Los Peñasquitos Watershed Management Area Water Quality Improvement Plan and Comprehensive Load Reduction Plan

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DRAFT

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ACKNOWLEDGMENTS

The following members of the Water Quality Improvement Plan Consultation Committee have collaborated with the Responsible Agencies to make significant contributions to this plan.

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Executive Summary

The Executive Summary will be provided with the complete Draft Water Quality Improvement Plan in June 2015.

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Acronyms and Abbreviations

Acronym or Abbreviation	Definition
%	percent
303(d)	Clean Water Act Section 303(d) list of impaired waters
AGR	Agricultural Supply (beneficial use)
Ag Waiver	Conditional Waiver of Discharges from Agricultural and Nursery Operations
ASBS	Area of Special Biological Significance
Bacteria TMDL	San Diego Regional Water Quality Control Board Resolution Number R9-2010-0001, *Revised TMDL for Indicator Bacteria, Project I – Twenty Beaches and Creeks in the San Diego Region (Including Tecolote Creek)*
Basin Plan	*Water Quality Control Plan for the San Diego Basin* (Regional Board, 1994)
Bight ’13	Southern California Bight 2013 Regional Monitoring Survey
BIOL	Preservation of Biological Habitats of Special Significance (beneficial use)
BMI	benthic macroinvertebrates
BMP	best management practice
BOA	business owners association
BOD	biological oxygen demand
Caltrans	California Department of Transportation
CEDEN	California Environmental Data Exchange Network
City	City of San Diego
CLRP	Comprehensive Load Reduction Plan
Consultation Committee	Water Quality Improvement Plan Consultation Committee
Copermittee	Operator of a municipal separate storm sewer system in San Diego County that is party to the MS4 Permit.

Acronyms and Abbreviations (continued)

Acronym or Abbreviation	Definition
County	County of San Diego
CRAM	California Rapid Assessment Method
CWA	Clean Water Act
CWP	Clean Water Program
DEH	Department of Environmental Health
DPR	(California) Department of Pesticide Regulation
DSD	(City of San Diego) Development Services Department
EST	Estuarine Habitat (beneficial use)
FIB	fecal indicator bacteria
FY	Fiscal Year
GIS	geographical information system
HMP	Hydromodification Management Plan
HOA	home owners association
IBI	Index of Biological Integrity
IC/ID	illicit connection and/or illicit discharge
IDDE	illicit discharge detection and elimination
IGP	Industrial General Permit
JRMP	Jurisdictional Runoff Management Program (2013 MS4 Permit)
JURMP	Jurisdictional Urban Runoff Management Program (2007 MS4 Permit)
Lagoon	Los Peñasquitos Lagoon
LID	low-impact development
LPC-MLS	Los Peñasquitos Mass Loading Station

Acronyms and Abbreviations (continued)

Acronym or Abbreviation	Definition
LTEA	Long-Term Effectiveness Assessment
MEP	maximum extent practicable
MLS	mass loading station
MOU	Memorandum of Understanding
MS4	municipal separate storm sewer system
MS4 Permit	San Diego Regional Water Quality Control Board Order Number R9-2013-0001, *National Pollutant Discharge Elimination System (NPDES) Permit and Waste Discharge Requirements for Discharges from the Municipal Separate Storm Sewer System (MS4) Draining the Watersheds Within the San Diego Region*
MST	microbial source tracking
MWD	Metropolitan Water District of Southern California
NA	not applicable
NAL	non-storm water action level
NCC	North Coast Corridor
NCTD	North County Transit District
NIH	National Institutes of Health
NLCD	National Land Cover Database
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
O&G	oil and grease
OAL	(California) Office of Administrative Law
PDP	priority development project
PFC	permeable friction course
PGA	pollutant-generating activity

Acronyms and Abbreviations (continued)

Acronym or Abbreviation	Definition
Porter-Cologne	Porter-Cologne Act
POTW	publicly owned treatment works
PUD	Public Utilities Department
REC-1	Contact Water Recreation (beneficial use)
REC-2	Non-Contact Water Recreation (beneficial use)
Regional Board	San Diego Regional Water Quality Control Board
Responsible Agency	A party subject to the Bacteria TMDL and/or Sediment TMDL and participating in this Water Quality Improvement Plan (specifically, the Copermittees and Caltrans)
RWL	Receiving Water Limitation
SAL	storm water action level
SANDAG	San Diego Association of Governments
SCCWRP	Southern California Coastal Water Research Project
SDCWA	San Diego County Water Authority
Sediment TMDL	San Diego Regional Water Quality Control Board Resolution Number R9-2012-0033, *Total Maximum Daily Load for Sedimentation in Los Peñasquitos Lagoon*
SHELL	Shellfish Harvesting (beneficial use)
SMARTS	Storm Water Multiple Application and Report Tracking System
SMC	Southern California Stormwater Monitoring Coalition
SOP	standard operating procedure
SQO	Sediment Quality Objective
SSC	suspended sediment concentrations
SSID	stressor/source identification
State	State of California

