporting and assessment requirements of the 2007 Order be significantly streamlined and simplified. Additional dialogue between the Copermittees and RWQCB

staff should be focused on identifying the most efficient and effective reporting and assessment approaches under a reissued Permit.

The Copermittees also recommend that jurisdictional compliance be monitored through the Watershed annual reports (see Section 3.B.iii).

RWQCB staff would have other means such as meetings and audits available to them to further evaluate jurisdictional compliance. With this change in emphasis, it's unlikely that JURMP Annual Reports would be necessary in the future.

JURMP Annual Reports in particular currently consume an inordinate amount of Copermittee resources to complete. Likewise, their sheer volume makes it very difficult for RWQCB staff to complete timely reviews. This is critical since the 2007 Order relies primarily on the jurisdictional reports for evaluating Copermittee progress and compliance. Assuming a significantly greater focus on watershed programs under the reissued Permit, this will likely be unnecessary. RWQCB staff could instead focus on evaluating Copermittee compliance within the context of each applicable Watershed Annual Report. Other aspects of core jurisdictional compliance could be evaluated in other ways (e.g., audits or specific information requests) and on different time scales (e.g., biannually or as-needed).

2.B MODIFICATIONS TO MONITORING PROGRAMS

The existing monitoring program is summarized in the monitoring attachment of the LTEA report, submitted separately. This section of the ROWD describes preliminary modifications to the monitoring program along with a summary of supporting data analysis. Details of the data analysis are presented in Attachments 2.1 to 2.3. Results from the Copermittees' visioning process informed the Copermittees' modifications to monitoring programs as follows:

- Monitoring results should aid Copermittees in establishing watershed priorities and adjusting watershed plans through the adaptive management strategy (see Goal 1)
- Monitoring should be more responsive to the Copermittees' needs within an adaptive management context (see Goal 4)
- Monitoring activities should be coordinated or leveraged with other monitoring programs including the implementation of TMDLs (see "Key Concepts" in ROWD Section 1.E.iii)
- Monitoring reports should be streamlined (see "Key Concepts", in ROWD Section 1.E.iii)
- Monitoring activities should aid watershed managers in developing watershed priorities based on the contribution of MS4s to identified watershed receiving water issues, the potential for beneficial use impacts, and the Copermittees' ability to control and assess compliance with performance standards, as applicable. (see Goals 1 and 4)

The preliminary monitoring approach emphasizes a Question-Driven Process consistent with the approach taken through the current permit term. In alignment with the Copermittees' proposed adaptive management process, the various monitoring efforts described in this section are designed to inform and assess watershed-based management decisions.

2.B.i Conceptual Monitoring Framework

The Copermittees have developed a Conceptual Watershed Monitoring Framework (Conceptual Framework) designed to serve the needs of the Watershed Plans, and to support the overall goal of reducing discharges of pollutants to the MEP. The Conceptual Framework is shown diagrammatically in **Figure 2.1**.

This framework recognizes that the fundamental purpose of the NPDES permit program is protection of receiving water quality, to support viable beneficial uses of the receiving waters. This underlying purpose then provides the basis for the permit requirements and the content of the Watershed Plans.

The Conceptual Framework incorporates monitoring activities involving two time frames:

- Long-term monitoring (typically conducted for more than 5 years) includes ongoing compliance monitoring of receiving waters, MS4 outfalls, and includes HMP and TMDL compliance monitoring, and
- Short-term monitoring (typically conducted for less than 5 years) involving Targeted Studies that are of limited duration and that are watershed-driven, as-needed, and may include monitoring of receiving waters or MS4 Outfalls, HMP and TMDL monitoring, Source Identification and Prioritization studies, and watershed-specific Targeted Studies, including BMP Effectiveness Studies.

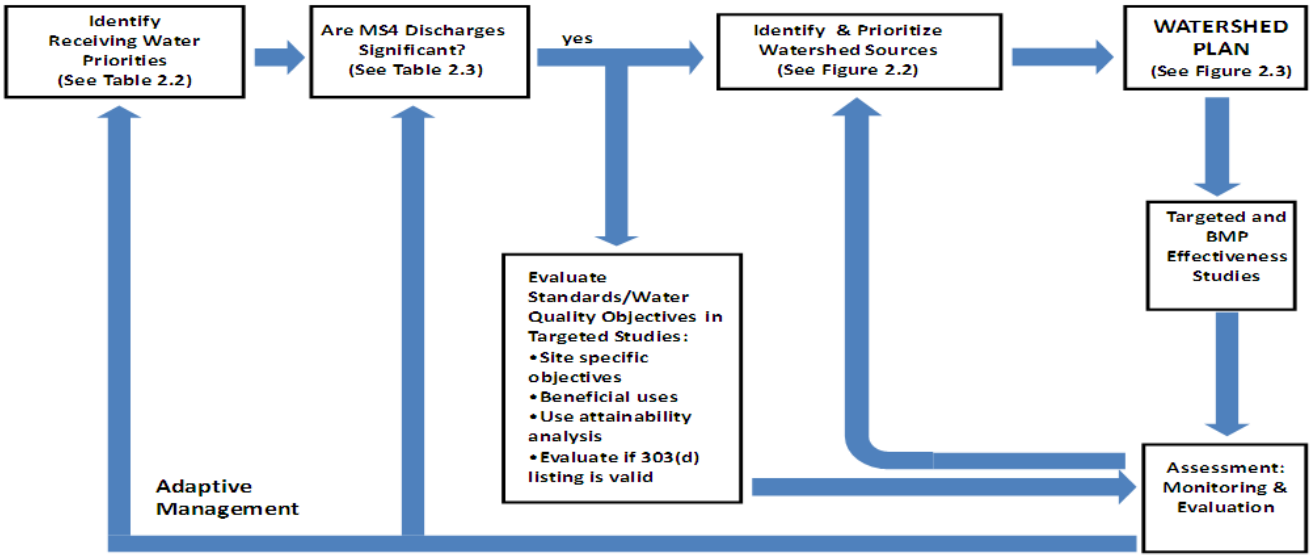


Figure 2.1: Conceptual Framework for Watershed Monitoring

The principal purpose of receiving water monitoring is to assess attainment of designated beneficial uses. Watershed receiving water priorities (Watershed priorities) are well established through prior monitoring of receiving waters in San Diego County (see Attachment 2-1, as well as the LTEA report, submitted separately).

With watershed priorities well established for the next permit cycle, monitoring can be reduced in receiving waters and those efforts refocused to determine to what degree discharges from the MS4s contribute to the identified watershed priorities. Receiving water monitoring may still be necessary to help assess stormwater program effectiveness, as shown in the feedback loop on the Conceptual Framework diagram (Figure 2.1). In this context receiving water priorities also may be revised. The Copermittees' participation in TMDLs also may involve receiving water monitoring to determine the effectiveness of TMDL implementation.

If MS4s are found to contribute significantly to receiving water issues, then follow-up investigation may be implemented within watersheds as indicated in Figure 2-1 (see box under "if yes"). For constituents for which MS4 discharges contribute significantly to confirmed receiving water issues, source identification and prioritization studies may be performed on a constituent-specific basis. Such follow-up investigations may involve monitoring in the form of watershed-driven targeted studies.

The results of the watershed-driven source investigations may then be used in the watershed planning process to develop strategies for reduction of the high priority sources of discharges of the subject constituent.

The Conceptual Framework includes the analysis of appropriate data to evaluate program effectiveness and identify data gaps, if any. This completes the monitoring information cycle to guide the alternate adaptive management approach.

2.B.ii Question-Driven Process

The conceptual framework addresses and clarifies the management questions developed by the Southern California Stormwater Monitoring Coalition (SMC) and listed in the current Permit:

1. Are conditions in receiving waters protective, or likely to be protective, of beneficial uses?
2. What is the extent and magnitude of the current or potential receiving water problems?
3. What is the relative urban runoff contribution to the receiving water problem(s)?
4. What are the sources of urban runoff that contribute to receiving water problem(s)?
5. Are conditions in receiving waters getting better or worse?

For monitoring of receiving waters and MS4 outfalls, including HMP and TMDL monitoring, – a question-driven approach was used to guide the identification of more specific questions or sub-questions, and from those sub-questions were derived the specific activities that may guide monitoring activities for the next permit term. The sub-questions and associated activities are described below for the receiving water and MS4 outfall monitoring categories.

Approaches for source identification, responses to potential action level exceedances, and potential development of watershed-driven targeted studies, as-needed, are outlined below.

2.B.iii Receiving Water Monitoring

In reviewing available receiving water monitoring data, the Copermittees determined the following:

- Watershed priorities are already well-established for the watersheds of San Diego County, based on prior monitoring by the Copermittees and others.
- Existing mass loading stations (MLS) and temporary watershed assessment stations (TWAS) should be consolidated into a smaller number of representative TWAS, with reduced monitoring frequency. Monitoring of 3 to 5 receiving waters stations once every five years should suffice for assessment of long-term trends of constituents per SMC Question 5 (see analysis, Attachment 2-1). In the future, watershed Copermittees will consider the need for focused receiving water studies as initiated through the Watershed Plans.
- Participation in the SMC Regional Monitoring Program is anticipated to be continued, to provide a statistically-sound, representative sampling of receiving water quality in the region's watersheds.
- The Ambient Bay and Lagoon Monitoring program (ABLM) is anticipated to be coordinated with the periodic Bight program monitoring, and integrated with the Copermittees' responsibility to conform to the Statewide Sediment Quality Objectives regulatory program.
- The 2010 HMP Monitoring Plan will continue to be implemented under the next permit.
- Receiving water monitoring conducted in response to adopted TMDLs should replace receiving water monitoring required by the Permit where applicable.
- Where appropriate, the Permit should allow for the trade-off of required monitoring elements in consideration of participation to support the RWQCB's Basin Planning priorities (i.e., evaluating or validating the appropriateness of beneficial use designations and water quality objectives).
- As under the 2007Order, the new Permit should allow a trade-off of required monitoring elements in consideration of participation in the Southern California Bight Regional Monitoring effort. The benefits of participation include regionally consistent data collection, additional in-depth data analysis and the leveraging of San Diego County resources with resources from outside the county.
- The Coastal Storm Drain Monitoring (CSDM) Program (which includes both MS4 outfall and receiving water monitoring) is essentially complete and should be discontinued (see analysis, Attachment 2-2). The CSDM Program has demonstrated that coastal storm drain flows cause few ocean or bay bacterial standard exceedances during dry weather. Less than 2 percent of paired receiving water and coastal storm drain samples collected from 2007-2010 indicate a "linkage", where elevated storm drain concentrations correlate with observed receiving water exceedances of AB 411 bacterial criteria. Of 1,647 individual receiving water bacteria indicator

samples analyzed, only 32 corresponded with elevated bacteria levels in coastal storm drain outfall discharges (3.5 % of paired samples for *Enteroccocus*, 1.5 % of paired samples for Fecal Coliform, and 0.9 % of paired samples for Total Colifoms).

SMC Management questions 1, 2, and 5 address receiving waters. Questions 1 and 2 have been well answered through the receiving water monitoring performed by the Copermittees, as well as work performed by others, including water quality impairments identified per CWA Section 303(d) and Bight Regional Monitoring Studies. Management question 5 addresses the issue of long-term trends; it is assumed that this question will be addressed on a continuing basis over the long term through the Copermittees continued participation in Bight Regional Monitoring Studies.

Preliminary receiving water sub-questions were developed, along with preliminary receiving water monitoring activities to guide the proposed approach in a more targeted manner through the next Permit term, as presented in **Table 2.2**. The management questions shown in Table 2.2 are meant to provide context for the more specific, technical monitoring sub-questions and associated monitoring activities. Monitoring results from any given activity may only partially contribute to answers for the overarching "big picture" management questions.

2.B.iv MS4 Outfall Monitoring

Under an updated approach, the principal role of MS4 Outfall Monitoring in the Conceptual Framework is to provide information on the relative contribution of MS4 discharges of priority constituents to receiving waters. It is recognized that the Permit may include requirements for performance metrics for MS4 discharges, and that outfall monitoring may be required to make the relevant assessments of discharge quality.

In reviewing available MS4 outfall monitoring data collected under the current Permit, the Copermittees determined the following:

- The ongoing MS4 outfall monitoring programs, which include both randomly selected and targeted sites, should be continued, with modifications to the number and distribution of sites as necessary to improve efficiency and value of the data. In particular, outfall monitoring should be evaluated with respect to established watershed priorities and TMDLs, and coordinated so as to provide information on the relative contribution of MS4s to receiving water issues. Outfall monitoring is anticipated to continue during both wet and dry weather conditions where appropriate for safe access and not disturbing critical habitat (Attachment 2-3). Additionally, a focused group of chemical analyses addressing the watershed priorities as is done in the current MS4 Outfall Program should be continued.
- Monitoring of representative outfalls should be considered for TMDL constituents in watersheds where the Copermittees are responsible parties in a TMDL implementation plan and where the outfalls are part of the monitoring plan.
- As described above, the CSDM program (which includes both MS4 outfall and receiving water monitoring) is essentially complete and should be discontinued (see analysis, Attachment 2-2). In addition to the low incidence of correspondence between elevated coastal storm drain outfall bacteria discharge levels and receiving water AB411 exceedances (as described above), the

number of coastal storm drain discharges that reach receiving waters has decreased during the past eight years, from 73 percent to 23 percent. This decrease in discharge flows reaching the receiving waters demonstrates a lower risk of a linkage occurring between coastal storm drains and receiving waters.

- The Dry Weather Field Screening and Analytical Monitoring Program characterizes discharges in the MS4s using a limited list of constituents. This overlaps with the current MS4 Outfall Monitoring Program, which expands the list of constituents and tailors the list to support watershed planning. To avoid this duplication of effort, the MS4 outfall monitoring should be conducted under the MS4 Outfall Monitoring Program instead of the Dry Weather Program (see analysis, Attachment 1-1).

Table 2.2: Preliminary Receiving Water Monitoring Sub-Questions and Activities

Management Question	Preliminary Monitoring Sub-Question	SMC QST No.	Preliminary Monitoring Activity
1. Are the aquatic ecosystems healthy?	What are conditions of benthic fauna in receiving waters?	1,2	Committed to completion of SMC Southern California bioassessment monitoring.
2. How is the health of the streams/rivers affected by urban runoff changing over time?	How are conditions in receiving waters that are affected by urban runoff discharges changing over time?	1,5	Wet Weather: Monitor at 3 to 5 MLS stations (locations to be determined) once per permit term for 3 events during Bight Regional Monitoring Survey. Dry Weather: Monitor at 3 to 5 MLS stations once per permit term (locations to be determined) for 2 events during Bight Regional Monitoring Survey.
3. What are additional receiving water quality problems?	Where data are lacking, what is receiving water quality with respect to watershed priorities and regulatory mandates?	1,2	Focused receiving water monitoring with a minimum of one special study per WMA per permit term coordinated with the Watershed Plans or substitute an equivalent regionally coordinated study (e.g., Bacteria/REC1 Beneficial Use Study) with RWQCB staff approval to evaluate: • Receiving Water Priorities • Triennial Review Priorities • Beneficial Uses and Basin Plan Objectives • 303(d) listings • TMDLs • Impact of MS4 outfalls on receiving waters

Table 2.2: Preliminary Receiving Water Monitoring Sub-Questions and Activities

Management Question	Preliminary Monitoring Sub-Question	SMC QST No.	Preliminary Monitoring Activity
4. How effective are our management actions to meet TMDL requirements?	What is the progress in achieving and complying with adopted TMDLs and WLAs?	1,5, Targeted	Perform compliance monitoring for: • Chollas Creek Diazinon TMDL • Shelter Island Yacht Basin Dissolved Copper TMDL • Chollas Creek Dissolved Copper, Lead and Zinc TMDL • Revised Project 1- Indicator Bacteria TMDLS for Twenty Beaches and Creeks in San Diego Region • Project II – Indicator Bacteria TMDLs in Dana Point Harbor and Shelter Island Shoreline Park in San Diego Bay
5. Are the bays and estuaries healthy and protective of estuarine beneficial uses?	What is the condition of sediments in enclosed bays and estuaries with respect to the statewide sediment quality objectives?	1,2	Submit a Work Plan to comply with the requirements of State Water Resources Control Board Resolution No. 2008-0070 – Adoption of a Water Quality Control Plan for Enclosed bays and estuaries – Part 1 Sediment Quality

Table 2.2: Preliminary Receiving Water Monitoring Sub-Questions and Activities

Management Question	Preliminary Monitoring Sub-Question	SMC QST No.	Preliminary Monitoring Activity
6. How is the Hydromodification Management Plan being implemented?	a. Do field observations confirm that the HMP appropriately defines the flow rate (expressed as a function of the 2-year runoff event) that initiates movement of channel bed or bank materials? b. Are mitigation facilities adequately meeting flow duration design criteria outlined in the HMP? c. What is the effect of development on downstream cross section incision and widening?	Targeted	a.b.c. Per Revised July 14, 2010 Section 8 of the Hydromodification Management Plan and California Regional Water Quality Control Board, San Diego Region, Resolution No. R9-2010-0066

SMC management question 3 addresses the relative contribution of MS4 discharges to receiving water constituent levels. Preliminary focused MS4 outfall monitoring sub-questions were developed along with preliminary MS4 outfall monitoring activities; see **Table 2.3** below. The management questions shown in Table 2.3 are meant to provide context for the more specific, technical monitoring sub-questions and associated monitoring activities. Monitoring results from any given activity may only partially contribute to answers for the overarching "big picture" management questions.

Table 2.3: Preliminary MS4 Outfall Monitoring Sub-Questions to SMC Question No. 3 and Preliminary Activities

Management Question	Preliminary Monitoring Sub-Question	Preliminary Monitoring Activity
1. Are the MS4s a potential source of priority constituents to receiving waters?	How do representative outfall concentrations compare to concentrations of priority constituents in receiving water?	An analysis of the MS4 outfall monitoring results collected under the 2007 Permit will be conducted when program is completed in 3 years.
2. Is it a system-wide or area-specific water quality issue?	How do MS4 outfall discharge characteristics differ within or between watersheds? (Note: Important for regional issues such as TDS & Bacteria)	An analysis of the MS4 outfall monitoring results collected under the 2007 Permit will be conducted when current program is completed in 3 years.
3. When is the best time to focus management actions and/or BMP implementation?	How do wet weather outfall concentrations compare to dry weather within and among watersheds?	An analysis of the MS4 outfall monitoring results collected under the 2007 Permit will be conducted when current program is completed in 3 years.
4. Which factors influence MS4 outfall discharge water quality?	How do wet season dry weather discharges differ from dry season dry weather discharges? What are the patterns and factors affecting wet weather discharge characteristics?	Perform monitoring to distinguish wet season dry weather from dry season dry weather. Perform appropriate data analysis (e.g., multivariate analysis including land use, geology, drainage acreage, antecedent rainfall conditions, etc.).
5. Are MS4 outfalls water quality improving overtime?	How do representative MS4 outlet discharge concentrations, loads, and flows change over time? (i.e. trends)	Continue to monitor at a sub-set of random MS4 outfall sites to assess long-term trend line

Table 2.3: Preliminary MS4 Outfall Monitoring Sub-Questions to SMC Question No. 3 and Preliminary Activities

Management Question	Preliminary Monitoring Sub-Question	Preliminary Monitoring Activity
6. Are MS4s outfalls meeting Permit Action Levels (if applicable)?	Do discharge concentrations at MS4 Outfall discharges meet permit action levels (if applicable)?	Conduct wet and dry weather monitoring at representative selected sites.
7. What outfalls ("priority outfalls") are contributing most to receiving water?	What outfalls contribute most to loadings for constituents identified as receiving waters priorities? (based on representative outfalls)?	Use monitoring results in numbers 1-3 and 5 and perform data analysis which may include modeling
8. To what extent is watershed plan implementation affecting discharge quality at priority MS4 outfalls?	How do discharge characteristics change over longer term (i.e. trends) at priority outfalls?	Monitor outfalls identified in assessment of number 6

2.B.v Source Identification

The principal role of Source Identification in the Conceptual Framework is to identify and prioritize pollutant generating activities and source categories. Identification of high-priority sources is an important step in support of the watershed planning process, to help inform the development of effective pollutant reduction strategies for particular priority constituents in particular watersheds.

In reviewing available source identification information, the Copermittees determined the following:

- The Copermittees should consider developing a more comprehensive approach to source identification, on a *constituent-specific basis*. These source identification efforts should focus on constituents identified as watershed priorities, and would likely include prioritization of sources based on magnitude, controllability, and other factors.
- The ongoing residential source identification program, which provides information on water quality of discharges from residential land uses, should be completed as planned and then discontinued.
- As described above, the CSDM Program (which includes both MS4 outfall and receiving water monitoring) is essentially complete and should be discontinued (see analysis, Attachment 2-2).
    - Only 4 of the 227 (1.7 percent) coastal storm drains monitored over the past three years were linked more than once to a nearby AB411 exceedance in the ocean or bay. These four coastal storm drains have ongoing source abatement programs.
    - In addition, upcoming Bacteria TMDL monitoring will overlap with CSDM Program requirements. The TMDL will require an implementation plan to assess and prioritize receiving water exceedances caused by outfall discharges.
- The Dry Weather Field Screening and Analytical Monitoring Program, intended to support IC/ID investigations, is not an efficient use of resources, has had a very low success rate in identifying

ICs and IDs, and is no longer necessary given other more effective measures that are implemented by the Copermittees (i.e., facility inspections, complaint hotline responses, public employee surveillance). This program should therefore be discontinued in its current form (see analysis, Attachment 1-1). IC/ID investigations as conducted under the Dry Weather Program are less efficient in detecting and eliminating IC/IDs than hotline call responses (over 1,600 annually), business inspections (over 6,000 annually), and visual surveys of the stormwater conveyance system performed during routine system maintenance and/or cleaning. Based on the number of samples collected through the Dry Weather Program over the past three years, only 3.7 percent of samples collected resulted in a successful detection and elimination of an illicit discharge (87 successful IC/ID investigations out of 23,635 sample analyses from 2007-2009). Copermittees observed that more IC/IDs were identified through complaint referrals than through the Dry Weather Program. The City of Oceanside reported in 2009-2010 that 86 out of 87 IC/IDs identified through their hotline were eliminated, whereas only one IC/ID was identified and resolved through their Dry Weather Program.

SMC management question 4 addresses the sources of MS4 discharges that contribute to receiving water constituent levels. The Copermittees will consider approaching this question principally through a source identification process for individual priority constituents.

As shown in **Figure 2.2**, the Copermittees' preliminary constituent-specific source identification process includes the following steps:

- Step 1: Compile known information on the priority constituent. This information includes potential sources and movement of a particular constituent within the urban watershed. Data generated by others and literature research on the priority constituent will be compiled and analyzed as appropriate.
- Step 2: Based on the compiled information generated on the priority constituent, identify data gaps, if any. Targeted studies may be performed where appropriate. For example, targeted studies to improve our understanding of the fate of a constituent in the environment might be considered.
- Step 3: Based on the information compiled, develop an inventory of sources and consider how to prioritize them within the watershed for potential follow-up action. Examples of prioritization criteria include relative magnitude and controllability.

Figure 2.2: Schematic of Preliminary Source Identification Process

The process outlined above is directed at improving the understanding of the fate, transport, and sources of priority constituents within urban watersheds. Steps 1 and 2 may be conducted at a regional scale to reduce costs. Step 3 will likely be applied within a watershed for that particular priority constituent.

2.B.vi Preliminary Watershed Responses to MS4 Monitoring Results

In the event that the RWQCB imposes NALs or SALs in the new permit, Copermittees recommend that the Permit include an iterative approach for responses to potential exceedances of those NALs or SALs. The overall goal is to provide for a range of responses that is comprehensive, consistent and appropriate to the measured outfall levels. The preliminary approach is outlined in **Figure 2.3**.

If initial field observations indicate a potential illegal discharge that is characterized by unusual odor, color, or sheen, etc, then an immediate response will be initiated. If warranted, a field investigation will be initiated to follow the observed flow upstream, in an attempt to observe the source, with additional water quality measurements performed as needed.

If there is no evidence of a potential illegal discharge, then the follow-up actions would fall into one of the following three categories:

- The receiving water has an active TMDL Implementation Plan, in which case the exceedance will be addressed through the relevant Watershed Plan.
- The constituent is an established watershed priority, in which case the constituent is addressed through the preliminary source identification process (see description above) and the data are fed into the watershed planning process.
- For constituents not covered under a TMDL implementation plan and which are not priority constituents, additional follow-up monitoring will be performed to verify the persistence of the exceedance. If the exceedance does persist, the measured outfall levels will be compared to receiving water levels for the constituent to provide an assessment of the relative contribution of the discharge to the in-stream levels. If the discharge is substantially contributing to the receiving water exceedance, then the constituent will be included in the watershed planning process. If the exceedance is not persistent, then no further action is required and routine monitoring will continue.

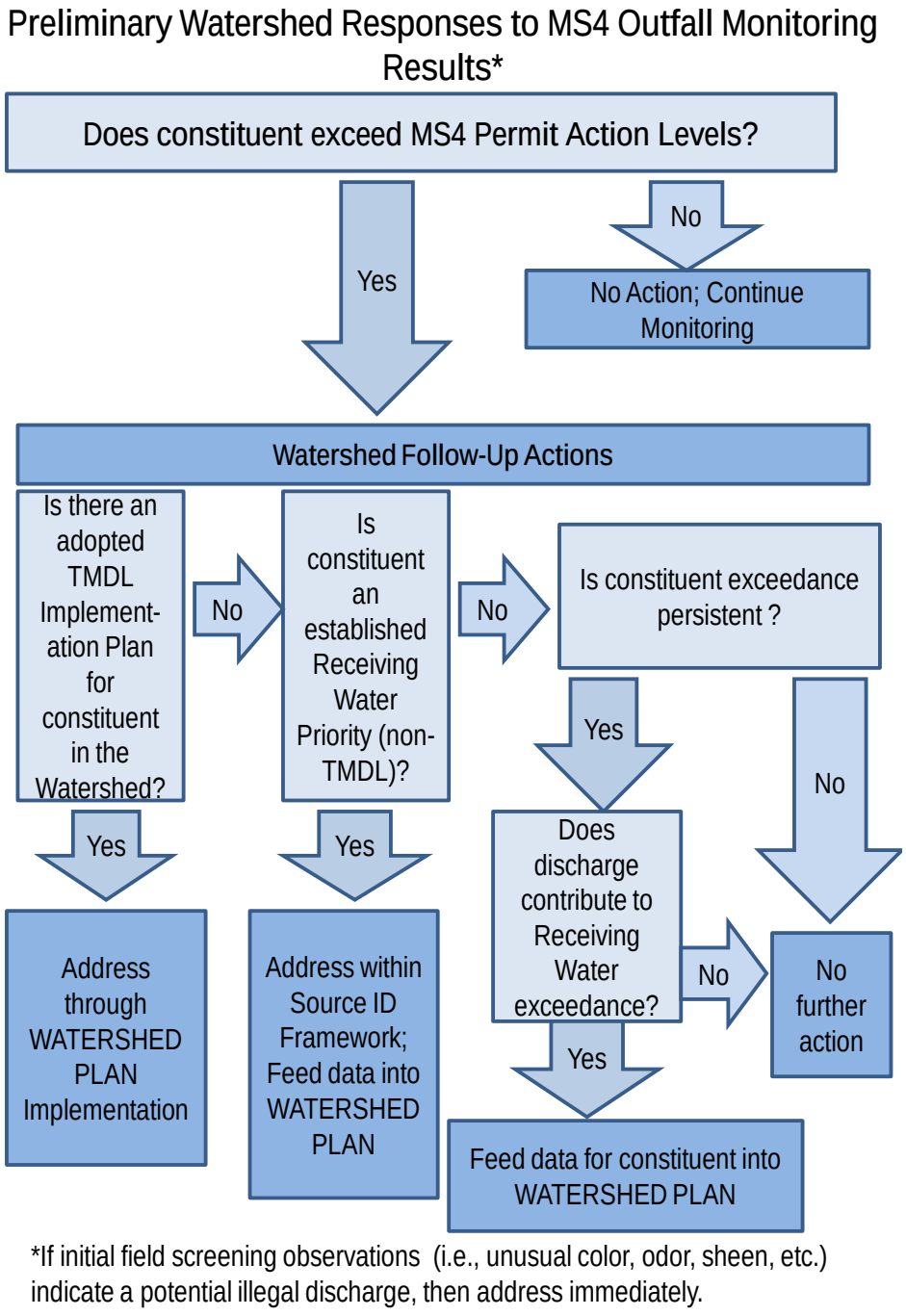


Figure 2.3: Preliminary Strategy for Responses to MS4 Outfall Exceedances

2.B.vii Targeted Studies

Copermittees would periodically evaluate the need for targeted studies to support the watershed adaptive management strategy. Examples of targeted studies include investigation of sources of MS4 contributions to receiving water priorities, participation in Bight Regional Monitoring projects, assessment of TMDL compliance strategies, evaluation of BMP effectiveness, and investigation of the appropriateness of beneficial uses or water quality objectives.

Section 3 Watershed Adaptive Management Strategy

In ROWD Section 1 the concept of watershed adaptive management was presented as the strategy for prioritizing, structuring and directing the Copermittees' stormwater management efforts. The translation of that strategy into an implementation document is represented by the development of a Watershed Plan. The development, implementation, and assessment and iterative updating of these Plans is described below.

3.A WATERSHED ADAPTIVE MANAGEMENT STRATEGY

As noted in Section 1, the Copermittees support a permitting approach that facilitates the implementation of the most effective and efficient stormwater management programs. Consequently, the Permit should be predicated on an adaptive management framework such as the one shown in **Figure 3.1**. As indicated, the Copermittees recognize that the Permit must continue to contain a "core" set of required activities. This is both appropriate and desirable for the purpose of defining what initially constitutes compliance. However, the Permit must also allow for modifications to core requirements when a Copermittee proposes and justifies a more effective or efficient suite of stormwater control measures. Two of the key factors expected to inform adaptive management decisions are watershed water quality priorities and BMP effectiveness data. Over time, core activities – which are typically established as generic preventive measures – should be evaluated with respect to whether they effectively address the pollutant-generating sources and activities causing a watershed's priority water quality problems, and adjusted as determined appropriate by the Copermittee with Regional Board staff approval to enhance efficiency. This is critical to ensuring the best use of limited resources.

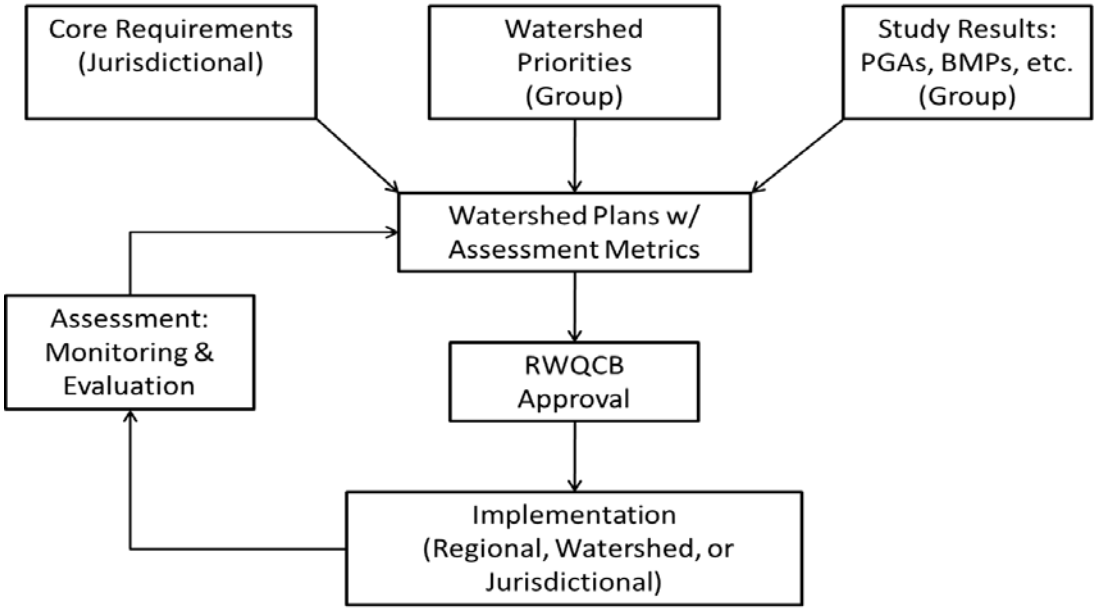


Figure 3.1: Watershed Adaptive Management Strategy

The Copermittees support the development of criteria to govern the adaptive management process so that modifications to core requirements are proposed and justified based on sound and impartial information. These criteria should either be developed during the Permit reissuance process, or as an early deliverable under the new Permit. In either case, to be workable in practice, the Permit's adaptive management provisions must also represent a reasonable balance of specificity and flexibility. Each Copermittee should remain responsible for selecting and proposing the combination of activities and controls that will result in the most effective and efficient stormwater program within its jurisdictional boundaries. A "one-size-fits-all" application of adaptive management requirements is neither effective nor desirable. Similarly, each jurisdiction should be held accountable for the implementation of its jurisdictional program and a determination as to whether it has met the Permit's "maximum extent practicable" performance standard. This is not to say that every jurisdiction should be completely independent in managing its program. For example, Figure 3.1 shows that watershed pollutant and source prioritization, as well as studies to evaluate BMP effectiveness or to characterize pollutant generating activities (PGAs), would be appropriate activities for implementation by groups of Copermittees at the watershed or regional scale. Other activities where economies of scale could be realized through group implementation might include public education and water quality monitoring. In most cases, however, identifying the appropriate scale of implementation is best left to jurisdictional discretion. The establishment of clear assessment metrics will play an important role in determining whether watershed plan implementation is on the right track and achieving desired results.

The Watershed Adaptive Management Strategy would also benefit from a well-defined role for RWQCB staff in reviewing and approving proposed modifications to core requirements. This is necessary not only to evaluate the appropriateness of proposed programs and changes, but to provide Copermittees with a level of certainty with regard to what constitutes compliance.

The central feature of the Copermittees' recommended Watershed Adaptive Management Strategy is the "Watershed Plan" as shown in **Figure 3.1**. A single plan for each watershed (i.e. replacing the URMPs – regional, watershed, and jurisdictional) would help streamline and refocus efforts and make best use of limited resources. The watershed appears to be the appropriate scale at which to integrate the many programs and activities targeting water quality improvement. Furthermore, this scale is consistent with other regulatory programs and policies (e.g. TMDLs and Basin Plans). While it is critical that decision-making remain within the discretion of each jurisdiction, the creation of Watershed Plans would encourage each Copermittee to carefully consider the impact of its management decisions on priority watershed water quality conditions. Enhancing the Permit's watershed focus would also enable Copermittees to better integrate TMDL and ASBS goals into Permit compliance activities. In fact, the Copermittees see the potential for Watershed Plans developed and implemented under the Permit to serve a similar function as the load reduction plans currently required by TMDLs. Better integration of TMDL and Permit programs is consistent with the Copermittees' Vision presented in Section 1 and could provide significant administrative cost savings.

3.B WATERSHED PLAN DEVELOPMENT

The Copermittees support the development of Watershed Plans for the nine major Watershed Management Areas (WMAs) currently identified in the 2007Order. Copermittees might also instead

elect to develop Watershed Plans specific to hydrologic areas within a WMA if determined appropriate (e.g., San Diego Bay and Carlsbad WMAs). Watershed Plans would be developed during the first year and implemented and periodically updated throughout the remainder of the Permit cycle. Watershed leads are summarized in **Table 3.1** below. Watershed Plans will be prepared at the watershed level but specific requirements may be implemented at the regional, watershed, and/or jurisdictional scale.

Table 3.1 Watershed Management Areas (WMAs) and Lead Jurisdictions

WMA	Lead Jurisdiction
Santa Margarita	County of San Diego
San Luis Rey	City of Oceanside
Carlsbad	City of Carlsbad
San Dieguito	City of Escondido
Penasquitos	City of Poway
Mission Bay	City of San Diego
San Diego River	City of El Cajon
San Diego Bay	Port of San Diego
Tijuana	County of San Diego

The Watershed Plans represent a continuation and refinement of the Watershed Urban Runoff Management Programs (WURMPs) developed under the 2007 Order. On the surface the two are very similar. WURMPs were completed for each of the WMAs with the goals of improving Copermittee understanding of water quality issues and concerns, enhancing stakeholder participation, and augmenting jurisdictional programs to more effectively address watershed specific issues. The Watershed Plan would further these goals by strategically focusing jurisdictional, watershed, and regional efforts toward the highest priority constituents and sources in each WMA. By making watersheds the primary foci of Permit programs, Copermittees would also be better able to address other regulatory requirements such as those associated with TMDLs and ASBS programs.

A key feature of Watershed Plans is that they incorporate a combination of planning, implementation, and assessment activities at the most appropriate scales to confer and demonstrate watershed-scale benefits. In essence they provide a unified comprehensive implementation plan for each WMA that identifies the jurisdictional, watershed, and regional activities and control measures that will be pursued. As illustrated in Figure 3.1, the development of the Watershed Plan is described below and includes the following steps:

1. Establishing the watershed priorities(constituents and sources);
2. Modifying jurisdictional core stormwater program implementation strategies to address the highest priority issues and concerns (including the incorporation of BMP effectiveness and source identification findings);
3. Identifying assessment and reporting objectives and metrics; and
4. Obtaining approval by the RWQCB Executive Officer.

3.B.i Establishing Watershed Priorities

In evaluating existing water quality conditions and establishing stormwater management priorities for a watershed, the Copermittees would consider a variety of data and information sources. These include existing water quality data and assessments, WURMPs, WURMP Annual Reports, TMDLs, LTEAs, focused analysis, current monitoring programs, and regulatory requirements. This evaluation will assist in identifying and prioritizing the watershed issues and may support the need to establish different priorities within a watershed. In establishing watershed priorities Copermittees may consider the following: pollutants or issues of concern, watershed characteristics, and a prioritization process to consider multiple issues in determining the watershed priorities. Each is discussed briefly below. Priorities will be established in the beginning of the Permit term and adjusted as needed in subsequent years.

The Copermittees have implemented an extensive monitoring program for many years with the data being used to identify Pollutants and Issues of Concern in previous regulatory documents. Such work provides an excellent foundation for establishing watershed priorities. In addition to pollutants, additional issues of concern may include stream bank erosion or benthic community conditions. In evaluating the previous monitoring programs, consideration will be given to historical trends, land-based pollutant loadings, designated uses, and persistent water quality impacts based on the triad of chemistry, toxicity, and benthic community data. The Copermittees may consider common pollutants/Issues of Concern and choose to prioritize these at the jurisdictional, watershed or regional scale, as defined in the Watershed Plan. In addition consideration may be given to differentiate between wet and dry weather issues.

Key watershed characteristics will vary by watershed but notable characteristics may include sensitive species or ecosystems (i.e., North County Multiple Habitat Conservation Program), 303(d) listed water bodies, ASBS, areas prone to flooding, channel erosion, tidally influenced waterbodies, groundwater recharge areas, presence of septic system, and age of infrastructure. These types of factors will be taken into account when determining the stormwater program activities most effective in each watershed. For example, it may be an effective use of resources to target components of an illicit discharge/illegal connection program in a watershed with aging infrastructure. Additional considerations may also include land use and growth patterns. Understanding the dominant land use within each watershed can help to direct resources on the program components most applicable to each watershed. For example, areas of watersheds predominantly made up of industrial/commercial land uses would benefit from placing emphasis on the industrial/commercial component of their stormwater program over the residential component.

Once the characterization is complete, the Copermittees would consider a number of other factors in prioritizing watershed issues. This prioritization would assist them in identifying the key stormwater program implementation activities that will address the pollutants or issues of concern as discussed above. These factors may include:

- Applicability of regulatory drivers such as 303(d) listing, approved TMDLs, 13267 water quality violations

- Optimizing ongoing implementation efforts (e.g., addressing the PGAs and/or source categories that are the major contributors of the pollutants of concern) to address water quality issues,
- Ability to serve as an "umbrella issue" that encompasses multiple community goals including recreation, habitat enhancement, etc.
- Ability to address primary stakeholder concerns including beach closures, drainage issues, etc.
- Feasibility to address within regulatory and time constraints

3.B.ii Refining Core Stormwater Programs to Address Watershed Priorities

The Copermittees are currently implementing comprehensive, jurisdictional stormwater management programs in a broad-based, preventive manner and consistent with the 2007 Order (see Section 2). In this capacity they've directed their resources to a wide range of activities and pollutants throughout the region. Although the Copermittees will continue to implement the core requirements for each program component, they must remain responsible for selecting and proposing which combination of activities and controls will result in the most effective and efficient stormwater program within their jurisdictional boundaries. Similarly, each Copermittee should also be held accountable for the quality of its jurisdictional program and a determination as to whether it has met the "maximum extent practicable" performance standard established by the Permit. Specific tasks chosen to address the priorities will be identified in each Copermittee's sections of the Watershed Plans. Copermittees should be given the ability to assess and prioritize their current stormwater management programs to identify opportunities for making better use of their resources for the relevant water quality issues in each watershed.

As an example, all Copermittees would be required by the new Permit to have a commercial/industrial program component that includes the following core control measures: maintaining an inventory, prioritizing businesses with the potential to discharge pollutants, inspecting businesses, requiring BMP implementation, and conducting enforcement actions, if necessary. However, depending on the watershed priority, the Copermittees may focus on business categories that have the highest potential to address the watershed priorities. By allowing watershed-based modifications to the core stormwater program, the jurisdictions may optimize their level of effort within one program component or across components (e.g., a jurisdiction may wish to focus on nurseries in a watershed where nutrients are the pollutant of concern and less on automobile repair shops). Likewise the jurisdiction may decide to focus on inspections and less so on outreach material). The intent of the watershed approach is to avoid the creation of additive requirements by focusing core program requirements on the pollutants or issues of concern within a watershed.

Copermittees would also consider previous LTEA findings and any relevant new BMP efficiency findings that may become available after the adoption of the new Permit.

3.B.iii Identifying Assessment and Reporting Metrics

Assessment is a critical component of an iterative adaptive management approach to incrementally improving the measurability of programs. Depending on the specific objectives, assessments and corresponding metrics may reflect different time intervals.

- **Short-term metrics** are typically conducted within intervals less than 5 years in duration.[6] Some assessments (e.g. documenting implementation) might occur annually, with others (e.g., behavior change) requiring more time. In general, short-term metrics would be limited to Outcome Levels 1-4 (implementation of Permit requirements, changes in awareness or behavior, and reduction of pollutant loads).
- **Long-term metrics** would typically be assessed at frequencies ranging from 5 -20 years. They would initially examine changes in urban runoff and receiving water quality. But over time, they could also be used to explore the relationship of program implementation to these "higher" Outcome Levels. In this context, water quality standards represent an ideal for guiding programs in achieving long-term compliance, and for defining the interim measures, actions, and program modifications necessary to achieve that end. As previously discussed, the Copermittees' ability to meaningfully assess long-term changes depends on many critical considerations such as the number and variability of data points and level of changes being measured.

The Copermittees will continue to assess the effectiveness of their Watershed Plans as well as the specific jurisdictional and regional activities implemented in support of them. The establishment of clear assessment metrics will play an important role in determining whether programs are on the right track and achieving desired results. It should be emphasized that reporting and assessment in a group setting (i.e., at the watershed and regional scales) require a higher degree of comparability between results than is currently needed for the jurisdictional analysis of programs and activities. Moreover, even where such comparability exists, the interpretation of common metrics (e.g., summaries of inspection results) can also be compromised if underlying data and information (e.g., classification of violation types, or thresholds for issuing violations) are also dissimilar. Because of this, the Copermittees recognize a need to further explore the development and Copermittee adoption of reporting and assessment standards under the reissued Permit. As such, it is important to remember that the development, adoption, and implementation of standards can take a significant amount of time. In this respect, the new Permit should realistically reflect the work that needs to be completed, and allow sufficient time to do so.

The 2007 Permit also requires the submittal of a number of reports including the JURMP WURMP, and RURMP Annual Reports from the Copermittees. The Watershed Plan will incorporate reporting formats and frequencies developed regionally for use in meeting Permit requirements. In the interest of streamlining this effort, the Copermittees recommend the submittal of one report for each of the nine watersheds (i.e. nine watershed reports). Each report would summarize the Copermittees efforts in the watershed, the assessment of activities and monitoring within the watershed, and, where applicable, activities and other efforts conducted to comply with TMDLs.

3.B.iv Approving Watershed Plans

A well-defined role for RWQCB staff in reviewing and approving any modifications to core requirements is necessary not only to evaluate the appropriateness of proposed programs and changes, but to provide

[6] Municipal Stormwater Program Effectiveness Assessment Guidance, CASQA, May 2007.

Copermittees with a level of certainty with regard to what constitutes compliance. Consequently the Copermittees propose that the Watershed Plans and modifications of such Plans require the approval of the RWQCB Executive Officer. Such approval will also aid in developing budgets and obtaining funds for the Watershed Plan implementation.

3.C WATERSHED PLAN IMPLEMENTATION

Watershed Plans will be prepared at the watershed level but may be implemented at the regional, watershed, and/or jurisdictional scale. This will allow the Copermittees to leverage their resources and provide efficiencies for the stormwater program as appropriate, as well as provide accountability for the Copermittees and RWQCB. This section describes an approach that might be used by the Copermittees in collaboratively addressing regional, watershed, and jurisdictional issues so that there is an effective integration of the programs.