Acronyms and Abbreviations (continued)

Acronym or Abbreviation	Definition
State Board	State Water Resources Control Board
SUSMP	Standard Urban Storm Water Mitigation Plan
SWAMP	Surface Water Ambient Monitoring Program
SWMP	Stormwater Management Plan
T&SW	(City of San Diego) Transportation and Storm Water Division
TBD	to be determined
TDS	total dissolved solids
TIE	toxicity identification evaluation
TMDL	total maximum daily load
TRE	toxicity reduction evaluation
TSS	total suspended solids
TWAS	temporary watershed assessment station
USEPA	United States Environmental Protection Agency
WARM	Warm Freshwater Habitat (beneficial use)
WLA	wasteload allocation
WMA	Watershed Management Area
WMAA	Watershed Management Area Analysis
WPP	Watershed Protection Program
WQBEL	water quality-based effluent limit
WQO	water quality objective
WRI	World Resources Institute
WURMP	Watershed Urban Runoff Management Program

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1 Introduction

Local government agencies work hard to protect water quality throughout the San Diego region. New regulations along with existing environmental protections create the need for new plans and programs that will address concerns about pollution in local rivers, streams, and other waterways leading to the ocean. Local agencies worked to develop Water Quality Improvement Plans that will help protect and improve the quality of waters in each community of San Diego. These plans address protections in what are known as Watershed Management Areas (WMAs). A Watershed Management Area includes the lands, stream systems, and other tributaries draining to a specific ocean or bay shoreline (or other receiving water). This document is the Water Quality Improvement Plan for the Los Peñasquitos WMA.

The Los Peñasquitos WMA is a highly urbanized 94-square-mile portion of central San Diego County. It includes three distinct hydrologic areas draining to the Los Peñasquitos Lagoon and ultimately the Pacific Ocean. Five local agencies share jurisdictional authority in this WMA and worked collaboratively to prepare this Water Quality Improvement Plan.

Water Quality Improvement Plans are required for each WMA under regulations adopted by the San Diego Regional Water Quality Control Board (Regional Board). The plans address only water flows and discharges from the storm drain systems maintained by the local agencies sharing authority in each area. Other discharges and sources of pollution are considered in the plan to the extent that they affect conditions in the storm drain system.

Following the passage of the Federal Clean Water Act (CWA) in 1972, surface water quality throughout the United States has improved substantially. However, poor water quality still impairs some beneficial uses of surface waters in

Section 1 Highlights

- This Water Quality Improvement Plan helps to protect and improve waters in the Los Peñasquitos Watershed Management Area.
- The plan specifically addresses conditions within storm water systems and receiving waters of this area.
- Los Peñasquitos WMA = 94 square miles
- Main Subwatersheds:
  - Carroll Canyon Creek
  - Los Peñasquitos Creek
  - Carmel Valley Creek
  - Los Peñasquitos Lagoon
- Responsible Agencies:
  - City of Del Mar
  - City of Poway
  - City of San Diego
  - County of San Diego
  - California Department of Transportation (Caltrans)
- Other Discharge Impacts:
  - Phase II Permittees – Marine Corps Air Station Miramar, University of California, San Diego, and North County Transit District
  - Construction General Permits
  - Industrial General Permits
  - Federal/State Lands
  - Agricultural Lands
- This document serves as the Comprehensive Load Reduction Plan for the Sediment Total Maximum Daily Load.

the Los Peñasquitos WMA. Beneficial uses are "the uses of water necessary for the survival or well-being of man, plants, and wildlife" (Regional Board, 1994).

1.1 Jurisdiction and Responsibilities

The Water Quality Improvement Plan outlines a framework to improve the surface water quality in the Los Peñasquitos WMA by identifying, prioritizing, and addressing impairments related to urban runoff discharges. On May 8, 2013, the San Diego Regional Water Quality Control Board adopted Order Number R9-2013-0001, *National Pollutant Discharge Elimination System (NPDES) Permit and Waste Discharge Requirements for Discharges from the Municipal Separate Storm Sewer System (MS4) Draining the Watersheds Within the San Diego Region* (MS4 Permit), establishing requirements for discharges from MS4s in the San Diego region.