As described, the RWQCB has indicated that they will pursue a region-wide Permit that would encompass the jurisdictions in the urbanized portions of San Diego County, south Orange County and south Riverside County. Once adopted the region-wide Permit would supersede the existing Permit. Notwithstanding the Copermittees comments in Section 1, if a region-wide Permit is developed and adopted, it should support the ability of the Copermittees to develop the Watershed Plans as described within this ROWD.

Regional coordination and collaboration should continue to be encouraged under the new Permit. Under a Region-wide Permit, this might also occur an inter-county basis (between the three counties; San Diego, Orange and Riverside). The emphasis of coordination, however, would likely remain on a countywide basis (between Copermittees within San Diego County). The Copermittees might continue to use the framework that has been established for the Regional Working Bodies, which includes the Regional Management Committee, the Regional Program Planning Subcommittee, and the Regional Workgroups. Some of the program activities that may be the focus of collaboration include:

- Public education;
- Training;
- Monitoring;
- BMP effectiveness assessments;
- Pollutant generating characterization studies; and
- Development of standards, model programs, and guidance documents.

As noted previously, the Watershed Plans will be developed by the Copermittees sharing a watershed. The Copermittees may continue to use the existing framework that has been established for the Watershed Working Bodies or may choose to include other dischargers as part of TMDL programs, or coordinate with other watershed groups and any appropriate regional coordinating groups. Some of the program activities that may be the focus of the watershed collaboration include:

- Establishing watershed priorities;

- TMDL implementation plan strategies and BMPs;
- Monitoring; and
- Pilot projects/studies.

As identified in Section 3.B.ii above, each Watershed Plan would have a jurisdictional (Core Requirements) section that is prepared by the Copermittees to identify how each will implement their stormwater programs to support the Watershed Plans. The jurisdictional section should have clear goals and performance standards so that Copermittees and the RWQCB can assess if the plan has been implemented as intended, whether programs are on the right track and achieving desired results, and to determine if the Copermittee is in compliance.

3.D. WATERSHED PLAN ASSESSMENT AND ACCOUNTABILITY

As noted in Section 3.B.iii the Watershed Plans should include reporting and assessment metrics and include a combination of short-term and long-term metrics that is best suited for demonstrating long-term program success and interim progress toward it. The reporting and effectiveness assessments will be conducted consistent with the California Stormwater Quality Association (CASQA) *Municipal Program Effectiveness Assessment Guidance Manual* (2007, or as amended) and will be focused at the watershed scale to assist the Copermittees and the RWCQB in determining if the goals, targets, waste load allocations (WLAs), or other metrics established by the Copermittees are being achieved or to evaluate progress toward achieving them. One report will be submitted for each Watershed Plan, but jurisdictional results will be included as appropriate.

These effectiveness assessments will allow the Copermittees to determine if the activities identified within the Watershed Plans are achieving the desired outcomes and to assist the Copermittees in allocating their limited resources toward the most effective programs and solutions.

3.E. ADAPTIVE MANAGEMENT

3.E.i Scope of Watershed Plan Modifications

The Watershed Plan modifications may be limited to changes to BMPs or control measures that, when considered in combination, are intended to enhance the overall effectiveness and efficiency of a Copermittee's implementation efforts within a watershed. However, each Copermittee remains responsible for selecting and proposing which combination of activities and controls will result in the most effective and efficient stormwater program within its jurisdictional boundaries and is responsible for the quality of its jurisdictional program. Modifications may include any combination of the following:

- Modifying Core Requirements to increase their effectiveness and efficiency,
- Increasing the implementation rate of more effective and efficient BMPs, or
- Decreasing the implementation rate of less effective and efficient BMPs.

3.E.ii Modifying Watershed Plans

Copermittees will consider and recommend enhancements to core requirements identified in the Watershed Plans when they obtain new BMP effectiveness or source identification findings, or when information is gained from an evaluation of the assessment metrics. Consistent with the initial preparation of the watershed plan there should be a criteria established for identifying and proposing modifications or enhancements that are based on sound and impartial information. Copermittees will identify these enhancements consistent with the time frame established for the assessment metrics (i.e. some enhancement may be identified sooner than others) and as part of the Copermittee's compliance reporting requirements. Ultimately approval by the RWQCB of the modifications in a timely manner will serve all parties well.

-- This page intentionally blank --

Section 4 Conclusions

Per Section J.2.d of Order No. R9-2007-0001, this Report of Waste Discharge (ROWD) serves as an application for issuance of a new waste discharge permit for the San Diego Municipal Stormwater Copermittees. We are now nearing the end of a third Permit cycle, and have conducted in-depth reviews of our management and monitoring programs with an eye toward continued improvement.

As a whole, the Copermittees have concluded that the next Permit cycle represents an important opportunity for program improvement, but that the way forward is fundamentally different than that embodied in the 2007 Order. This ROWD describes a vision that emphasizes iterative, adaptive urban runoff management approaches, and a predominant focus on watersheds as the focal point of these efforts. This updated approach is largely based on a review of existing programs, but also on an extensive visioning process collaboratively conducted by the Copermittees in Fall 2010, and subsequent discussions with RWQCB staff in early 2011. RWQCB staff has informed the Copermittees of its intention to issue a single Region-wide Order for the San Diego, south Orange, and south Riverside regions, to increasingly emphasize water quality monitoring information as a driver of watershed-based management, and to decrease the current Order's emphasis on detailed jurisdictional reporting.

A core set of principles have guided the Copermittees' development of this ROWD:

- Simplified reporting;
- Streamlined and more meaningful assessment;
- Better coordinated water quality monitoring;
- Enhanced watershed and Total Maximum Daily Load (TMDL) focus; and
- Increased emphasis on strategic planning.

As a starting point for program modification, the Copermittees identified a number of specific recommendations for change to existing management and monitoring requirements. These are identified and discussed in detail in ROWD Section 2. Building on this, ROWD Section 3 further describes a process for modifying program approaches in accordance with established watershed priorities, and as necessary to improve programs over time. In accordance with this approach, the following key principles should guide the development and implementation of Watershed Plans under a reissued Order:

- Watershed Adaptive Management should drive the planning, review, and modification of Copermittee programs;
- Watershed Plans should identify watershed priorities (constituents and sources) and be the vehicle for implementing the Watershed Adaptive Management Strategy;
- Watershed priorities should be the primary driver for determining how individual Copermittees prioritize, develop, and implement stormwater program activities within their jurisdictions;
- Watershed requirements should focus, rather than add to, core jurisdictional program requirements within a watershed;

- Implementation of Watershed Plans should be carried out at the most efficient and effective scale – either jurisdictional, watershed, or regional;
- RWQCB staff should approve the Watershed Plans; and
- With very limited exception, Permit compliance should be assessed at the individual Copermittee level.

Finally, it should be noted that this ROWD represents the results of an extended discussion that can in no way be considered complete. The Copermittees believe that it goes a long way toward describing a workable vision for the future. But, as described throughout, many important details have yet to be discussed (Watershed Plan approvals, mechanisms and standards for program modification, performance metrics, monitoring requirements, etc.). Further discussion of these and other critical details must necessarily precede the finalization or endorsement of any new Permit requirements.

ATTACHMENT 1-1

JURISDICTIONAL ILLICIT DISCHARGE DETECTION AND ELIMINATION PROGRAM AND DRY WEATHER FIELD SCREENING AND ANALYTICAL MONITORING EVALUATION

ATTACHMENT 1-1 JURISDICTIONAL ILLICIT DISCHARGE DETECTION AND ELIMINATION PROGRAM AND DRY WEATHER FIELD SCREENING AND ANALYTICAL MONITORING EVALUATION

The purpose of the Jurisdictional Illicit Discharge Detection and Elimination Program is to detect and eliminate illegal connections and illicit discharges (IC/IDs) to the Municipal Separate Storm Sewer System (MS4). In support of the Illicit Discharge Detection and Elimination Program, a Dry Weather Field Screening and Analytical Monitoring Program (Dry Weather (DWM) Program) is a requirement of the San Diego Regional Water Quality Control Board Municipal Permit (Order No. R9-2007-0001).

An evaluation of the DWM Program was conducted to answer the following question:

Does the DWM Program successfully detect and eliminate illicit dry weather discharges?

Evaluation of the DWM Program found that:

- IC/ID investigations are less efficient in detecting and eliminating IC/IDs than hotline call responses (over 1,600 annually), business inspections (over 6,000 annually), and visual survey of the stormwater conveyance system during routine maintenance and/or cleaning. Based on the number of samples collected through the Dry Weather Program over the past three years, only 3.7 percent of samples collected resulted in a successful detection and elimination of an illicit discharge (87 successful IC/IDs out of 23,635 sample analyses from 2007-2009). Copermittees observed that more IC/IDs were identified through complaint referrals than through the Dry Weather program. The City of Oceanside reported in 2009-2010 that 86 out of 87 IC/IDs identified through their hotline were eliminated whereas only one IC/ID was identified and resolved through their Dry Weather Program.
- In addition to the inefficiency of the DWM Program to detect IC/IDs compared to hotline calls or inspections, the follow-up investigations which are required within two business days are rarely effective. Typically, it takes a week or more for laboratory analytical data to be reported, and if action levels are exceeded, an upstream investigation must be conducted within 2 business days of receipt of the data. With so many transient sources it is unrealistic to expect an upstream investigation conducted over a week after the IC/ID was observed to detect the source of the IC/ID. Requiring that other priorities be shifted to conduct the investigation is not an effective use of resources and does not necessarily result in the elimination of more IC/IDs.
- Identification of an action level exceedance from a storm drain outfall discharge does not necessarily indicate detection of IC/IDs. Exceedances can be caused by other sources, such as ingress of nitrate-bearing groundwater into the storm drain system, resulting in nitrate exceedances. If nitrate reduction subsequently occurs in ponded water, ammonia may also be detected. Exceedances may also be caused by saline intrusion, resulting in high conductivity, or alkalization of the runoff in a concrete channel, resulting in higher pH. Within the current permit, exceedances from these common causes currently still require a prompt upstream investigation by many jurisdictions to confirm that there is no IC/ID upstream, diverting attention away from more effective activities.

- The DWM Program characterizes discharges in the MS4s using a limited number of constituents. This overlaps with the MS4 Outfall Monitoring Program, which expands the list of constituents and tailors the list to support watershed planning. In fact, efficiencies have been gained through incorporating parts of the MS4 Outfall Monitoring Program into the DWM Program. However, the MS4 Outfall Monitoring Program has the advantage of focusing on watershed priority pollutants and not on a standard list of constituents that includes the use of field test kits that may have chemical interferences which can limit their usefulness.
- The MS4 Outfall Monitoring Program could be used to assess discharges from the storm drain system. The detection of IC/IDs could be addressed through those methods proven to be most effective to date: stormwater hotline complaints, facility inspections and public employee surveillance. Additionally, in the modified MS4 Outfall program anticipated in the next Permit, Copermittees propose that if initial field screening observations (i.e., unusual color, odor, sheen, etc.) indicate a potential illegal discharge, then it will be addressed immediately.
- Indicator bacteria are the constituent with the highest frequency above action levels from the period of 2007-2009. IC/ID investigations are typically not successful at identifying sources of bacterial indicators related to anthropogenic activities (e.g. re-growth in storm drains and wildlife scat are common sources as opposed to illicit discharges). The introduction of the Revised Total Maximum Daily Loads for Indicator Bacteria Project I – Twenty Beaches and Creeks in the San Diego Region Total Maximum Daily Load (Bacteria Project – I TMDL) for many watersheds in the region will require additional monitoring, source investigations, and treatment of bacteria. Any IC/ID component incorporating bacteria investigation should simultaneously fulfill other parallel regulatory MS4 requirements to ensure that monitoring efforts are optimized.
- Diazinon and Chlorpyrifos are no longer commercially available. These pesticides have been detected above action levels in no more than 0.3% of samples over the past three years. The analysis of organophosphate compounds is no longer a useful analysis for this program.
- The transient nature of many IC/IDs frequently causes difficulties in identifying the source of an IC/ID, even when a suspected IC/ID is detected. Often, based on exceedances of NPDES dry weather action levels, it can be concluded that an "activity" or group of "activities" have occurred in a sub-drainage area, but the source cannot be pinpointed. The nature of nonpoint source pollution may result in a timing disconnect between the "activity" producing a pollutant (e.g., over fertilizing a lawn) and the transport mechanism of the pollutant into the MS4 system (e.g., runoff from over irrigation hours after the application of the fertilizer). Unless the IC/ID activity is actually occurring and being transported into the MS4 system during the field screening and subsequent upstream investigations, the precise source and location of the IC/ID cannot be identified. In these circumstances the IC/ID is addressed through other means, such as education, and periodic reconnaissance of the area. Additionally, other program elements such as more stringent development standards and inspections of municipal, industrial and commercial facilities are preventive measures to reduce the likelihood of IC/IDs.

Conclusions:

- The conclusion of this evaluation is that the DWM Program should be discontinued in its current form. IC/ID investigations are less efficient in detecting and eliminating IC/IDs than hotline call responses (over 1,600 annually), business inspections (over 6,000 annually), and visual survey of the stormwater conveyance system during routine maintenance activities. During the permit term a comprehensive range of stormwater program elements have been implemented to decrease the likelihood of IC/IDs, and have been shown to be more efficient than the DWM Program. In addition, the MS4 Outfall Monitoring Program also samples outfall discharges. To avoid this duplication of effort, the MS4 outfall monitoring should be conducted under the MS4 Outfall Monitoring Program instead of the DWM Program. Additionally, Copermittees propose that in the MS4 outfall discharge program under the next Permit that if initial field screening observations (i.e., unusual color, odor, sheen, etc.) indicate a potential illegal discharge, then it will be addressed immediately.

Supporting Documentation

Jurisdictions conduct a separate DWM Program as described in each Jurisdictional Urban Runoff Management Program (JURMP) Annual Report. Dry weather samples are collected from the jurisdictions' MS4 to detect and eliminate IC/IDs. Samples are collected from May 1 through September 30 each Permit monitoring year. The results of the 2007, 2008, and 2009 DWM Program are included in the data assessment. The DWM Program primarily answers two core management questions, which address urban runoff discharges in the MS4: 3) What is the relative urban runoff contribution to the receiving water problem(s)? and 4) What are the sources of urban runoff that contribute to receiving water problem(s)?

During the 2007, 2008, and 2009 DWM Program monitoring years, out of 23,635 individual field and analytic samples, 1,258 samples had results measured above the dry weather action levels (Table 1) for an exceedance rate of only 5.3-percent. Table 1 also shows the exceedance rate for each analyte measured under the DWM Program. The analyte with the highest rate of results above the action level for 2007-2009 was total coliforms (25-percent), and Enterococcus was the constituent with the second highest exceedance rate (15-percent). Out of 1,091 dry weather samples collected from the region and analyzed for Diazinon, there was one dry weather action level exceedance. Of 1,089 dry weather samples collected and analyzed for Chlorpyrifos, only one sample (in Point Loma) was reported as an action level exceedance. Among the four dissolved metals for which analyses were conducted (i.e., cadmium, lead, copper, and zinc), the action level exceedance rate was less than 2-percent. Dissolved copper had the greatest number of reported exceedances (21 exceedances in 1,067 samples). Dissolved lead was found to be above the dry weather action level in five of 1,060 samples and dissolved cadmium exceeded the action level in one of 1,065 samples. Six exceedances out of 1,068 samples were reported for dissolved zinc in the region. The dissolved metals action levels are based on the CTR hardness based criteria.

Table 1. 2007, 2008, and 2009 Jurisdictional Dry Weather Program Monitoring Data Summary of Action Level Exceedances

Constituent Group	Constituent	Number of Dry Weather Samples Collected Regionally	Number of Dry Weather Action Level Exceedances	Percentage of Action Level Exceedances (%)
General chemistry	pH	2868	80	3%
	Oil & grease	976	8	1%
	Ammonia (NH_3-N)	2821	164	6%
	Methylene blue active substance (MBAS)	1515	119	8%
Nutrients	Orthophosphate (PO_4-P)	2844	117	4%
	Nitrate (NO_3-N)	2837	156	5%
Metals	Cadmium (dissolved)	1065	1	0%
	Copper (dissolved)	1067	21	2%
	Lead (dissolved)	1060	5	0%
	Zinc (dissolved)	1068	6	1%
Pesticides	Chlorpyrifos	1089	1	0.09%
	Diazinon	1091	1	0.09%
Bacteria	Total coliforms	1111	283	25%
	Fecal coliforms	1112	127	11%
	Enterococci	1111	169	15%
Grand Total		**23,635**	**1.258**	**5.3%**

* For conductivity and turbidity the action levels adopted by the Dry Weather Workgroup are based on best professional judgment and are excluded from this table.

When the Regional Monitoring Program implemented the analysis of organophosphate pesticides in 2001, it was based on the threat of these pesticides entering the region's receiving waters, evidence of persistent exceedances of Diazinon and Chlorpyrifos, and evidence of pesticide-induced acute and chronic toxicity to *Ceriodaphnia dubia*. DWM Program results for Chlorpyrifos and Diazinon over the past seven years are shown in Table 2. The dry weather exceedance rates for Diazinon and Chlorpyrifos have steadily declined over the past six years of monitoring and have been less than 1% in each year over the past five years. With respect to the USEPA ban on the pesticides Diazinon and Chlorpyrifos and the infrequent (or lack of) detections for these analytes in the DWM Program, this analysis could be justifiably removed from the next Permit constituent list..

Table 2. Jurisdictional Dry Weather Monitoring Program Results for Chlorpyrifos and Diazinon for the Period 2003–2009

Monitoring Year	Analyte	Number of Dry Weather Samples Collected Regionally	Number of Dry Weather Action Level Exceedances	Percentage of Action Level Exceedances
2003	Chlorpyrifos	373	117	31.4%
2004	Chlorpyrifos	241	1	0.4%
2005	Chlorpyrifos	285	0	0%
2006	Chlorpyrifos	382	1	0.3%
2007	Chlorpyrifos	333	0	0%
2008	Chlorpyrifos	387	1	0.3%
2009	Chlorpyrifos	369	0	0%
2003	Diazinon	373	129	34.6%
2004	Diazinon	240	6	2.5%
2005	Diazinon	286	2	0.7%
2006	Diazinon	377	2	0.5%
2007	Diazinon	333	0	0%
2008	Diazinon	389	0	0%
2009	Diazinon	369	1	0.3%

During the past three years (2007-2009) an IC/ID was detected for 118 (5-percent) of the action level exceedances. Of the 118 IC/IDs, 87 were resolved (i.e., source was identified and eliminated). Compared to the stormwater hotline and inspection programs, the proportion of IC/IDs that are resolved in the DWM Program is much lower. Methods such as hotline call in programs and inspection programs meet the requirements of non-stormwater discharge elimination to the storm sewers, and Copermittees report the number of IC/IDs eliminated as a result of their hotline call-in program or inspection program in their Annual Jurisdictional Urban Runoff Management Plan Reports.

ATTACHMENT 2-1

RECEIVING WATER ASSESSMENT OF MASS LOADING STATIONS/ TEMPORARY WATERSHED ASSESSMENT STATIONS

ATTACHMENT 2-1: RECEIVING WATER ASSESSMENT OF MASS LOADING STATIONS/ TEMPORARY WATERSHED ASSESSMENT STATIONS

Wet and dry weather samples are collected at mass loading stations (MLS) and temporary watershed assessment stations (TWAS) within nine watershed management areas. Samples are collected per the requirements of Table 1 of the San Diego Regional Water Quality Control Board Order No. R9-2007-001 (Permit). The MLS stations have been consistently sampled for the last 10 to 15 years whereas the TWAS address specific questions beginning with the 2007 Permit and were not designed to be long term monitoring stations.

This monitoring is designed to answer core management questions 1, 2, and 5. The core monitoring management questions per the Permit are as follows:

1. *Are conditions in receiving waters protective, or likely to be protective, of beneficial uses?*
2. *What is the extent and magnitude of the current or potential receiving water problems?*
3. *What is the relative urban runoff contribution to the receiving water problem(s)?*
4. *What are the sources of urban runoff that contribute to receiving water problem(s)?*
5. *Are conditions in receiving waters getting better or worse?*

Analysis of receiving water data was conducted to evaluate progress so far on questions 1, 2 and 5. Additionally, the following sub-questions were analyzed to guide the Copermittees' monitoring recommendations for the next permit:

1. Have priority constituents changed over this current Permit cycle compared to the previous?
2a. How have the TWAS contributed to the understanding of the spatial extent and magnitude of receiving water problems?
2b. How do the monitoring results of the upstream TWAS compare to the downstream MLS?
2c. Can wet weather priority constituents be linked to land uses in the watersheds?
3. What frequency of sampling at the MLS is necessary to maintain the detection of long-term trends of receiving water quality?

Statistical analysis of the water quality data from the MLs and TWAS concluded that:

- Receiving water constituent priorities in 2010 are similar to the previous assessment conducted in 2005 for wet weather. Dry weather ambient monitoring was added in the 2007 Permit to address seasonal variability. With few exceptions, priority constituents are the same in all watersheds. Wet weather priorities, in general, are bacteria and sediment. Dry weather priorities, in general, are bacteria, nutrients and total dissolved solids (TDS). Synthetic pyrethroids, not analyzed under the previous Permit, are an emerging regional issue beginning to be addressed at the state and national levels.
- With few exceptions, the constituent priorities at TWAS and MLS across the region are similar. Constituent concentrations and patterns of occurrence are similar at TWAS and MLS in the same watershed.

- Additional constituent priorities were identified in Chollas Creek Watershed (copper and zinc) and Tijuana River Watershed (e.g., ammonia, surfactants (MBAS), and biological chemical oxygen demand). Both of these watersheds have unique characteristics compared to the rest of the region. Tijuana River is subject to periodic sewage discharges from across the international border and Chollas Creek has a high density of industrial facilities and transportation corridors.
- Statistical analysis of 8 to 18 years of wet weather receiving water data indicate that sampling frequency may be reduced from alternate years to once every five years without increasing the amount of time necessary to detect long term trends. Because wet weather data has a higher variability than dry weather data, it is assumed that a reduced frequency for ambient dry monitoring will also be appropriate.
- Statistical analysis of the wet weather receiving water data also showed that if a significant increasing or decreasing trend is observed, a reduction of sampling frequency from alternate years to every five years will not increase the time necessary to detect a significant trend.

Conclusions

Constituent priorities in receiving water are similar in 2010 to the previous 2005 assessment. Additionally, the upstream TWAS and downstream MLS have similar constituent priorities. Therefore, core monitoring questions 1 and 2 (i.e., impact to beneficial uses and the magnitude and lateral extent of problem) have been successfully addressed by the monitoring of the 2007 Permit. Because the constituent concentrations and patterns are generally similar at the TWAS and MLS, especially within a watershed, there is no added value to continuing TWAS monitoring in its current form. The similarity of priority constituents across the region support reducing the number of receiving water stations from the 2007 Permit. Several stations (3 to 5 across the region) close to the mouth of the watershed will be adequate to monitor receiving water conditions in the region. The region has the wet weather constituent priorities of bacteria and sediment and the dry weather constituent priorities of bacteria, nutrients and TDS. Resources can be reduced from receiving water monitoring and redirected to working on how to fix the problems by increasing emphasis on MS4 outfall monitoring, source identification and source abatement activities.

Wet weather sampling at the MLS may be reduced to once every five years. The statistical simulation results show that decreasing the sampling frequency to every five years will not affect the ability to detect long-term trends. This finding is further supported by the finding that receiving water priority constituents have not changed substantially at individual MLS during the past five years. Therefore, reduced receiving water monitoring will still allow for detection of trends in the long-term, answering management question 5.

Supporting Documentation

A list of watershed management area and mass loading station (MLS) acronyms is presented in Table 1.

Table 1. Watershed Management Area and Watershed Acronym List

Watershed Management Area	Watershed Name	Mass Loading Station
Santa Margarita	Santa Margarita River	SMR-MLS; SMR-MLS2
San Luis Rey River	San Luis Rey River	SLR-MLS
Carlsbad Watershed	Loma Alta Creek	LAC-TWAS-1
	Buena Vista Creek	BVC-TWAS-1
	Agua Hedionda Creek	AHC-MLS; AHC-TWAS-1
	Escondido Creek	ESC-MLS; ESC-TWAS-1
San Dieguito River	San Dieguito Creek	SDC-MLS; SDC-TWAS-1; SDC-TWAS-2
Los Peñasquitos River	Los Peñasquitos	LPC-MLS; LPC-TWAS-1; LPC-TWAS-2
Mission Bay and La Jolla	Tecolote Creek	TC-MLS
	Mission Bay	MB-TWAS-1; MB-TWAS-2
San Diego River	San Diego River	SDR-MLS; SDR-TWAS-1; SDR-TWAS-2; SDR-TWAS-3
San Diego Bay	Chollas Creek	CC-SD8(1)-MLS; CC-NF54
	Sweetwater River	SR-MLS; SR-TWAS-1
	Otay River	OR-TWAS-1
Tijuana River	Tijuana River	TJR-MLS; TJR-TWAS-1; TJR-TWAS-2

Sub-Question #1: *Have priority constituents changed over this current Permit cycle compared to the previous?*

Determination of whether or not receiving water priorities remained similar between the Baseline Long Term Effectiveness Assessment (BLTEA) and the current long term effectiveness assessment (LTEA) was made by comparing the two sets of results at the watershed level. The BLTEA analysis was conducted in 2005 and grouped wet and ambient data from the municipal separate storm sewer system (MS4) and the receiving waters, along with whether or not an constituent was included on the Section (§) 303(d) list. The LTEA analysis was conducted in 2010 and evaluated data from the MS4, receiving water (RW), wet, and ambient separately. In addition, inclusion of a constituent on the §303(d) list did not result in that constituent categorized as high priority. Constituent groups are used for the comparison of the BLTEA and the receiving waters LTEA. Priorities within watersheds were also evaluated. The purpose of this evaluation was to determine if the answer to management question #1 (conditions in receiving waters protective of beneficial uses) is the same in 2010 (LTEA) as the 2005 (BLTEA).

As shown in Table 2, wet weather priorities are similar between the BLTEA and the LTEA, as well as across the region. Cells highlighted orange are high priorities (greater than 50-percent exceedance of water quality benchmark (WQB)) and yellow cells are medium priorities (greater than 25-percent exceedance of WQBs, up to and including 50-percent exceedance of WQBs). A comparison of BLTEA and LTEA priority results at each MLS indicates that priorities remain similar between the two evaluations. Due to the dry weather ambient monitoring element initiated in the 2007 Permit, seasonal differences in priority constituents were identified in receiving water. Nutrients were not found to be a priority constituent during wet weather monitoring, but were a high priority constituent across many watersheds during dry weather conditions. These seasonal variations may in part be attributed to the differences in WQBs between seasons.

Since 2005, Copermittees participation in the Stormwater Monitoring Coalition (SMC) Regional Monitoring Program has provided additional ambient dry weather nutrient data. In general, during dry weather bacteria, nutrients, and TDS are constituent priorities found in watershed management areas across the region. In general, during wet weather, bacteria and sediments (total suspended sediments) are region-wide constituent priorities.

Table 2. Comparison of 2005 Baseline Long Term Effectiveness Assessment and 2010 Long Term Effectiveness Assessment Priority Results

Priority Group	BLTEA or LTEA	SMR-MLS	SLR-MLS	AHC-MLS	ESC-MLS	SDC-MLS	LPC-MLS	TC-MLS	SDR-MLS	CC-SD8(1)	SR-MLS	TJR-MLS
Baseline Long Term Effectiveness Assessment Priorities												
Bacteria	BLTEA											
Gross Pollutants	BLTEA											
Heavy Metals	BLTEA											
Nutrients	BLTEA											
Pesticides	BLTEA											
Sediment	BLTEA											
Total Dissolved Solids	BLTEA											
Toxicity	BLTEA											
Turbidity	BLTEA											
2010 Long Term Effectiveness Assessment Wet Weather Priorities												
Bacteria	LTEA-WET											
Gross Pollutants	LTEA-WET											
Heavy Metals	LTEA-WET											
Nutrients	LTEA-WET											
Pesticides	LTEA-WET											
Sediment	LTEA-WET											
Total Dissolved Solids	LTEA-WET											
Toxicity	LTEA-WET											
Turbidity	LTEA-WET											
2010 Long Term Effectiveness Assessment Dry Weather Priorities												
Bacteria	LTEA-DRY											
Gross Pollutants	LTEA-DRY											
Heavy Metals	LTEA-DRY											
Nutrients	LTEA-DRY											
Pesticides	LTEA-DRY											
Sediment	LTEA-DRY											
Total Dissolved Solids	LTEA-DRY											
Toxicity	LTEA-DRY											
Turbidity	LTEA-DRY											

BLTEA Priorities were based on Section 303(d) listing and combined wet and dry weather data
Orange highlights indicate high priorities (>50% exceedance of WQOs/WQBs), and yellow highlights indicate medium priorities (>25-50% exceedance of WQOs/WQBs)

Sub-Question #2a. How have the TWAS contributed to the understanding of the spatial extent and magnitude of receiving water problems?

and

Sub-Question #2b. How do the monitoring results of the upstream TWAS compare to the downstream MLS?

Priority constituents were also examined within watersheds to determine whether or not Priorities remained consistent throughout a watershed, and to help determine whether or not the TWAS have contributed to the understanding of the spatial extent and magnitude of receiving water quality problems. Three watersheds were examined in detail, and are presented in Table 3. The results demonstrate that Priorities remained consistent within the same watershed. Some differences in upstream and downstream relationships may be due to differences in the Basin Plan objectives in a specific hydrologic subarea (e.g. the TDS results for San Diego River stations).

Table 3. Agua Hedionda Creek, Escondido Creek, and San Diego River Mass Loading Station and Temporary Watershed Assessment Station Wet Weather Priority Constituent Comparison

Station	HSA	No. Samples	Assessment Scores - NPDES Monitoring - Wet Weather					
			Chemistry	Toxicity	IBI	Bacterio-logical	Nutrients	TDS
Agua Hedionda Hydrologic Area								
AHC-MLS	Los Monos (904.31)	9	TSS, Turbidity, Bifenthrin	*Hyalella azteca* acute	Very Poor	Fecal Coliforms		TDS
AHC-TWAS-1	Los Monos (904.31)	2	TSS, Turbidity, Chlorpyrifos, Bifenthrin	*Hyalella azteca* acute	Very Poor	Fecal Coliforms		TDS
Escondido Creek Hydrologic Area								
ESC-MLS	San Elijo (904.61)	9	Turbidity, Bifenthrin, TSS		NA	Fecal Coliforms		TDS
ESC-TWAS-1	Escondido (904.62)	2	Turbidity, Bifenthrin, TSS, Diazinon		Very Poor	Fecal Coliforms		TDS
San Diego River Hydrologic Area								
SDR-MLS	Mission San Diego (907.11)	9	Turbidity Bifenthrin		Very Poor	Fecal Coliforms		
SDR-TWAS-1	Mission San Diego (907.11)	2	Turbidity/Bifenthrin Surfactants (MBAS)	*Ceriodaphnia dubia* reproduction	Very Poor	Fecal Coliforms		TDS

Station	HSA	No. Samples	Assessment Scores - NPDES Monitoring - Wet Weather					
			Chemistry	Toxicity	IBI	Bacterio-logical	Nutrients	TDS
SDR-TWAS-2	Santee (907.12)	2	TSS/Turbidity Bifenthrin/Permethrin pH/BOD	*Hyalella azteca* acute survival	Very Poor	Fecal Coliforms		
SDR-TWAS-3	Santee (907.12)	2	Turbidity Bifenthrin		Very Poor	Fecal Coliforms		

-Orange highlights indicate high priorities (>50% exceedance of WQOs/WQBs), yellow highlights indicate medium priorities (>25-50% exceedance of WQOs/WQBs), blue indicates low priorities (≤25% exceedance of WQOs/WQBs). Only group scores of blue (low priority) are presented in the table.
-NA, not applicable no data collected

Sub-Question #2c.Can wet weather priority constituents be correlated to land uses in the watersheds?

A cluster evaluation was conducted to evaluate whether or not watersheds with similar land use also exhibited similar Priority constituent concentrations during wet conditions. The TWAS data were included to evaluate whether or not Priority constituent similarities between MLS and TWAS were found within watersheds.

Land use proportions upstream of each receiving water catchment (MLS or TWAS) were calculated using Geographic Information System (GIS), and compared using cluster analysis. The results of the analysis are presented in Figure 1. A map of the cluster results is presented in Figure 2. Several distinct land use group patterns were found, three of which are discussed here. Cluster "A" is defined by watersheds that contain relatively large proportions of industrial and agricultural land uses, and includes Agua Hedionda Creek (AHC-MLS and AHC-TWAS-1), San Dieguito Creek (SDC-MLS), Loma Alta Creek (LAC-TWAS-1), and Otay River (OR-TWAS-1). Cluster "C1" is defined by the highly urbanized watersheds, and includes relatively high proportions of public facilities, residential, transportation, and commercial land uses. This group includes Buena Vista Creek (BVC-TWAS-1), Sweetwater River (SR-MLS), Chollas Creek (CC-SD8(1)-MLS and CC-NF54-MLS), and portions of San Dieguito (SDC-TWAS-1). Finally, the most rural watersheds are characterized by Clusters "D1, D2, and E", which include relatively large proportions of vacant and undeveloped land, agriculture, and spaced rural residential land uses. Watersheds included in the cluster are portions of San Dieguito (SDC-TWAS-2), San Luis Rey (SLR-MLS and SLR-TWAS-1), Sweetwater River (SR-TWAS-1), Tijuana River (TJR-MLS, TJR-TWAS-1, TJR-TWAS-2), and Santa Margarita River (SMR-MLS and SMR-MLS2).

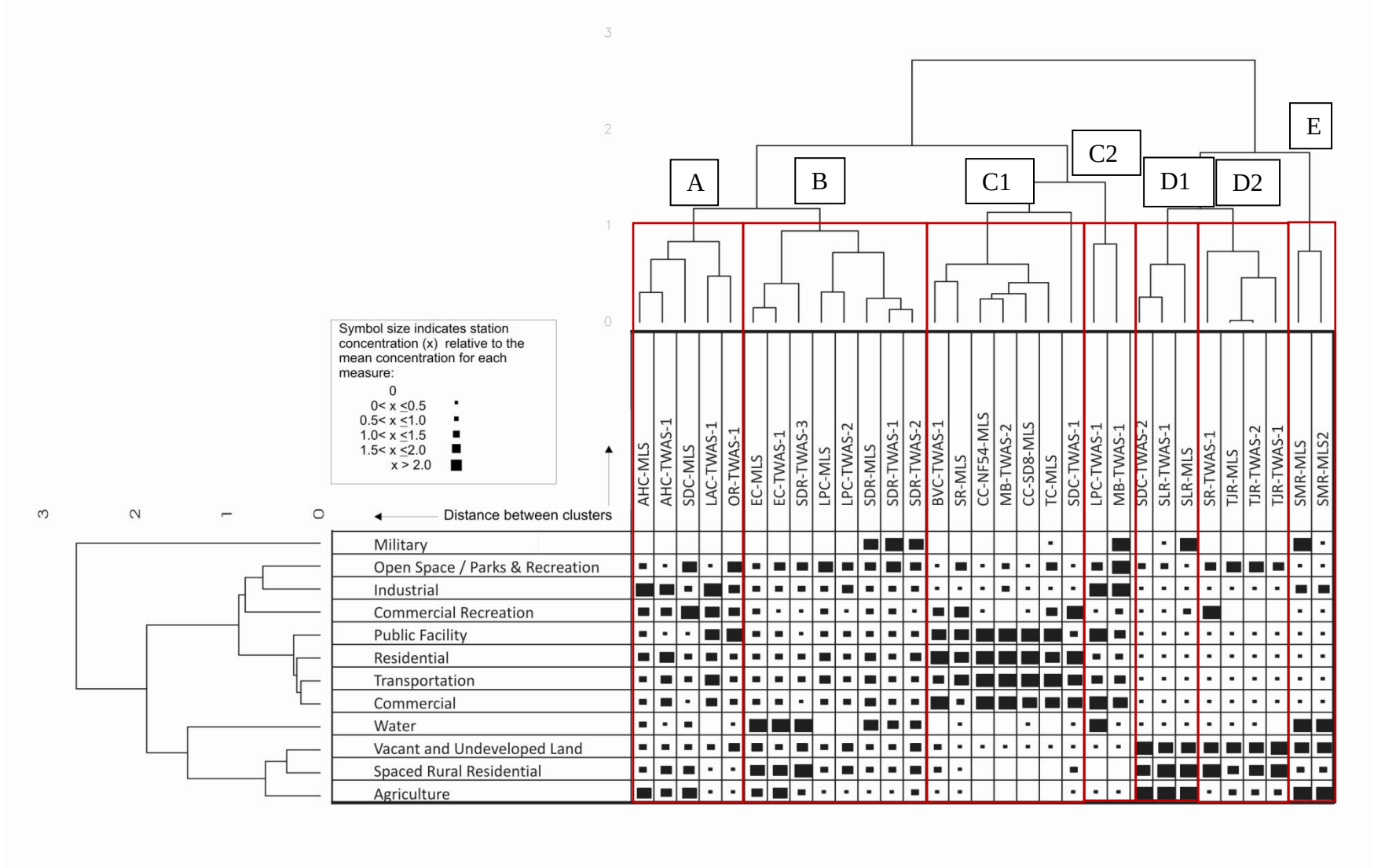


Figure 1. Land Use Cluster Analysis of the Mass Loading Station and Temporary Watershed Assessment Stations

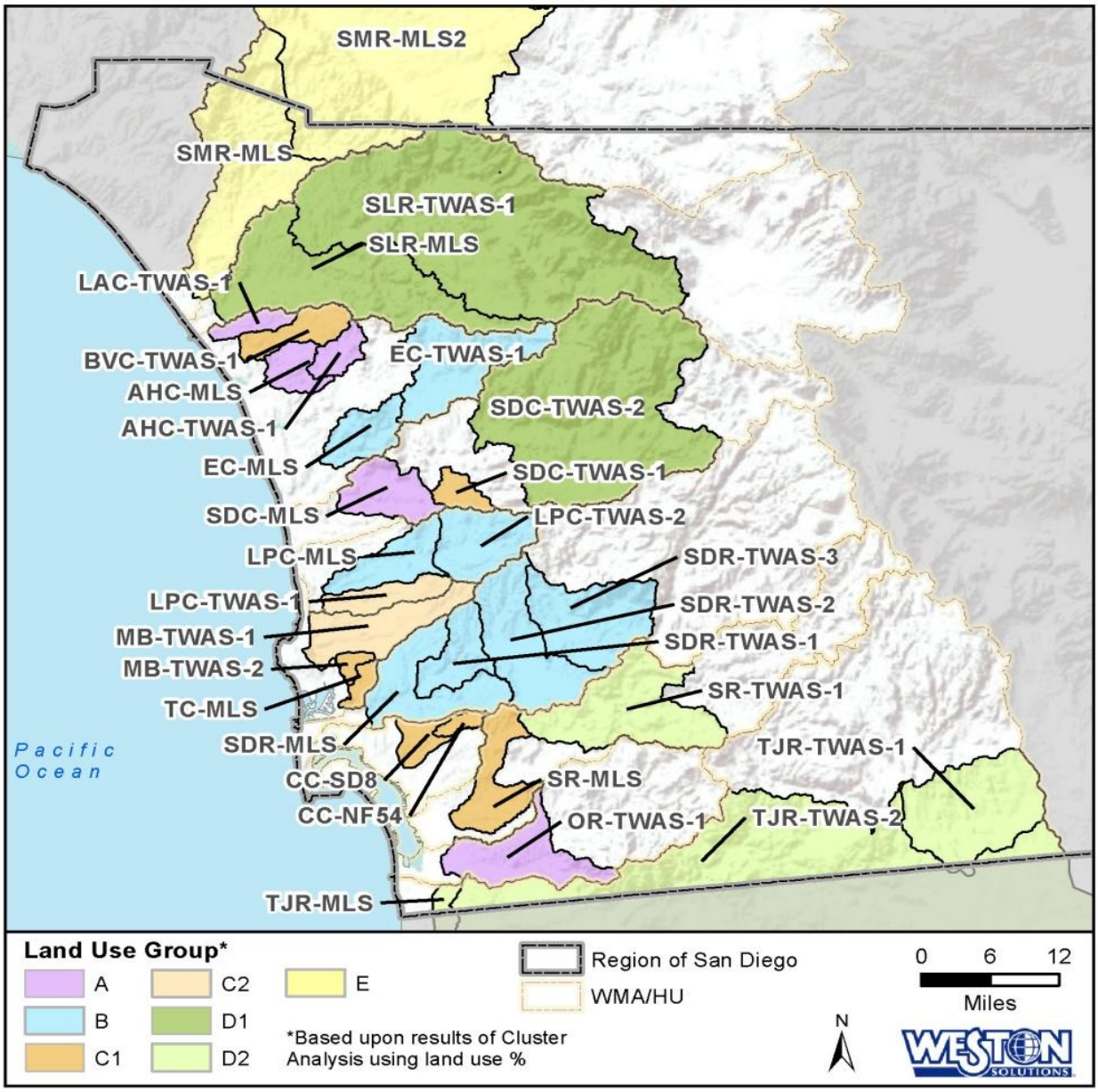


Figure 2. Land Use Cluster Analysis Results

The patterns of constituent concentrations at each MLS and TWAS were also evaluated using cluster analysis. The five-year LTEA dataset was used, and included wet weather data only, as receiving water constituent concentrations are expected to be more related to wash-off during wet events than during ambient conditions.

Results of the analysis are presented in Figure 3. In general, MLS and TWAS samples clustered together over time and a distinct sewage pattern was observed for Tijuana River (TJR-MLS and TJR-TWAS-2, highlighted blue) along with higher toxicity (highlighted orange). Chollas Creek (CC-SD8(1)-MLS) samples exhibited relatively higher concentrations of metals than other MLS and TWAS stations (highlighted purple). However, the groupings based on the water quality data do not directly correspond to the land use cluster analysis results. Therefore, based on constituent

concentrations, there does not appear to be a strong correlation between land use and constituent concentrations (i.e., individual land uses do not relate directly to stormwater concentrations). The exceptions are Tijuana River and Chollas Creek, which have unique activities. Tijuana River is subject to sewage discharge and Chollas Creek has a high density of industrial facilities and transportation corridors. The SDC-TWAS-2 grouping with the Tijuana River (TJR-MLS) sites was due to the post-fire stormwater monitoring results which were highly impacted by the 2007 San Diego Wildfires.

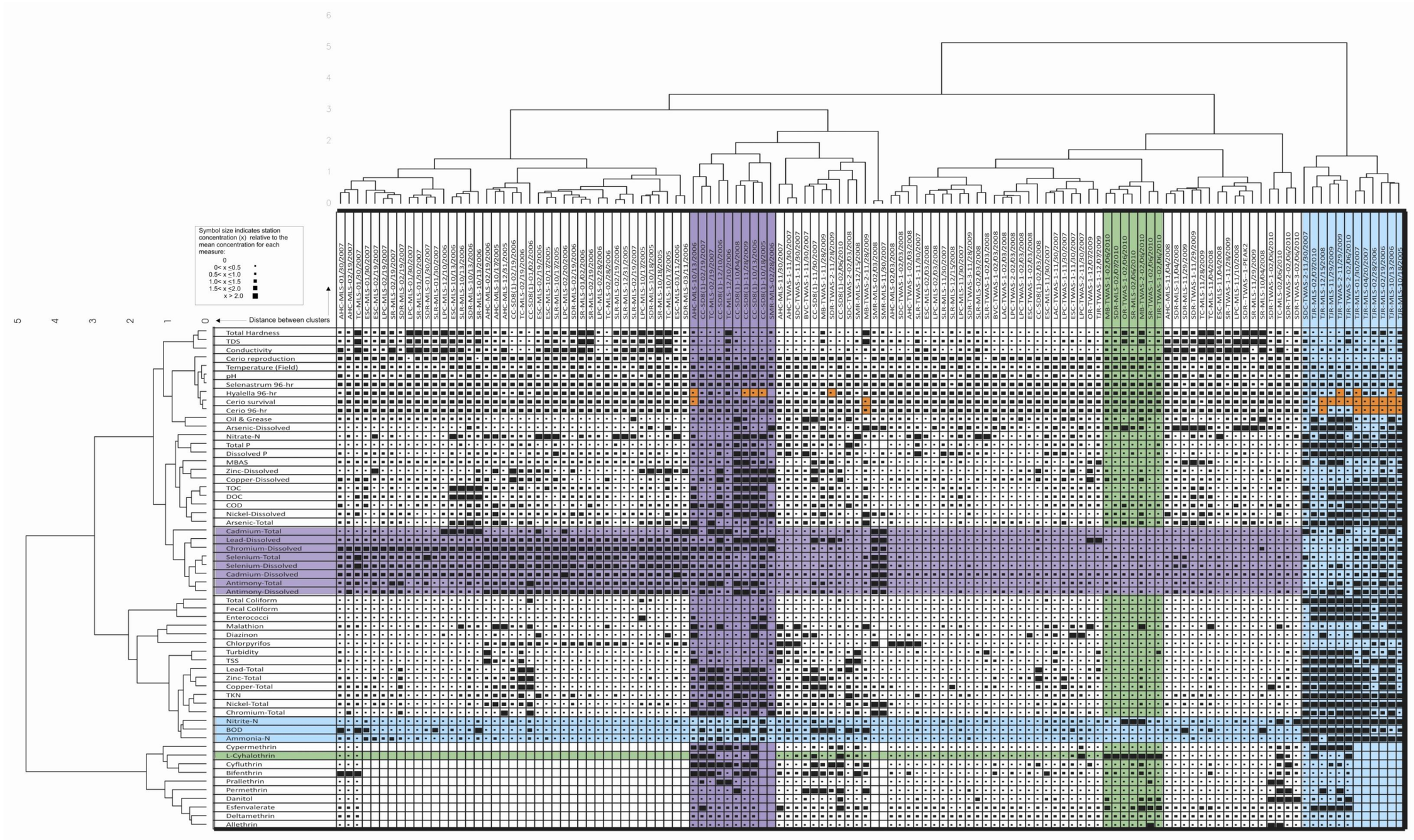


Figure 3. Cluster Analysis Results for Wet Weather Concentrations at Mass Loading Station and Temporary Watershed Assessment Stations during 2005-2010

Sub-Question #3: What frequency of sampling at the MLS is necessary to maintain the detection of long-term trends of receiving water quality?

A statistical analysis was conducted to determine whether or not a reduction in sample frequency from two wet weather events every other year to three wet weather events every five years at the MLS would decrease the Copermittees' ability to detect long-term receiving water trends. In particular, the question of whether a change in sampling frequency would affect Copermittees' ability to detect when the constituent concentrations fall below the WQB (or, for increasing trends, above the WQB) was evaluated.

The statistical analysis utilized the data from the existing program, between 8 and 18 years of data and 113 constituents at 10 MLS. The MLS and constituent combinations included all high priority constituents at each MLS, as well as constituents with greater than 50-percent detection frequency (more than half of the results were greater than the reporting limit). In addition, each MLS and constituent combination was tested for normality and log-normality (results in Attachment 1a). Only constituents that were found to be normal or log-normally distributed were included in the final statistical analysis dataset, because of the statistical method requirements. The final statistical analysis dataset included 66 analytes at 10 MLS. A full explanation of statistical tools utilized to assess the recommended monitoring program compared with the existing program is presented in Attachment 1a.

The existing data were used to evaluate trends (increasing, decreasing, or no trend), and the slope of the line was utilized to project future sampling results. Of the constituents included in the analysis, 2 were found to be significantly decreasing, 11 were found to be significantly increasing, and 53 did not exhibit a significant trend.

The statistical analysis included two scenarios, 1) the current program of two samples every other year and, 2) three samples every five years. The scenarios were compared to determine whether or not a reduction in monitoring frequency will increase the number of years it will take before the measured constituent of concern is observed below the WQO or WQB. Constituents that exhibited significant or non-significant decreasing or increasing trends were included in the analysis.

Comparison of the two scenarios found that, given the continuation of the existing trend line, decreasing the sampling frequency from two storm events every two years (n=5 per permit cycle) to three storm events every five years will not increase the amount of time necessary to detect when a decreasing or increasing trend crosses the WQO with 95-percent confidence. For MLS and constituent combinations that currently exhibit a significant increasing or decreasing trend, decreasing the sampling frequency will not decrease the ability to detect trends. For constituent and MLS combinations that do not exhibit significant trends, there is no difference between the two scenarios to detect when annual average concentrations first fall below or above the WQB or WQO with 95-percent confidence.

TSS was selected to illustrate the simulation results because it is often correlated to other constituents during storm events, including total phosphorus, bacteria, and total metals. Regionally, bacteria and TSS are Priority constituents during wet weather events. Therefore, evaluation to detect when these Priorities fall below WQOs is highlighted in the analysis. Results of the correlation analysis used to justify examination of TSS as a surrogate for other

constituents is included in Attachment 1b. Statistically significant correlations are highlighted yellow in the table (alpha=0.10).

Significantly Decreasing Trends

Only two of the 66 constituent and MLS combinations included in the statistical analysis exhibited statistical decreasing trends. These included total suspended solids (TSS) at Tecolote Creek Mass Loading Station (TC-MLS) and TDS at SLR-MLS. Figure 4 below illustrates the statistical assessment results for TC-MLS. The upper and lower 95-percent confidence interval is shown as a green and light blue line, respectively. Currently, there is a significantly decreasing trend for TSS at this MLS. Observed data are shown as black diamonds, and simulated data are shown as light blue diamonds. The existing program of two wet weather events every other year is compared to three events every five years at TC-MLS. Given the steep decreasing trend at TC-MLS (Figure 4), changes to the frequency of monitoring will not increase the amount of time required to detect when the 95-percent confidence interval falls below the wet weather water quality benchmark of 100 mg/L for TSS (shown in red on the graphs). As shown in Figure 4, the anticipated date to detect TSS concentrations below the WQO is during 2010 for both scenarios (shown as a vertical fuchsia line).

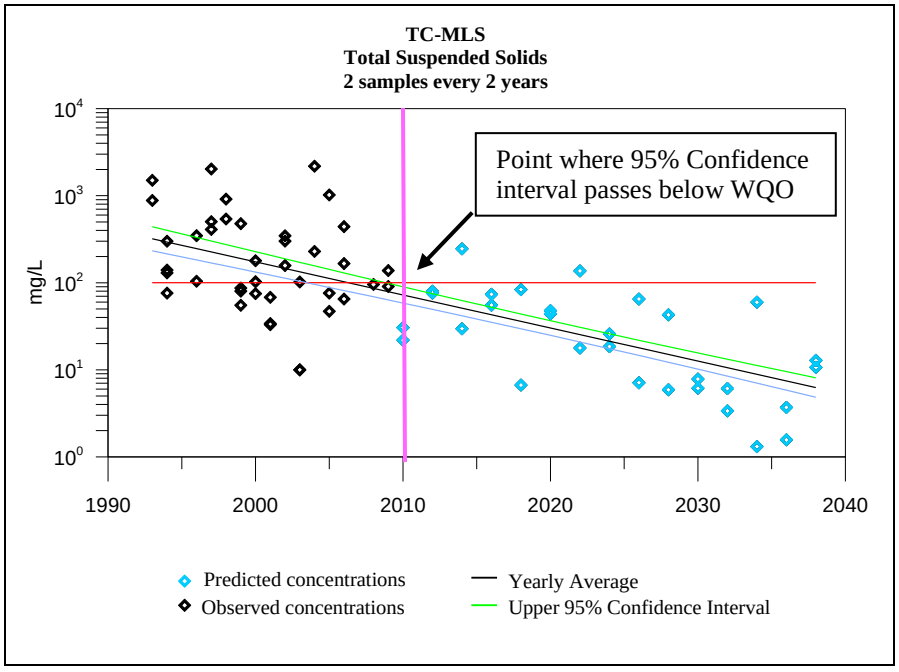
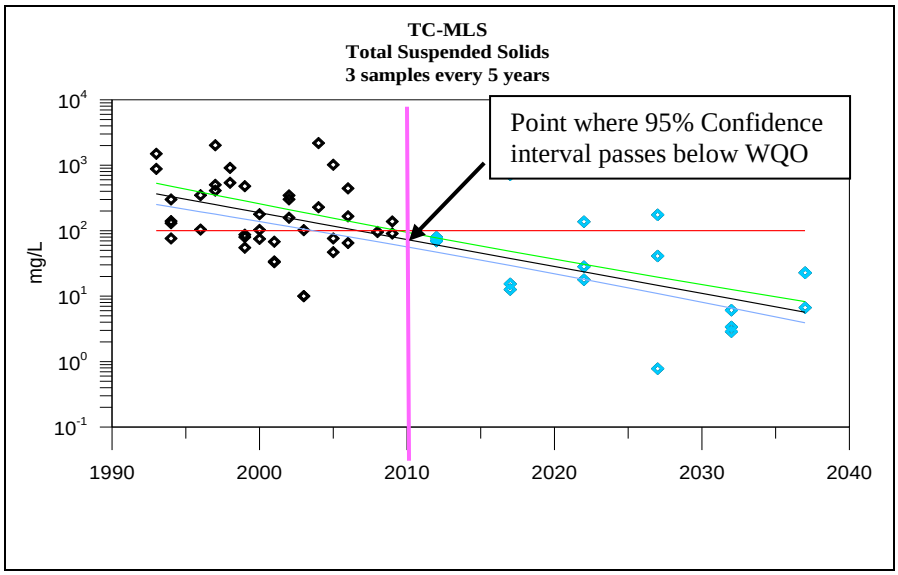


Figure 4. Statistical Analysis Results

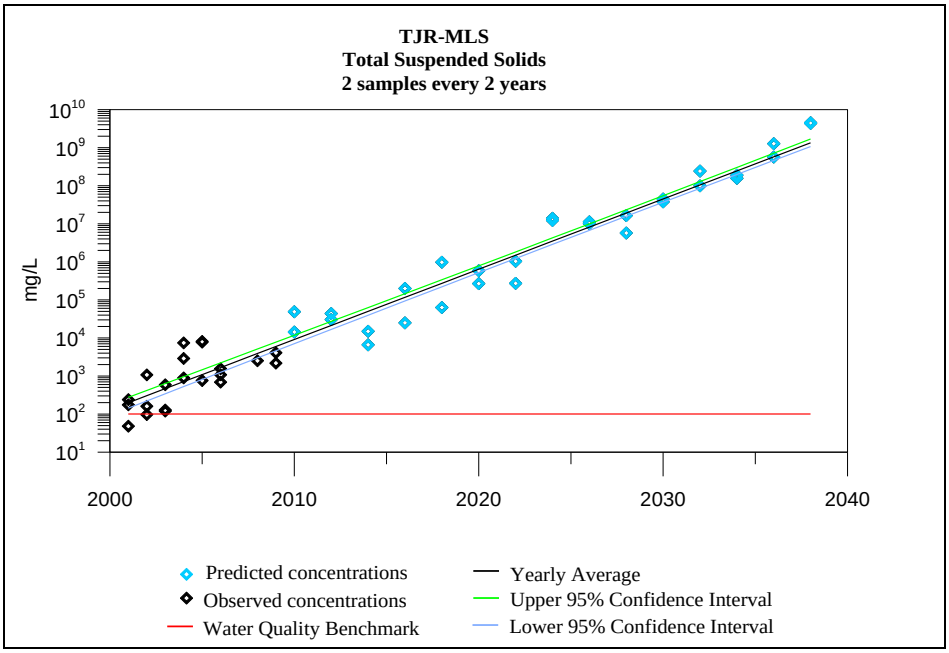


Comparison for Mass Loading Station with Significantly Decreasing Trend, Tecolote Creek Simulated Total Suspended Solids concentrations with Trend Line and 95-percent confidence interval bound

Significantly Increasing Trends

Eleven of the 66 constituent and MLS combinations included in the statistical analysis were found to be statistically increasing over time. Of these 11, four were turbidity, three were Total coliform, two were Fecal coliform, one was for TSS, and one was for total phosphorus.

The increasing trend shown in Figure 5 of TSS at Tijuana River MLS (TJR-MLS) (shown as the black line) illustrates the finding that if a significant increasing trend is observed, a reduction in sampling frequency will not affect the Copermittees' ability to detect it. Additional examples are provided in Attachment 1c that supports this conclusion.



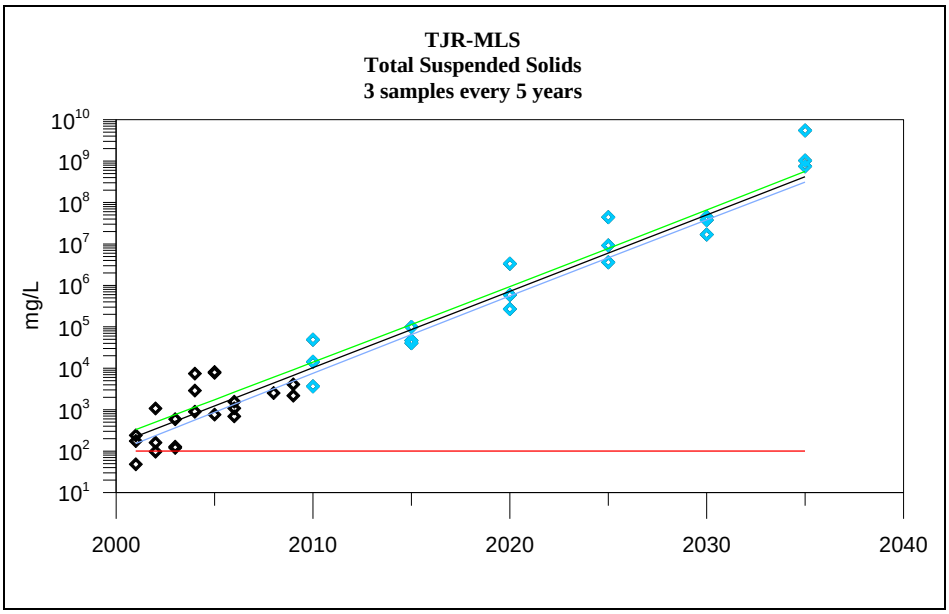


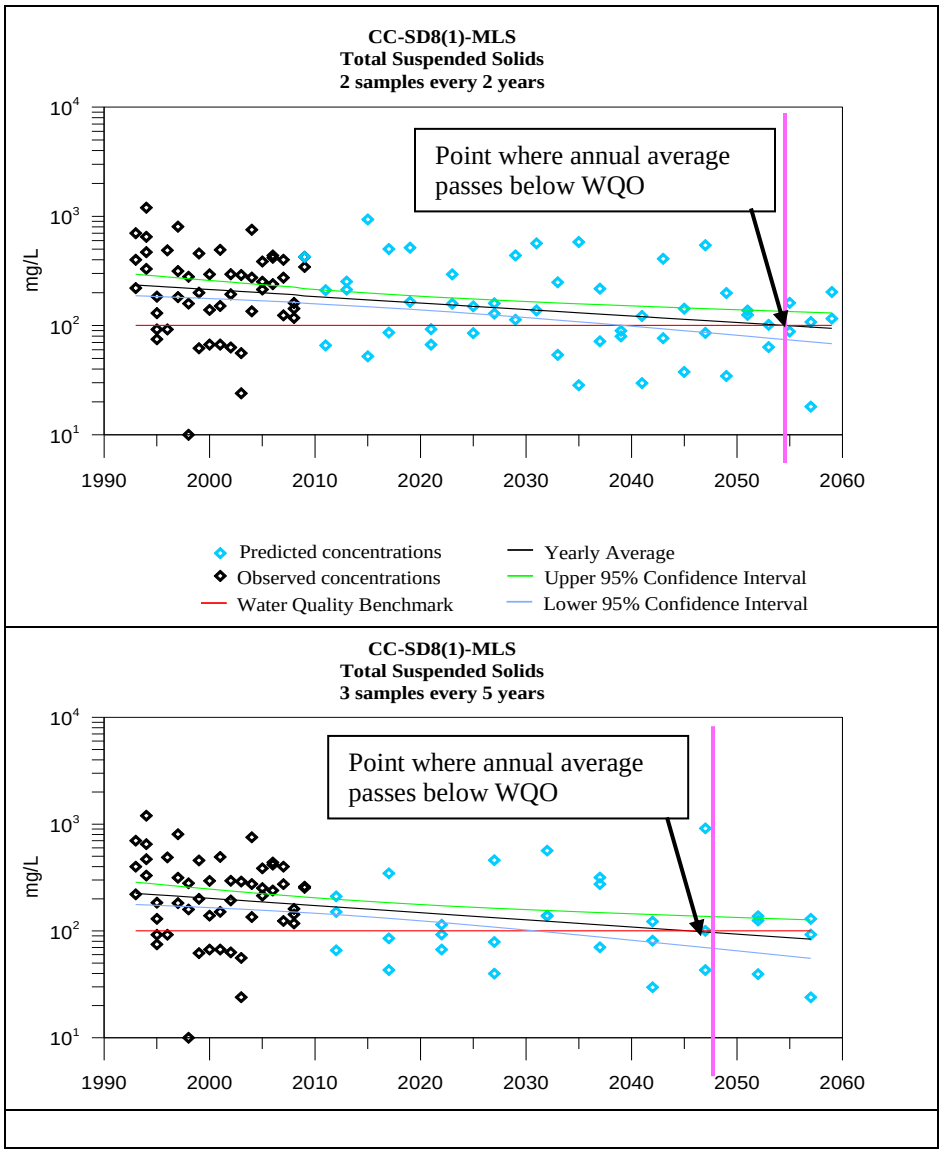
Figure 5. Statistical Analysis Results Comparison for Mass Loading Station with Significantly Increasing Trend, Tijuana River Simulated Total Suspended Solids concentrations with Trend Line and 95-percent confidence interval bound

No Significant Trends

Constituent and MLS combinations for which no significant increasing or decreasing trend has been observed present the worst case scenario for sample frequency reduction (53 of the 66 constituent and MLS pairs analyzed). The two scenarios are compared for TSS at Chollas Creek Mass Loading Station (CC-SD8(1)-MLS) and TSS at San Dieguito River (SDC-MLS) in Figure 6. The trend is generally decreasing at CC-SD8(1) and generally increasing at SDC-MLS.

In the CC-SD8(1) example, because a significant trend is not currently observed, the existing trend line will take a considerable amount of time before the upper 95-percent confident interval passes the WQB. As noted in Figure 6, although the average result is expected to cross the WQB in 2054 at the two year sampling frequency, and 2047 for the five year frequency, the 95-percent confidence interval is not predicted to fall below the WQB before the next 50 years. This finding is based on the variability of the data. Because the data are highly variable, sampling every two years actually makes it more difficult to predict when the average annual TSS concentrations will fall below the WQB. Therefore, decreasing the sample frequency from every other year to every five years will not decrease the Copermittees' ability to detect a decreasing trend. If the existing slope of the line changes to decrease faster, this scenario would result in less time to detect a trend in either instance.

At SDC-MLS a generally increasing TSS trend is observed. This example is included here to illustrate that although the current TSS levels are below the WQB, it is possible to predict when TSS concentrations will meet or exceed the WQB using either the current monitoring program or the reduced sampling frequency to every five years. In this instance, the average annual TSS concentrations are not expected to exceed the WQB within the next 50 years. The lower 95-percent confidence interval does not pass the WQB in this example.


CC-SD8(1)-MLS
Total Suspended Solids
2 samples every 2 years
Point where annual average passes below WQO
mg/L
10^4
10^3
10^2
10^1
1990
2000
2010
2020
2030
2040
2050
2060
Predicted concentrations
Observed concentrations
Water Quality Benchmark
Yearly Average
Upper 95% Confidence Interval
Lower 95% Confidence Interval
CC-SD8(1)-MLS
Total Suspended Solids
3 samples every 5 years
Point where annual average passes below WQO
mg/L
10^4
10^3
10^2
10^1
1990
2000
2010
2020
2030
2040
2050
2060

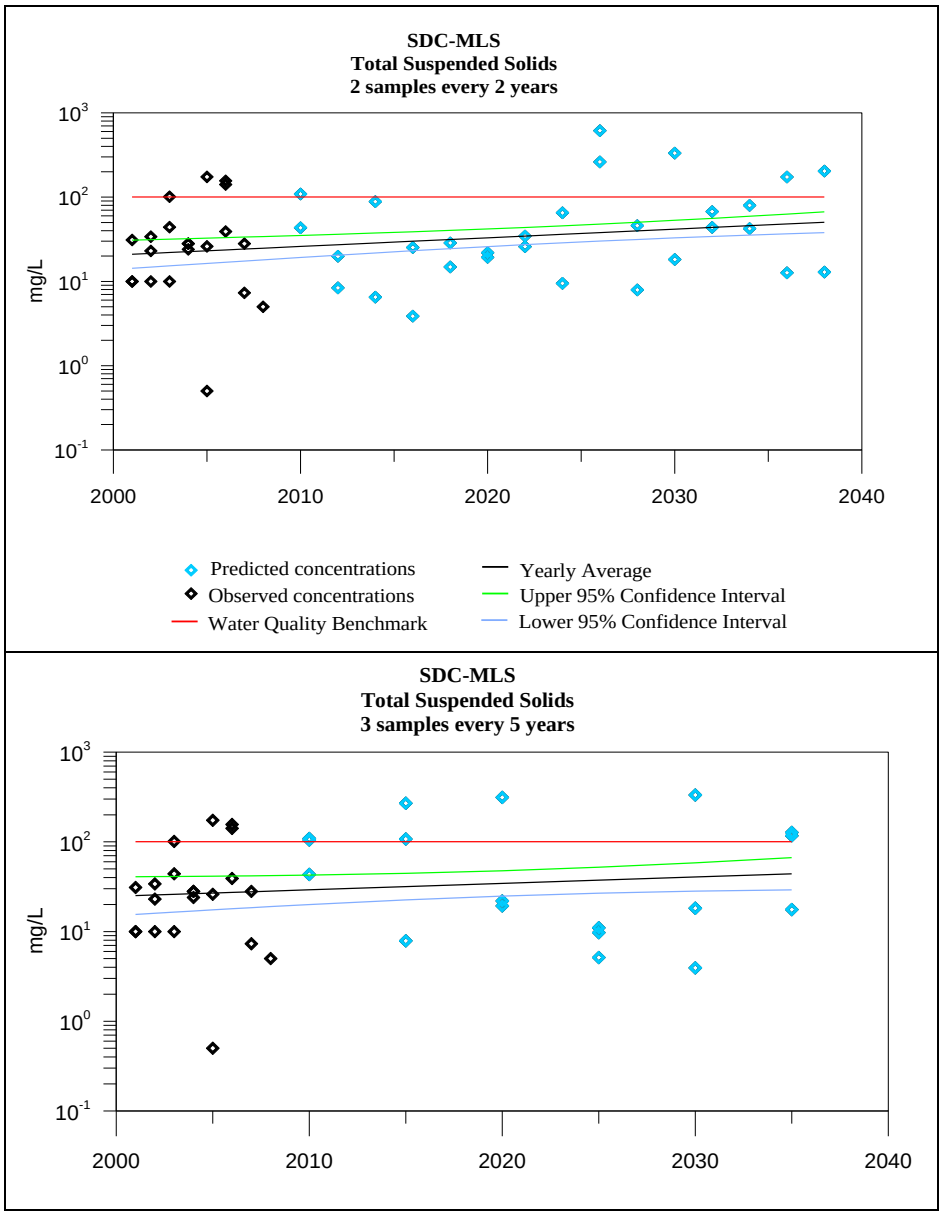


Figure 6. Tecolote Creek and Chollas Creek Simulated Total Suspended Solids concentrations with Trend Line and 95-percent confidence interval bound

ATTACHMENT 2-2

COASTAL STORM DRAIN MONITORING PROGRAM REVIEW

ATTACHMENT 2-2: COASTAL STORM DRAIN MONITORING PROGRAM REVIEW

The Coastal Storm Drain Monitoring Program met the overall monitoring program goals by complying with San Diego Regional Water Quality Control Board Order No. R9-2007-0001 (Permit), characterizing urban runoff discharges, identifying sources of bacteria, and helping to detect and eliminate illegal discharges. The Coastal Storm Drain Monitoring Program provided information that is intended to primarily answer the core management questions addressing urban runoff discharges, particularly core management question 3 and question 4 from the Permit, which are as follows:

3. What is the relative urban runoff contribution to the receiving water problem(s)?
4. What are the sources of urban runoff that contribute to receiving water problem(s)?

The Permit requires monitoring of indicator bacteria levels in urban runoff from coastal storm drain outfalls. Through a paired sampling design of the flowing coastal storm drain that reaches the ocean or bay and the nearby AB411 ocean or bay station, this program evaluates the relationship between coastal storm drain discharges and exceedances of bacteriological water quality standards in the coastal receiving waters.

An evaluation of the CSDM Program was conducted to answer the following question:

What is the impact of dry weather discharges from the coastal storm drains on the REC-1 beneficial use the adjacent coastal beach?

Evaluation of the results of the CSDM Program found that:

- The CSDM Program has demonstrated that coastal storm drain flows cause few ocean or bay bacterial exceedances during dry weather. Less than 2 percent of paired receiving water and coastal storm drain samples collected from 2007-2010 indicate a "linkage", where elevated storm drain concentrations correlate with observed receiving water exceedance of AB 411 bacterial criteria. Of 1,647 individual receiving water bacteria indicator samples analyzed, only 32 corresponded with coastal storm drain outfall discharges (0.9% of Total coliform, 1.5% of Fecal coliform, and 3.4% of *Enterococcus* paired samples). In addition to the low incidence of linked coastal storm drain outfall discharge and receiving water AB411 exceedances, the number of coastal storm drain discharges that reach receiving waters has decreased during the past eight years from 73 percent to 23 percent. The decrease in discharge reaching the receiving waters demonstrates a lower risk of a linkage occurring between coastal storm drains and receiving waters.
- Results of the CSDM Program indicate that few storm drains contribute discharges that are linked to the AB411 exceedances in receiving waters. Only 4 of the 227 (1.7 percent) coastal storm drains monitored over the past three years corresponded more than once to a nearby AB411 exceedance in the ocean or bay. These four coastal storm drains have ongoing source abatement programs. An additional six coastal storm drains over the past three years each corresponded only once with an elevated coastal storm drain discharge to a nearby AB 411 exceedance in the ocean or bay.

- Of the ten coastal storm drain outfalls over the past three years linked to AB411 exceedances in the ocean or bay, five will be included in the implementation plans for the Revised Total Maximum Daily Loads for Indicator Bacteria Project – I Twenty Beaches and Creeks in the San Diego Region (Including Tecolote Creek Bacteria TMDL). The Bacteria TMDL will cover the following hydrologic areas: San Luis Rey River HU 903.00, San Marcos HA 904.50, San Dieguito HU 905.00, Miramar Reservoir HA 906.10, Scripps HA 906.30, Tecolote HA 906.50, San Diego River HU 907.00, and Chollas HSA 908.22. These areas cover much of the coastline and will result in a duplication of effort between the CSDM Program and the Bacteria TMDL monitoring program.

Conclusions
The conclusion of this evaluation is that the CSDM Program should be discontinued, as it has shown that the correspondence between elevated coastal storm drain outfall discharges and AB411 exceedances in the receiving water is minimal (1.9 percent). In addition, upcoming Bacteria TMDL monitoring will overlap with CSDM Program requirements. The TMDL will require an implementation plan to assess and prioritize receiving water exceedances caused by outfall discharges. The very few stations that exhibit a link to AB411 indicator bacterial exceedances in the bay or ocean are addressed by special programs at those stations.

Supporting Documentation

Background
The CSDM Program has been implemented since 2001, and includes the cities of Oceanside, Carlsbad, Encinitas, Solana Beach, Del Mar, San Diego, and the San Diego Unified Port District. The cities of Coronado and Imperial Beach do not currently participate in the program because Coronado participates in a weekly bacteria beach monitoring program, and Imperial Beach coastal storm drains do not flow during dry weather.

Order 2007-0001 require the Copermittees to identify all coastal storm drains and sample those that are flowing on a monthly basis. Current active sites for each jurisdiction were selected based on the following considerations:

- Accessibility
- Safety for samplers
- Outfall conveys urban runoff from the Copermittees' MS4.

Samples were collected from all locations meeting the site selection criteria above, in the manner described below:

1. Samples will be collected at all flowing storm drain outlets, even if the discharge does not come into direct contact with the receiving water.
2. Storm drain outlet samples will be collected if the storm drain discharge infiltrates into the sand before reaching the receiving water.
3. Storm drain outlet samples will be collected if the flowing storm drain results in ponding between the drain and the receiving water.

4. Paired samples (both storm drain sample and receiving water sample) will be collected when storm drain flows are observed to reach the receiving water.

Monthly samples are collected at all flowing coastal storm drain outfalls, and paired samples are collected in the receiving water if the coastal storm drain discharge reaches the receiving water. A total of 471 unpaired samples were collected at coastal storm drain outfalls from 2007-2010, and a total of 549 paired samples were collected during the same timeframe (2007-2008, 2008-2009, and 2009-2010 Coastal Storm Drain Monitoring Program Annual Reports). In total, 1,569 samples were analyzed for *Enterococcus*, Fecal Coliform, and Total Coliform (4,707 analyses total).

Summary of receiving water samples collected from 2007-2010

The geometric mean and range of receiving water results from 2007-2010 are presented in Figure 1 through Figure 3. Except for *Enterococcus*, the geometric mean for all stations and bacteria indicators is below the AB411 benchmark. Coast 36 and CSD010 are the only two stations with geometric means above the AB411 criteria for *Enterococcus* (although there are some single sample exceedances). Fecal coliform has a few single samples that are above the AB411 standard, but no geometric means. Total coliform also has no stations with geometric means above the benchmark, just a few single samples.

These results corroborate the findings of the receiving water and outfall discharge linkage analysis, which demonstrate that 19 Enterococcus, 8 Fecal Coliform, and 5 Total Coliform receiving water exceedances were likely caused by storm drain discharges. In those instances where receiving water results indicated higher concentrations of indicator bacteria than observed in storm drain runoff discharges, there was not a causal relationship demonstrated between storm drain discharge and the receiving water exceedance (see Table 1). Overall, there were more receiving water samples above the AB411 standard than presented in Table 1 because in some samples the receiving water result was much higher than the storm drain discharge concentration. For example, Station CSD021 exceeded the receiving water standard for *Enterococcus* and Fecal coliform on 12/1/2008 (804 MPN/100mL, and 460 MPN/100mL, respectively), but the storm drain concentrations were much lower than the receiving water results (280 MPN/100mL, and 9 MPN/100mL, respectively).

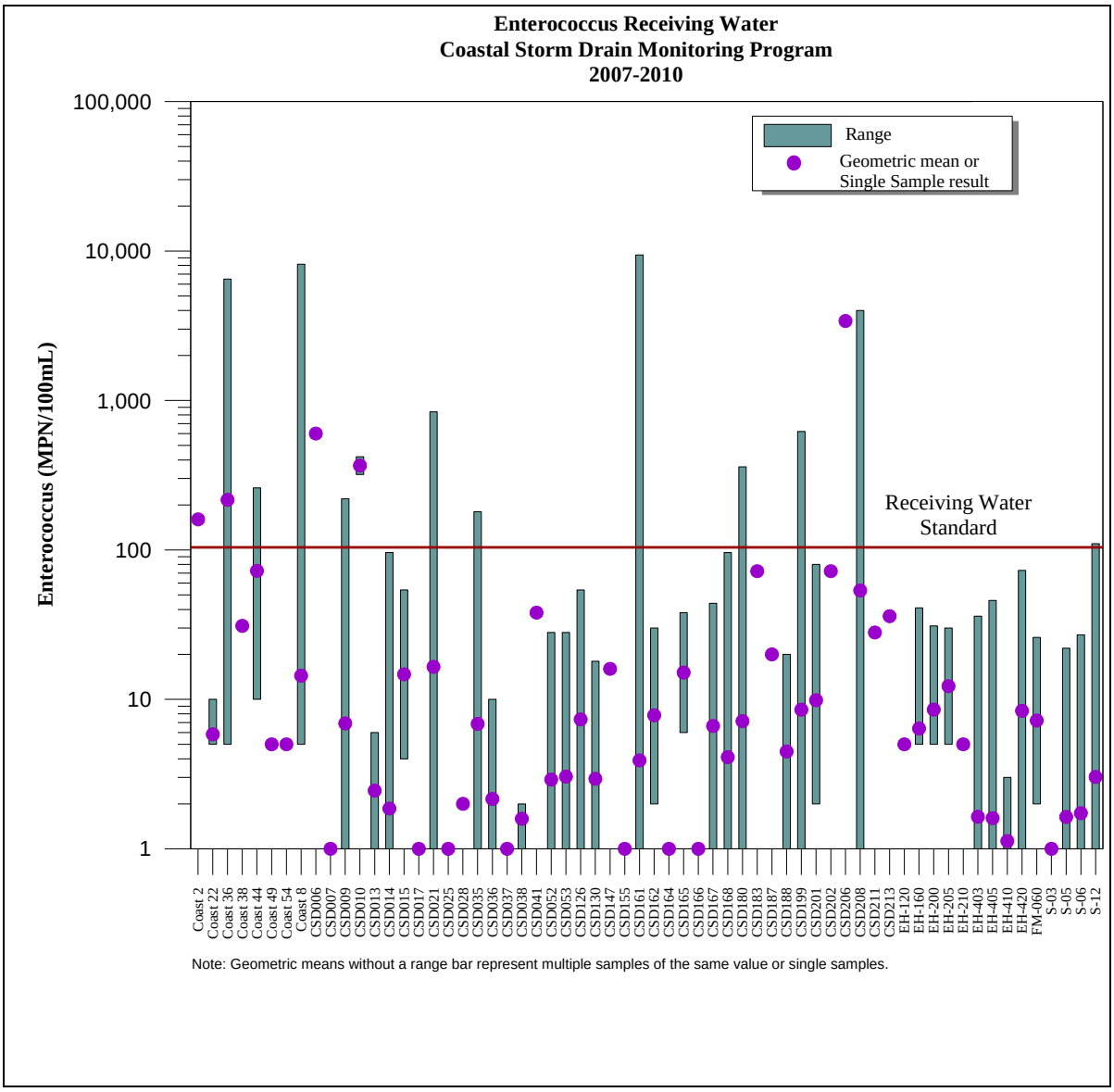


Figure 1. Summary of Coastal Storm Drain Monitoring Program Enterococcus Receiving Water Results 2007-2010

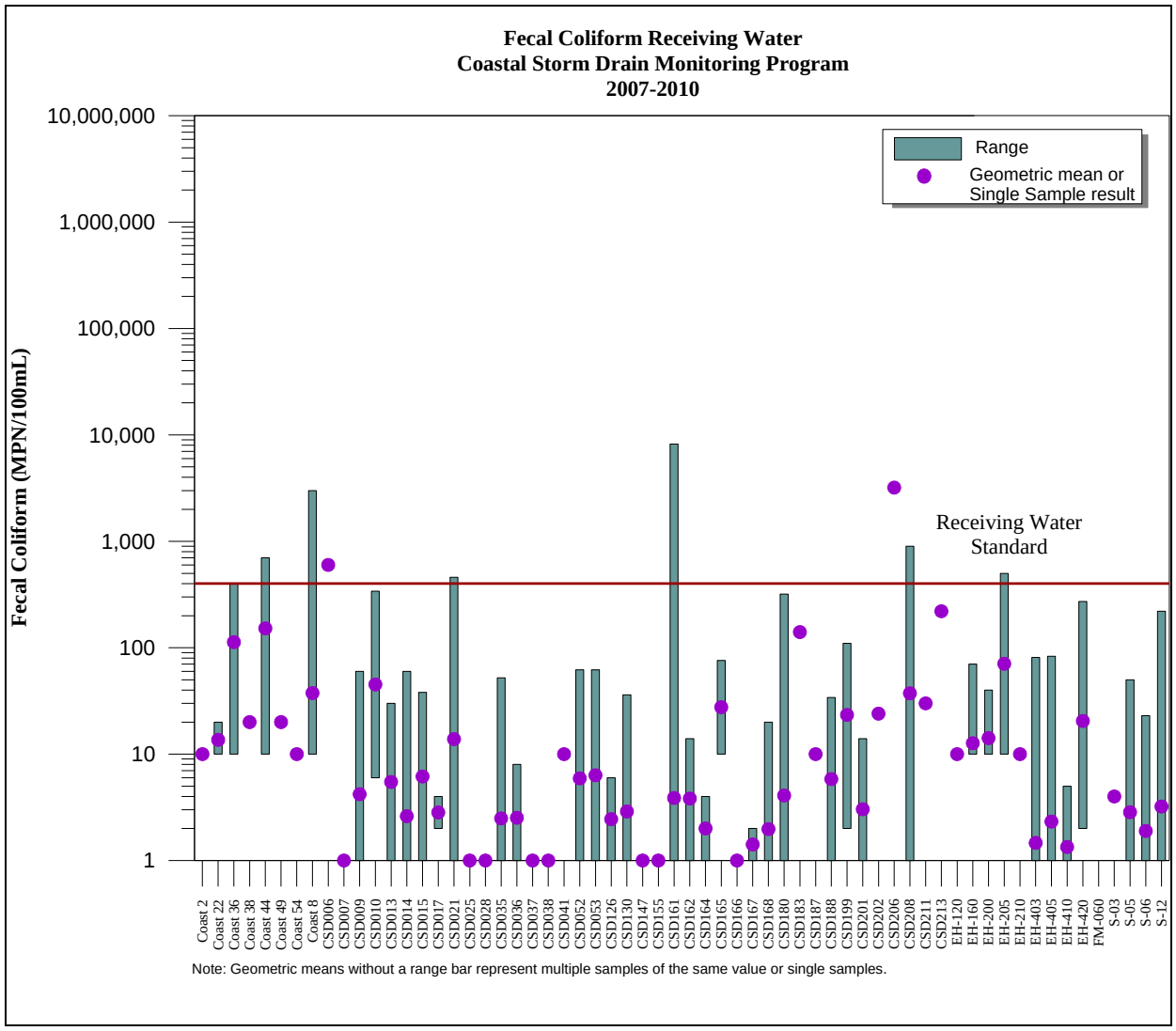


Figure 2. Summary of Coastal Storm Drain Monitoring Program Enterococcus Receiving Water Results 2007-2010

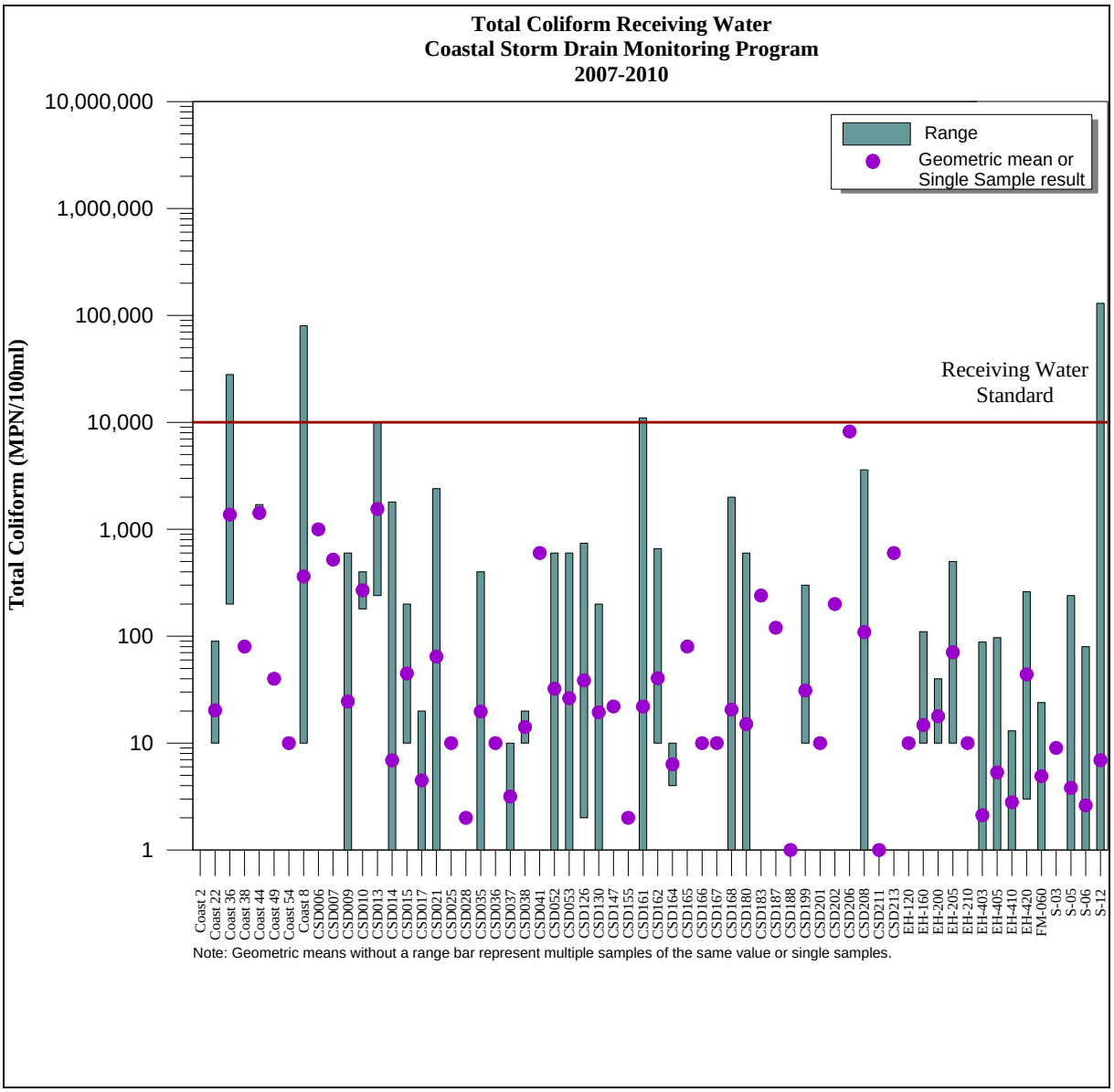


Figure 3. Summary of Coastal Storm Drain Monitoring Program Enterococcus Receiving Water Results 2007-2010

Coastal Storm Drain Outfall Discharge and Receiving Water Linkage Analysis

Sampling of the receiving water occurs when coastal storm drain outfall discharges reach the receiving waters. During the past three years of monitoring (2007-2010) 549 paired samples were collected. A paired sample consisted of one sample from the coastal storm drain outfall discharge and one from the receiving water. Of the 549 paired samples, 1.9 percent showed a link between storm drain outfalls and the receiving water (Table 1).

Table 1. Summary of Coastal Storm Drain Outfall and Receiving Water Linkages

Analyte	Number of Linked Samples	Total Number of Paired Samples	Percent Storm Drain Caused Receiving Water Exceedance
Enterococcus	19	549	3.5%
Fecal Coliform	8	549	1.5%
Total Coliform	5	549	0.9%
Total	**32**	**1,647**	**1.9%**

To further illustrate the relationships between receiving water and storm drain bacteria levels, and receiving water and storm drain action levels, a series of scatter plots referred to as adaptive monitoring diagrams were developed. The adaptive monitoring diagrams stratified the paired sampling data into categories, or quadrants and are essential tools in the implementation of understanding how storm drain flows can impact receiving waters. Figure 4 through Figure 6 summarize the results of Total Coliform, Fecal Coliform, and *Enterococcus* paired samples for 2007-2010.

The scatter plots are divided into five quadrants that are formed by superimposing a line of slope = 1 and two perpendicular lines that delineate the AB411 standard for the indicator of interest. For example, the five quadrants in Figure 1 through Figure 3 are formed by the 1:1 slope line and two lines delineating the AB411 standard line for Total Coliform (10,000 MPN/ 100mL). Receiving water bacteria levels in samples falling within quadrants above the 1:1 slope line (Quadrants II and III, and the upper part of Quadrant I) are higher in bacteria than the corresponding storm drain sample and are therefore, likely influenced by sources in addition to the storm drain discharge. Possible sources include birds, other marine wildlife, discharges from watercraft, and ocean bathers. Quadrant IV of the scatter plots includes the paired samples where elevated storm drain bacteria are likely to have caused or contributed significantly to the AB411 exceedance. Quadrant V includes the elevated storm drain samples that did not result in an AB411 exceedance. Table 2 describes the relationships associated with paired sample data falling into each quadrant.

Table 2. Adaptive Monitoring Description, Recreated from Coastal Storm Drain Monitoring Program 2009-2010 Annual Report

Quadrant	Area	Relationship/Possible Action
Lower Left	I	Storm drain and receiving water levels are below receiving water standards. The receiving waters support beneficial uses
Lower Right	I-A	Storm drain concentration is above receiving water criteria but below 95th percentile action level, receiving water is below receiving water criteria. No action necessary
	V	Storm drain concentration is above 95th percentile action level while receiving water concentration is below receiving water criteria. Highly elevated storm drain concentration does not cause receiving water exceedance, however, the magnitude of the exceedance warrants follow-up and possible investigation.
Upper Left	II	Storm drain less than receiving water standards, while criteria are exceeded in receiving water sample. It does not appear that storm drain flow is responsible for the receiving water exceedance.

Quadrant	Area	Relationship/Possible Action
Upper Right	III	Storm drain and receiving water samples are above receiving water criteria, and storm drain concentration is less than receiving water concentration. Storm drain contamination may contribute to receiving water exceedance, but other sources are also likely.
	IV	Storm drain and receiving water samples are above receiving water criteria, and storm drain concentration is greater than the receiving water concentration. Elevated storm drain concentration likely to have caused receiving water exceedance.

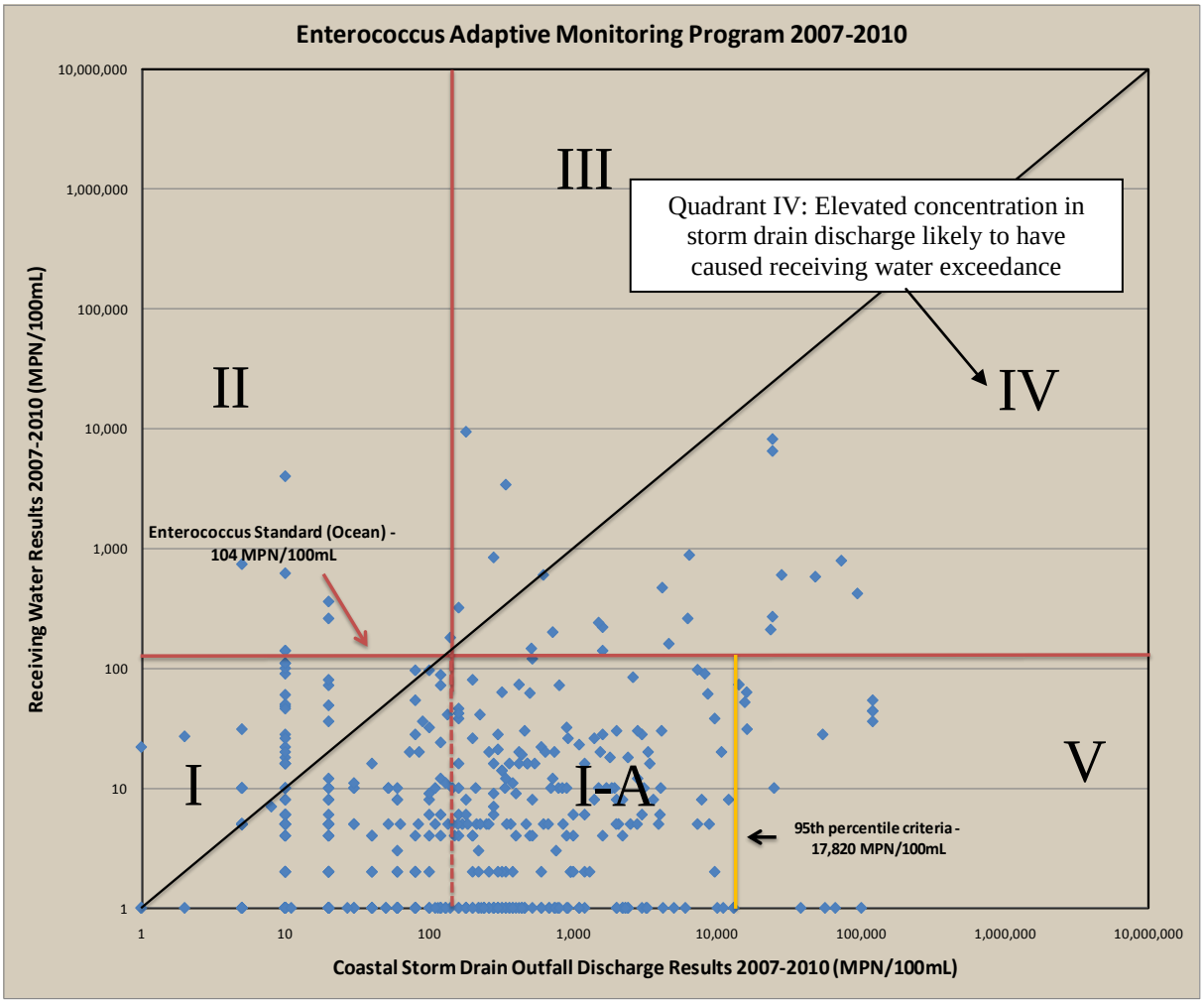


Figure 4. *Enterococcus* Adaptive Monitoring Results 2007-2010

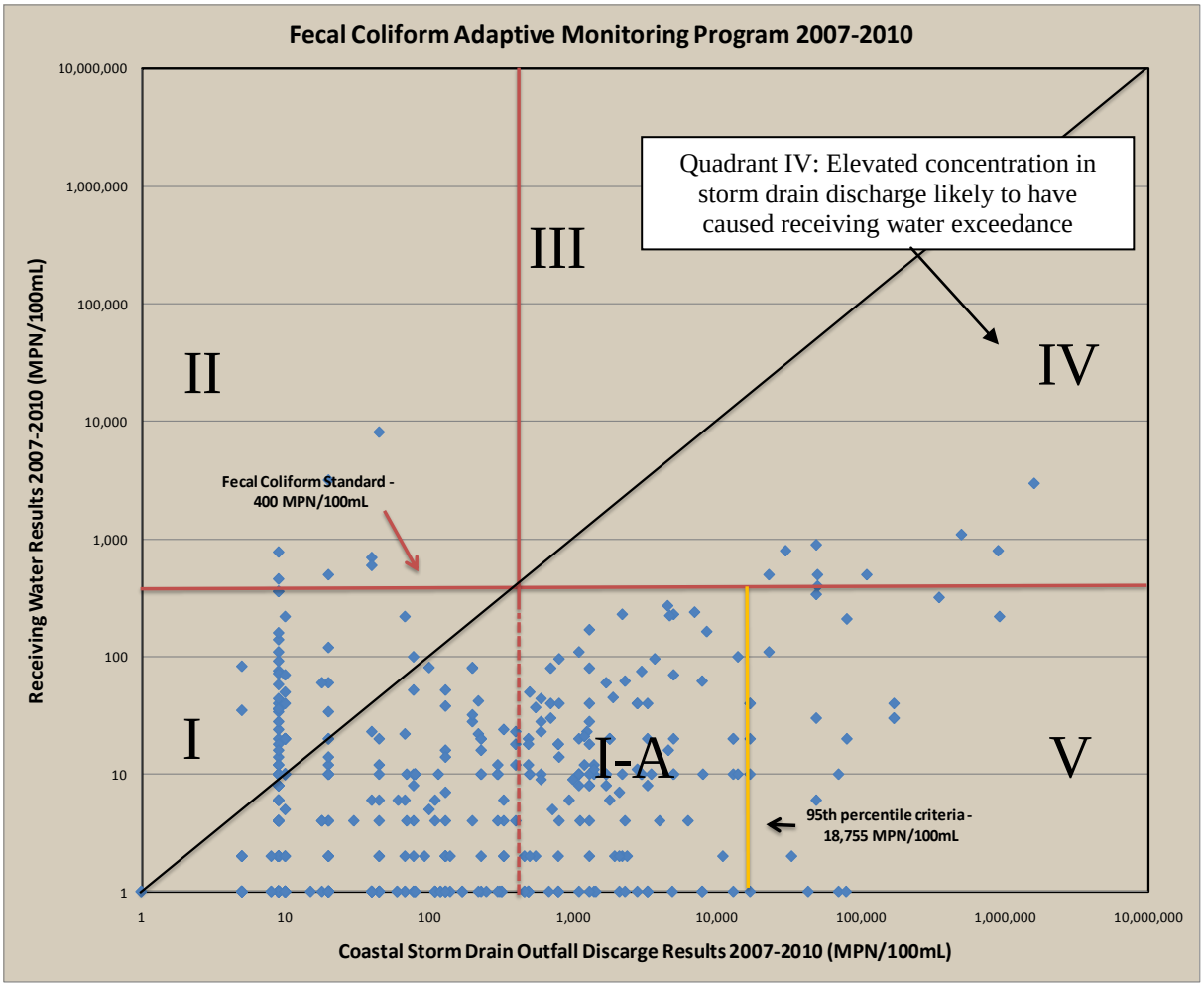


Figure 5. Fecal Coliform Adaptive Monitoring Results 2007-2010

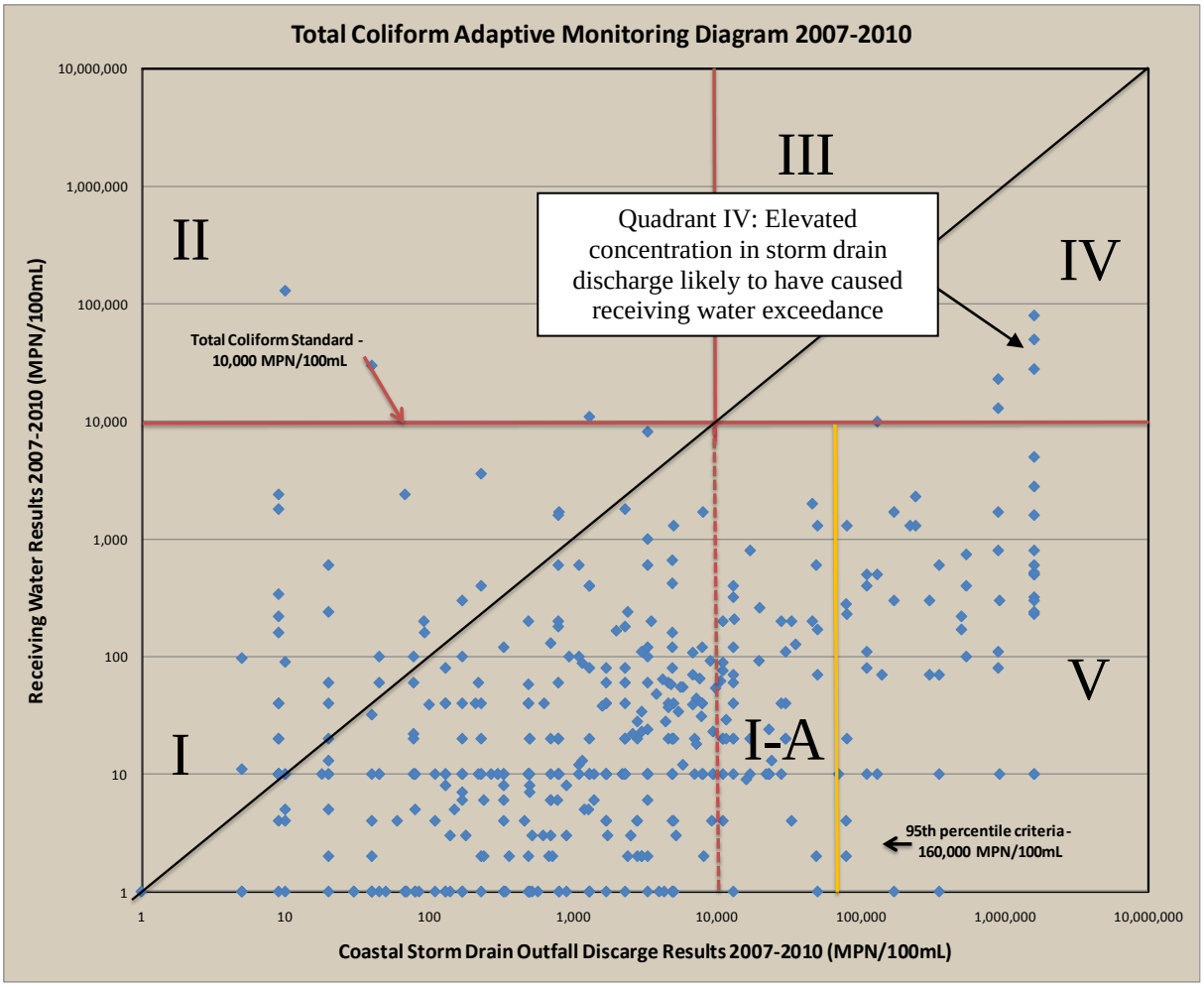


Figure 6. Total Coliform Adaptive Monitoring Results 2007-2010

The samples that fall into Quadrant IV in Figure 4 through Figure 6 are summarized in Table 5, which presents a seasonal breakdown of the coastal storm drain discharge and receiving water results where linkages are present. The majority of linked samples occurred during the winter months (11 of 19 *Enterococcus* samples, 4 of 7 Fecal Coliform, and 4 of 5 Total Coliform).

Table 3. Seasonal Summary of Coastal Storm Drain Discharge and Linked Receiving Water Samples

Month	*Enterococcus*	Fecal Coliform	Total Coliform	Season
May	1	0	0	Dry Season
June	1	1	0	
July	0	1	0	
August	3	1	0	
September	3	0	1	
Summer Total	**8**	**3**	**1**	
October	1	2	1	Wet Season
November	2	0	0	
December	1	0	0	
Jan	4	2	3	
Feb	2	0	0	
March	1	0	0	
April	0	0	0	
Winter Total	**11**	**4**	**4**	

Stations for which a linkage between coastal storm drain discharge and receiving water results has been observed are presented in Table 4. Of 227 stations included in the program, only four of the ten stations with a suspected linkage exhibit a chronic pattern of paired sample exceedances. These four stations represent 1.7 percent of the stations monitored within the CSDM Program. At two of these four stations, additional measures have already been taken to ensure the linkage between coastal storm drain discharges and receiving waters is eliminated. Effectiveness assessment of BMP implementation (Coast 8) is currently underway, and for CSD208 special monitoring is currently underway to understand and eliminate the source of bacteria. The sources of indicator bacteria exceedances at Coast 36 and Coast 44 have been identified. The outfall at Coast 36 is from Camp Pendleton and results have been forwarded to them for action. The two exceedances at Coast 44 were from commercial fishing activity and Oceanside Harbor Maintenance and Oceanside Code Enforcement have worked with the fisherman and the fish distributors to implement appropriate BMPs. The other six stations have exhibited a linkage between storm drain discharge and receiving water bacteria indicator results only once during the past three years. Four of the six stations will be monitored under the upcoming Bacteria TMDL. Therefore, additional special monitoring at these locations is not necessary.

Table 4. Summary of Coastal Storm Drain Outfall Monitoring Stations with Linkages to Receiving Water AB411 Exceedances

Station	Season Linkage Observed	Years Linkage Observed	HU	Water Body	Latitude	Longitude	Ongoing Actions
Coast 2	Winter (2008-2009)	1	902*	Oceanside Harbor	33.21303	-117.39474	Not an ongoing receiving water and storm drain outfall discharge linkage. No further action necessary.
Coast 36	Summer/Winter (2008-2010)	2	902*	Oceanside Harbor	33.21253	-117.39426	Source of flow identified. Results, photos, and details sent to Camp Pendleton for abatement.
Coast 44	Winter (2008-2010)	2	902*	Oceanside Harbor	33.20642	-117.38961	Source of flow identified. Oceanside Harbor Maintenance and Code Enforcement have implemented structural and administrative BMPs for the commercial fisherman and seafood transport and distribution companies.
Coast 8	Summer/Winter (2007-2010)	3	902*	Oceanside Harbor	33.20564	-117.3932	Effectiveness Assessment of BMP implementation ongoing
CSD006	Winter (2008-2009)	1	906	Vallecitos	32.85562	-117.25819	Included in Bacteria TMDL; Not an ongoing receiving water and storm drain outfall discharge linkage. No further action necessary.
CSD009	Winter (2008-2009)	1	906	Roseland Dr	32.852138	-117.26111	Included in Bacteria TMDL; Not an ongoing receiving water and storm drain outfall discharge linkage. No further action necessary.
CSD010	Summer (2008-2009)	1	906	Coast Blvd	32.850346	-117.27297	Included in Bacteria TMDL; Not an ongoing receiving water and storm drain outfall discharge linkage. No further action necessary.
CSD035	Winter (2007-2008)	1	906	Cortez Place	32.818586	-117.27428	Included in Bacteria TMDL; Not an ongoing receiving water and storm drain outfall discharge linkage. No further action necessary.
CSD208	Summer/Winter (2007-2010)	3	906	Cudahy	32.78679	-117.20791	Included in Bacteria TMDL, Special Monitoring through City of San Diego
EH-205	Summer (2008-2009)	1	908	Bessemer St	32.71803	-117.23344	Not an ongoing receiving water and storm drain outfall discharge linkage. No further action necessary.

* Hydrologic Unit designated as 902* is representative of stations in Oceanside Harbor. The harbor is listed as a coastal water body in Table 2-3 of the Water Quality Control Plan for the San Diego Basin (9). A Hydrologic Unit Basin Number has not been assigned to the harbor. According to SanGIS data, the stations fall into the 902 Hydrologic Unit, Santa Margarita.

The sample results shown in Quadrant IV of Figure 4 through Figure 6 are presented in Table 5.

Table 5. Coastal Storm Drain Discharge and Receiving Water Linkage Analysis Individual Results

Station	Date	Analyte	Months	Coastal Outfall Concentration (MPN/100 ml)	Coastal Receiving Water Concentration (MPN/100 ml)
Coast 2	2/4/2009	Enterococcus	Feb	4,611	160
Coast 36	9/2/2008	Enterococcus	Sept	24,196	6,488
Coast 36	6/1/2009	Enterococcus	June	4,150	470
Coast 36	11/9/2009	Enterococcus	Nov	23,500	210
Coast 36	9/1/2010	Enterococcus	Sept	72,700	790
Coast 44	3/10/2008	Enterococcus	March	512	146
Coast 44	1/11/2010	Enterococcus	Jan	6,240	260
Coast 8	1/17/2008	Enterococcus	Jan	24,196	8,164
Coast 8	5/12/2008	Enterococcus	May	24,196	269
CSD006	12/1/2008	Enterococcus	Dec	620	600
CSD009	11/10/2008	Enterococcus	Nov	1,600	220
CSD010	8/4/2008	Enterococcus	Aug	94,000	420
CSD035	1/14/2008	Enterococcus	Jan	1,600	140
CSD208	8/11/2008	Enterococcus	Aug	1,500	240
CSD208	8/5/2009	Enterococcus	Aug	28,000	600
CSD208	10/14/2009	Enterococcus	Oct	48,000	580
CSD208	1/13/2010	Enterococcus	Jan	6,400	880
CSD208	2/1/2010	Enterococcus	February	720	200
CSD208	9/7/2010	Enterococcus	Sept	520	120
Enterococcus: 19 Receiving Water Samples Likely Linked to Storm Drain Discharge					
Coast 44	1/11/2010	Fecal Coliform	Jan	50,000	500
Coast 8	10/8/2007	Fecal Coliform	Oct	500,000	1,100
Coast 8	1/17/2008	Fecal Coliform	Jan	30,000	800
Coast 8	6/2/2008	Fecal Coliform	June	110,000	500
Coast 8	10/21/2009	Fecal Coliform	Oct	1,600,000	3,000
Coast 8	2/15/2010	Fecal Coliform	February	900,000	800
CSD208	8/5/2009	Fecal Coliform	Aug	49,000	900
EH-205	7/23/2009	Fecal Coliform	July	23,000	500
Fecal Coliform: 8 Receiving Water Samples Likely Linked to Storm Drain Discharge					
Coast 36	9/2/2008	Total Coliform	Sept	1,600,000	23,000
Coast 8	1/17/2008	Total Coliform	Jan	1,600,000	50,000
Coast 8	1/31/2008	Total Coliform	Jan	90,000	23,000

Table 5. Coastal Storm Drain Discharge and Receiving Water Linkage Analysis Individual Results

Station	Date	Analyte	Months	Coastal Outfall Concentration (MPN/100 ml)	Coastal Receiving Water Concentration (MPN/100 ml)
Coast 8	1/12/2009	Total Coliform	Jan	90,000	13,000
Coast 8	10/21/2009	Total Coliform	Oct	1,600,000	80,000
Total Coliform: 5 Receiving Water Samples Likely Linked to Storm Drain Discharge					
In Total: 1.9 Percent (32 of 1,647) Receiving Water Samples Likely Linked to Storm Drain Discharge					

Coastal Storm Drain Discharge Frequency

During the time period of 2007-2010, coastal storm drain outfall discharges that reach the receiving water have decreased. Figure 7 illustrates the reduction of coastal storm drain outfall discharges, from approximately 73 percent of coastal storm drains discharging in 2002-2003 down to 23 percent discharging in 2009-2010. The reduced incidence of discharging outfalls translates to a reduced risk of beneficial use impairment in the coastal receiving waters.

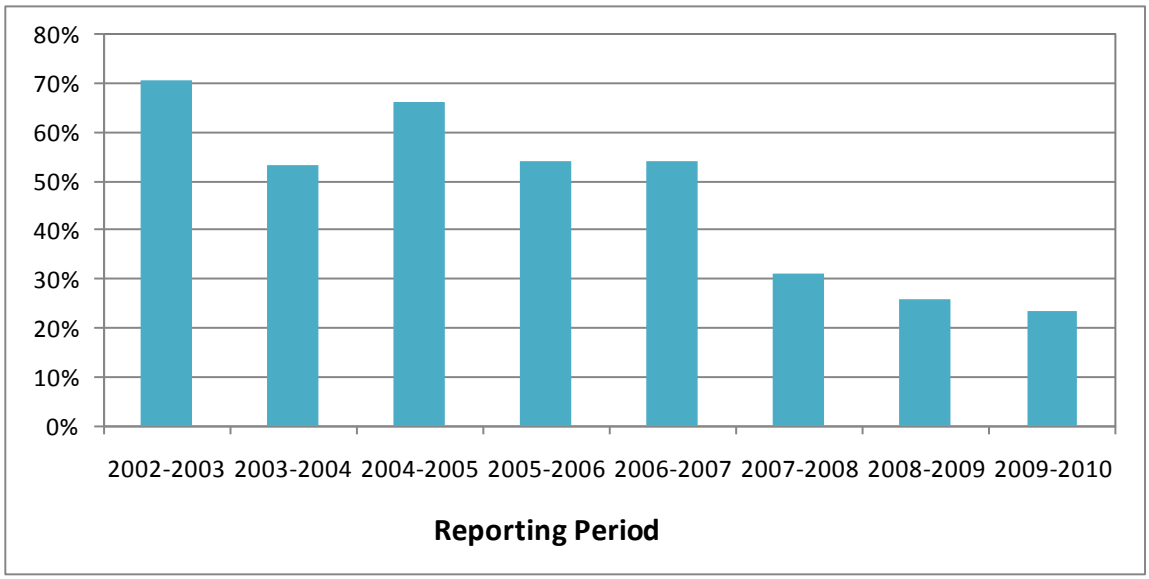


Figure 7. Proportion of Flowing Coastal Storm Drains, Reproduced from Figure 4-10 of Coastal Storm Drain Monitoring Program 2009-2010 Annual Report

ATTACHMENT 2-3

MS4 OUTFALL MONITORING PROGRAM REVIEW

ATTACHMENT 2-3: MS4 OUTFALL MONITORING PROGRAM REVIEW

The 2007 Permit required a municipal separate storm sewer system program (MS4 Program) to characterize constituent discharges from MS4 outfalls and to assess whether these discharges contribute to the water quality problems in the receiving waters. The MS4 Program addresses core management question #3 of the Permit (what is the relative urban runoff contribution to the receiving water problem(s)?). The MS4 Outfall Work Plan (Attachment to Copermittees Scope of Work for 2010-2011, 2010) consists of a random and targeted sampling design during dry weather and wet weather periods (Table 0-1).

Table 0-1: Summary of the MS4 Outfall Monitoring Design

Season	Design Type	Outfall Diameter	Number of Samples
Dry	Random	≥36 inches	54 per year
	Targeted	Any	200 per year
Wet	Random	≥36 inches	54 per year
	Targeted	Any	9 per Permit cycle

The following monitoring questions guide the different components of the MS4 Outfall monitoring program.

Random Program-

1. *What are the characteristics of discharges from MS4 outfalls in regard to high priority pollutants?*
2. *Are constituent loadings changing over time?*

Targeted Program-

3. *Which of the targeted MS4 outfalls have the greatest constituent loading?*
4. *Are the pollutants loading decreasing over time?*

A preliminary assessment of the MS4 Program was conducted to answer those questions that could be addressed with the data collected thus far which include questions 1 and 3. Table 0-2 shows the number of samples collected each year in each element of the five-year program. Except for the targeted wet weather element, which has only one year of data thus far, there were two years of monitoring data for evaluation.

Table 0-2: Summary of MS4 Program Monitoring Data Collection (2007-2010)

Program Year	Random Sites		Targeted Sites	
	Wet Weather	*Dry Weather*	*Wet Weather*	*Dry Weather**
2007-2008	0	0	0	9
2008-2009	39	40	0	178
2009-2010	50	35	3	172

*For targeted dry, number of sites differs by analyte and includes all sites sampled. An additional 28-29 sites visited were dry (~14%) and could not be sampled.

Key Findings

- On a regional basis, dry weather priority constituents from MS4 outfalls included: bacteria, nutrients, and TDS. Wet weather priority constituents included bacteria and TSS.
- In general, these regional MS4 outfall priorities match the priorities in receiving waters.
- MS4 targeted outfalls with the greatest pollutant loading differ somewhat by constituent and year. However, upon further data collection, priority MS4 outfalls will be identified.

Conclusions

The on-going MS4 Program will provide a sound basis for updating the design under the next Permit. In general, priority constituents in dry and wet weather conditions match the receiving water priorities. Preliminary results have indicated that high priority MS4 outfalls will be identified with a more robust data set at the completion of the current MS4 program in three years. When an adequate number of samples are collected, this program will allow for Copermittees to focus on key drainages to identify and abate sources, as warranted.

Supporting Documentation

The analysis of all data collected from the MS4 outfalls throughout the region was used to answer the following question:

> *Question 1: What are the characteristics of discharges from MS4 outfalls in regard to high priority pollutants?*

Storm drain discharge data were compared to receiving water benchmarks to determine if storm drain runoff has the potential to contribute to the receiving water problems.

Dry Weather – Of the ten constituents analyzed in the MS4 random program, dry weather priority constituents for MS4 outfall discharges included: total nitrogen, total phosphorus, TDS, fecal coliform and enterococcus for the region. Note that discharge results were compared to WQOs for receiving waters (RW) to determine priority rating, where greater than 50-percent detections were above WQO was considered high priority and greater than 25-percent frequency and less than or equal to 50-percent was considered medium priority (shown as percent above the receiving water –water quality objective (% above RW-WQB) in the following tables). The high priority and the medium priority constituents were evaluated using all of the data collected in the random and targeted monitoring elements of the MS4 Program. The results of the random program regionally represent the ten constituents sampled at randomly-selected outfalls in each watershed. The results of the targeted program support the regional results for these constituents, and also identify two additional constituents, chloride and sulfate (constituents of TDS), as priorities in some watersheds.

Table 0-3: Summarized Results of MS4 Random Outfalls Dry Weather Sampling

MS4 Random Dry		
Constituent	n	% Above RW-WQB
pH	75	3%
Nitrate as N	75	7%
Nitrate/Nitrite as N	75	7%
Nitrite as N	75	0%
Total Phosphorus	75	79%
Total Nitrogen	75	91%
Total Suspended Solids*	75	17%
Total Dissolved Solids	67	93%
Enterococcus	75	92%
Fecal Coliform	75	43%

Notes:
Discharge results compared to receiving water quality benchmarks.
*TSS-WQO is a narrative standard, the objective is a benchmark based on the overall median values and EMCs from the NSDQ, Version 1.0 (2004).
n= number of samples
High priority constituents shown in orange and medium priority constituents in yellow.

Table 0-4: Summarized Results of MS4 Targeted Outfalls Dry Weather Sampling

MS4 Targeted Dry		
Constituent	n	% Above RW-WQB
pH	95	5%
Nitrate as N	125	14%
Nitrate/Nitrite as N	56	7%
Nitrite as N	96	0%
Total Phosphorus	257	69%
Total Nitrogen	259	88%
Total Suspended Solids	228	4%
Total Dissolved Solids	260	90%
Enterococcus	355	80%
Fecal Coliform	352	42%
Chloride	41	68%
Sulfate	44	98%
Cadmium (Dissolved)	106	0%
Copper (Dissolved)	110	5%
Lead (Dissolved)	106	0%
Nickel (Dissolved)	6	0%
Zinc (Dissolved)	105	1%
Selenium, Total	33	15%
Ammonia as N	51	4%
Dissolved Oxygen	99	12%
Turbidity	52	12%
MBAS	32	22%
Chlorpyrifos	69	1%
Diazinon	73	0%
Malathion	45	0%
Oil & Grease	32	0%

Notes:
Discharge results compared to receiving water quality benchmarks.
Based on 202 different sites; 149 sites sampled in both 2008-2009 and 2009-2010.n= number of samples
High priority constituents shown in orange and medium priority constituents in yellow.

Preliminary dry weather priority ratings for monitored constituents by MLS drainage area are provided in Table 0-5 and Table 0-6 for the random and targeted MS4 outfall discharge results, respectively. These tables identify the number of MS4 samples within each MLS drainage area, and the priority identified based on these data. The ambient receiving water priorities based on the MLS monitoring results are also shown for comparison. In general, the priorities for the MS4 outfall discharges were largely consistent with the priorities identified in the corresponding receiving water.

Table 0-5: MS4 Random Dry Weather Results compared to Receiving Water Priorities by Watershed (MLS Drainage Area)

Constituent	AHC		CC-SD8(1)		EC		LPC		SDC		SDR		SLR		SMR		SR		TC		TJR	
	n	% Above RW-WQB	n	% Above RW-WQB	n	% Above RW-WQB	n	% Above RW-WQB	n	% Above RW-WQB	n	% Above RW-WQB	n	% Above RW-WQB	n	% Above RW-WQB	n	% Above RW-WQB	n	% Above RW-WQB	n	% Above RW-WQB
pH	2	0%	0	NA	1	0%	5	0%	2	0%	4	0%	8	0%	12	0%	4	0%	2	50%	2	50%
Nitrate as N	2	0%	0	NA	1	0%	5	0%	2	0%	4	0%	8	25%	12	25%	4	0%	2	0%	2	0%
Nitrate/Nitrite as N	2	0%	0	NA	1	0%	5	0%	2	0%	4	0%	8	25%	12	25%	4	0%	2	0%	2	0%
Nitrite as N	2	0%	0	NA	1	0%	5	0%	2	0%	4	0%	8	0%	12	0%	4	0%	2	0%	2	0%
Total Phosphorus	2	100%	0	NA	1	100%	5	60%	2	100%	4	75%	8	63%	12	75%	4	75%	2	100%	2	50%
Total Nitrogen	2	100%	0	NA	1	100%	5	60%	2	50%	4	100%	8	88%	12	92%	4	100%	2	100%	2	100%
Total Suspended Solids	2	0%	0	NA	1	0%	5	20%	2	0%	4	0%	8	25%	12	8%	4	0%	2	0%	2	50%
Total Dissolved Solids	2	100%	0	NA	1	100%	5	100%	2	100%	4	100%	8	100%	12	100%	4	100%	0	NA	2	0%
Enterococcus	2	50%	0	NA	1	100%	5	100%	2	100%	4	100%	8	88%	12	92%	4	100%	2	100%	2	100%
Fecal Coliform	2	0%	0	NA	1	0%	5	40%	2	0%	4	50%	8	50%	12	67%	4	50%	2	50%	2	0%
Ambient RW Priorities		Total Nitrogen (medium), TDS, Enterococcus, Fecal coliform, Toxicity (medium)		pH, Dissolved Phosphorus, Total Phosphorus, Total Nitrogen, Ammonia as N (medium), Bacteria (medium), Dissolved Cu, Total Selenium (medium); Toxicity (medium); and Turbidity, MBAS, COD, BOC, Oil and Grease (all medium)		Total Nitrogen, TDS, Enterococcus, Toxicity (medium)		Total Nitrogen (medium), Total Phosphorus, TDS, Enterococcus , Toxicity		Total Phosphorus (medium), Total Nitrogen, TDS, Enterococcus (medium) Fecal coliform (medium), BOD (medium), Toxicity (medium)		Dissolved Phosphorus, Total Phosphorus (medium),		Dissolved Phosphorus, Total Phosphorus, Total Nitrogen (medium), TDS, Enterococci (Med), Fecal Coliforms (Med)		Total Nitrogen, TDS, Chlorpyrifos		Total Phosphorus (medium), Total Nitrogen (medium) TDS, Enterococci (medium), Toxicity		Total Phosphorus (medium), Toxicity		Dissolved Phosphorus, Total Phosphorus, Total Nitrogen, Ammonia as N, Enterococcus, Fecal coliform, BOD, MBAS, Turbidity (medium), COD (medium), Toxicity

Discharge results compared to receiving water quality benchmarks. Ambient RW Priorities based NPDES Regional Program and does not include results from SMC or Third Party data.
NA – Either no data were collected upstream of the mass loading station, or stations were dry and no data collected

Table 0-6: MS4 Targeted Dry Weather Results compared to Receiving Water Priorities by Watershed (MLS Drainage Area)

Constituent	AHC		CC-SD8(1)		EC		LPC		SDC		SDR		SLR		SMR		SR		TC		TJR	
	n	% Above RW-WQB	n	% Above RW-WQB	n	% Above RW-WQB	n	% Above RW-WQB	n	% Above RW-WQB	n	% Above RW-WQB	n	% Above RW-WQB	n	% Above RW-WQB	n	% Above RW-WQB	n	% Above RW-WQB	n	% Above RW-WQB
pH	0	NA	1	0%	12	8%	1	0%	0	NA	25	4%	4	0%	0	NA	0	NA	0	NA	1	0%
Nitrate as N	5	60%	0	NA	16	13%	1	0%	0	NA	15	27%	25	20%	10	0%	5	0%	0	NA	0	NA
Nitrate/Nitrite as N	4	0%	0	NA	0	NA	8	25%	0	NA	20	5%	0	NA	0	NA	0	NA	0	NA	0	NA
Nitrite as N	5	0%	0	NA	6	0%	0	NA	0	NA	15	0%	25	0%	10	0%	5	0%	0	NA	0	NA
Total Phosphorus	9	67%	1	100%	18	50%	18	72%	0	NA	54	63%	28	71%	10	50%	5	60%	8	88%	7	100%
Total Nitrogen	9	78%	1	100%	18	78%	18	89%	0	NA	54	94%	28	96%	10	70%	5	100%	8	75%	7	86%
Total Suspended Solids	11	0%	8	0%	18	6%	18	0%	11	0%	54	6%	3	0%	9	0%	0	NA	8	0%	7	0%
Enterococcus	11	91%	8	88%	18	83%	19	89%	11	64%	54	74%	28	68%	10	60%	17	82%	8	100%	8	75%
Fecal Coliform	11	73%	8	0%	18	67%	19	63%	11	18%	54	35%	28	39%	10	20%	16	13%	8	50%	8	0%
Total Dissolved Solids	11	100%	0	NA	18	100%	19	100%	11	100%	54	81%	28	100%	10	80%	17	88%	0	NA	0	NA
Chloride	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	28	64%	1	0%	0	NA	0	NA	0	NA
Sulfate	11	100%	0	NA	17	100%	0	NA	0	NA	0	NA	0	NA	3	67%	0	NA	0	NA	0	NA
Cadmium (Dissolved)	0	NA	8	0%	10	0%	0	NA	0	NA	0	NA	0	NA	0	NA	16	0%	6	0%	7	0%
Copper (Dissolved)	0	NA	8	0%	10	0%	2	0%	0	NA	0	NA	0	NA	0	NA	16	0%	6	0%	7	0%
Lead (Dissolved)	0	NA	8	0%	10	0%	0	NA	0	NA	0	NA	0	NA	0	NA	16	0%	6	0%	7	0%
Nickel (Dissolved)	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	6	0%
Zinc (Dissolved)	0	NA	8	0%	10	0%	0	NA	0	NA	0	NA	0	NA	0	NA	16	0%	6	0%	7	0%
Selenium, Total	9	33%	0	NA	18	11%	0	NA	0	NA	0	NA	3	0%	0	NA	0	NA	0	NA	0	NA
Ammonia as N	0	NA	0	NA	10	10%	1	0%	0	NA	8	0%	1	0%	0	NA	0	NA	0	NA	0	NA
Dissolved Oxygen	0	NA	0	NA	10	0%	0	NA	0	NA	46	7%	4	0%	0	NA	0	NA	0	NA	7	86%
Turbidity	0	NA	0	NA	12	0%	1	0%	0	NA	0	NA	4	0%	0	NA	0	NA	0	NA	0	NA
MBAS	0	NA	0	NA	10	0%	1	0%	0	NA	1	0%	0	NA	0	NA	0	NA	0	NA	0	NA
Chlorpyrifos	5	20%	8	0%	10	0%	0	NA	0	NA	2	0%	0	NA	2	0%	0	NA	0	NA	7	0%
Diazinon	5	0%	8	0%	10	0%	0	NA	0	NA	2	0%	0	NA	2	0%	0	NA	0	NA	7	0%
Malathion	5	0%	8	0%	0	NA	0	NA	0	NA	2	0%	0	NA	2	0%	0	NA	0	NA	0	NA
Oil & Grease	0	NA	0	NA	10	0%	0	NA	0	NA	2	0%	3	0%	0	NA	0	NA	0	NA	0	NA
Ambient RW Priorities		Total Nitrogen (medium), TDS, Enterococcus, Fecal coliform, Toxicity (medium)		pH, Dissolved Phosphorus, Total Phosphorus, Total Nitrogen, Ammonia as N (medium), Bacteria (medium), Dissolved Cu, Total Selenium (medium); Toxicity (medium); and Turbidity, MBAS, COD, BOC, Oil and Grease (all medium)		Total Nitrogen, TDS, Enterococcus, Toxicity (medium)		Total Nitrogen (medium), Total Phosphorus, TDS, Enterococcus , Toxicity		Total Phosphorus (medium), Total Nitrogen, TDS, Enterococcus (medium) Fecal coliform (medium), BOD (medium), Toxicity (medium)		Dissolved Phosphorus, Total Phosphorus (medium),		Dissolved Phosphorus, Total Phosphorus, Total Nitrogen (medium), TDS, Enterococci (Med), Fecal Coliforms (Med)		Total Nitrogen, TDS, Chlorpyrifos		Total Phosphorus (medium), Total Nitrogen (medium) TDS, Enterococci (medium), Toxicity		Total Phosphorus (medium), Toxicity		Dissolved Phosphorus, Total Phosphorus, Total Nitrogen, Ammonia as N, Enterococcus, Fecal coliform, BOD, MBAS, Turbidity (medium), COD (medium), Toxicity

Discharge results compared to receiving water quality benchmarks. Ambient RW Priorities based NPDES Regional Program and does not include results from SMC or Third Party data.
NA – Either no data were collected upstream of the mass loading station, or stations were dry and no data collected

Overall, the five primary dry weather regional priority constituents in the MS4 outfall discharges are the same priorities identified in the receiving water as shown in Table 0-7. This table displays a check mark if the constituent was a priority in both the MS4 and receiving water.

Table 0-7: General Comparison of Dry Weather Regional MS4 Outfall Priority Constituents and Receiving Water Priorities by Watershed Management Area

Dry Weather Regional MS4 Priority Constituents	Receiving Waters by WMA*								
	SMR	SLR	CAR	SDC	LPC	MB	SDR	SDB	TJR
Total Nitrogen	✓	✓	✓	✓	✓	✓	✓	✓	✓
Total Phosphorus	*MS4*	✓	✓	✓	✓	✓	✓	✓	✓
TDS	✓	✓	✓	✓	✓	✓	✓	✓	✓
Enterococci	*MS4*	✓	✓	✓	✓	✓	✓	✓	✓
Fecal Coliform	*MS4*	✓	✓	✓	*MS4*	✓	*MS4*	✓	*RW*

✓=Both RW and MS4; MS4 indicates priority identified for MS4 only; RW indicates priority identified for RW only.

Wet Weather – Analysis of the constituents collected in the MS4 random wet weather program indicated priority constituents of fecal coliform and TSS (Table 0-8). The limited results of the targeted wet weather program (Table 0-9) supported the random regional results, with fecal coliform (high) and TSS (medium) identified as priority constituents. Turbidity was also a priority constituent in two of three sites.

Table 0-8: Summarized Results of MS4 Random Outfalls Wet Weather Sampling

MS4 Random Wet		
Constituent	n	% Above RW-WQB
pH	86	13%
Nitrate as N	73	4%
Nitrate/Nitrite as N	88	3%
Nitrite as N	73	0%
Total Phosphorus	89	0%
Total Dissolved Solids	76	21%
Total Suspended Solids	89	25%
Fecal Coliform	89	75%

No wet weather benchmark for Total Nitrogen or Enterococci
Based on n= 89 sites; analytes not collected at all sites.
Discharge results compared to receiving water quality benchmarks (RW-WQBs).

Table 0-9: Summarized Results of MS4 Targeted Outfalls Wet Weather Sampling

MS4 Targeted Wet		
Constituent	n	% Above RW-WQB
pH	3	0%
Nitrate as N	3	0%
Nitrite as N	3	0%
Total Phosphorus	3	0%
Dissolved Phosphate	3	0%
Total Suspended Solids	3	33%
Total Dissolved Solids	2	0%
Fecal Coliform	3	100%
Chloride	2	0%
Sulfate	2	0%
As (Dissolved)	3	0%
Cd (Dissolved)	3	0%
Cr (Dissolved)	3	0%
Cu (Dissolved)	3	33%
Ni (Dissolved)	3	0%
Pb (Dissolved)	3	0%
Sb (Dissolved)	3	0%
Zn (Dissolved)	3	0%
Selenium, Total	3	0%
Turbidity	3	67%
MBAS	3	33%
Ammonia as N	3	0%
Chemical Oxygen Demand	3	0%
Dissolved Oxygen	3	0%
Chlorpyrifos	3	0%
Diazinon	3	0%
Malathion	3	0%
Oil & Grease	3	0%

No wet weather benchmark for Total Nitrogen or Enterococci
Discharge results compared to wet weather receiving water quality benchmarks (RW-WQBs).

Overall, the two wet weather priority constituents in the MS4 outfall discharges match the priorities identified in the receiving water as shown in Table 0-10. Table 0-10

Table 0-10. General Comparison of Wet Weather Regional MS4 Outfall Priority Constituents and Receiving Water Priorities by Watershed Management Area

Wet Weather Regional MS4 Priority Constituents	Receiving Waters by WMA*								
	SMR	SLR	CAR	SDC	LPC	MB	SDR	SDB	TJR
Fecal Coliform	✓	✓	✓	✓	✓	✓	✓	✓	✓
TSS	✓	✓	RW	✓	RW	✓	RW	RW	✓

✓=Both RW and MS4; MS4 indicates priority identified for MS4 only; RW indicates priority identified for RW only.

Question 3: Which are the Targeted MS4 outfalls with the greatest constituent loading?

The instantaneous loads of the targeted MS4 outfalls from the dry program will be analyzed by constituent when additional data from the 200 monitored outfalls are collected. The MS4 outfall program is beginning year 3 of the 5-year program. Future analyses will consider not only load, but load/unit area to identify priority MS4 outfalls.

Additional questions answered in the MS4 Analysis:

1. *Is it likely that differences can be detected between seasons for analyte concentrations within watersheds, and among watersheds (both within and between seasons) at the end of the 2007 Permit MS4 monitoring program?*

To address this question, the average concentration, as well as the standard error, of an analyte measured in the MS4 program was calculated by season for each watershed management area. In Figure 0-1, these means with standard errors are plotted as side-by-side wet and dry result bars by watershed for the regional priority constituents. The graph demonstrates typically higher concentrations of bacteria and TSS in the wet weather samples. Conversely, total nitrogen and TDS concentrations tend to be higher in dry weather. Total phosphorus is less consistent, with some watersheds being higher in wet while others are higher in dry weather. Given the size of the error bars, however, these differences may not be significant. In general, these results indicate that detection of differences within and among watersheds (both within and between seasons), may be possible for some constituents (total phosphorus, enterococcus, some fecal, TDS, some TSS).

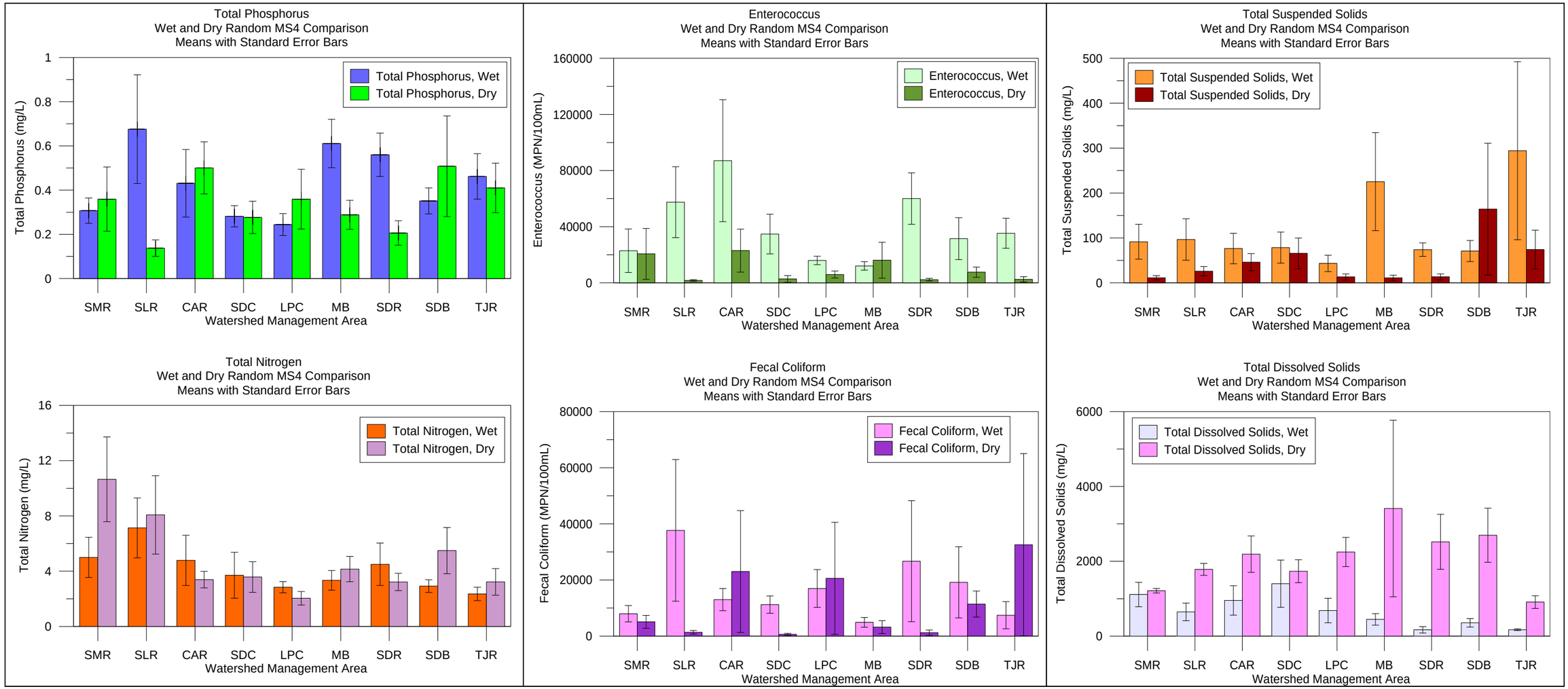


Figure 0-1. Mean Concentration with Standard Error by Analyte and Season for each WM