The MS4 Permit affects local municipal agencies, including those with jurisdictional responsibilities in the Los Peñasquitos WMA. As defined in the MS4 Permit, a permittee to an NPDES permit is responsible only for permit conditions relating to the discharges for which it is an operator. In the case of the MS4 Permit, this responsibility includes discharges from Copermittees (jurisdictions party to the MS4 Permit) in the San Diego region. The San Diego County Copermittees are listed in Table 1a of the MS4 Permit and the Copermittees with jurisdictional area within the Los Peñasquitos WMA are as follows:

- City of Del Mar
- City of Poway
- City of San Diego
- County of San Diego

Each Copermittee must comply with the MS4 discharge prohibitions and receiving water limitations outlined in the MS4 Permit through timely implementation of control measures, other actions specified in the MS4 Permit, and adherence to this Water Quality Improvement Plan.

The Los Peñasquitos WMA also includes land area and MS4s that are owned and operated by parties other than the Copermittees or that are regulated by separate NPDES permits.

Discharges from non-municipal sources and activities (e.g., runoff from agriculture and industrial land uses, federal and state facilities, the California Department of Transportation [Caltrans], and Phase II storm water permittees) are regulated separately. For example, facilities designated as Phase II permittees (small MS4s) are regulated under the Phase II General Permit (State Water Resources Control Board [State Board] Order No. 2013-0001-DWQ). Phase II permittees in the Los Peñasquitos WMA include a transit authority, a university, and a military installation. In California, industrial and construction activities are regulated under the General Industrial Permit

(State Board Order No. 2014-0057-DWQ) (State Board, 2014) and General Construction Permit (State Board Order No. 2012-0006-DWQ) (State Board, 2012a). Finally, conditional waivers that remove the need to file a report of waste discharge and that avoid coverage under the NPDES permit program are given to activities such as agriculture and nursery operations, onsite disposal systems, silvicultural operations, and animal operations. Recently, draft general water discharge requirements for commercial agricultural and nursery operations were released for public review. The tentative draft order may be finalized during the development of this Water Quality Improvement Plan, affecting the ways in which sources from commercial agricultural and nursery operations are managed.

Under this regulatory framework, there are two general areas of storm water management responsibilities: (1) jurisdictional inspection and oversight (such as education, enforcement, and other Illicit Discharge Detection and Elimination (IDDE) activities), as described in the Jurisdictional Runoff Management Programs (JRMPs) in the MS4 Permit, and (2) control of pollutant discharges.

(1) The Los Peñasquitos WMA Copermittees require minimum Best Management Practices (BMPs) and have inspection responsibilities over all lands within their jurisdictional boundaries (including industrial lands and construction sites), except for NPDES Phase II, agricultural, state, federal, Caltrans, and Indian reservation lands. The United States Environmental Protection Agency (USEPA), State Board, and Regional Board are responsible for inspections of Phase II, agricultural, state, federal, and Indian reservation lands. Caltrans is subject to its own State of California (State)-issued MS4 Permit. In addition, the USEPA, State Board, and Regional Board have dual permitting and oversight responsibilities over industrial lands and construction sites.

    Copermittees do have limited regulatory oversight over industrial lands, construction sites, Phase II MS4s, and agricultural, state, federal, and Indian reservation lands. For example, the Copermittees implement IDDE activities to indentify, investigate, and enforce discharges to their MS4s. Discharges to receiving waters from non-municipal sources and activities (e.g., runoff from agriculture and industrial land uses, federal and state facilities, Caltrans, and Phase II storm water permittees) are not regulated or controlled by the Copermittees since they do not enter a MS4. Accordingly, the scope of the Water Quality Improvement Plan is limited to the regulatory oversight of the Copermittees specified above.

(2) In regard to controlling pollutant discharges, various NPDES permits or conditional waivers regulate storm water and non-storm water discharges within the Los Penasquitos WMA, as shown in Figure 1-1. The Copermittees are responsible for controlling pollutant discharges from lands within their jurisdictional boundaries, except for agriculture and industrial land uses, federal and state facilities, Caltrans, and Phase II storm water permittees. The Copermittees do not have regulatory authority under the MS4 Permit to require

entities regulated by other permits issued by the USEPA, State Board, or Regional Board to implement and/or construct BMPs to treat wet/dry weather pollutant discharges originating from their properties, facilities, and/or activities. However, the MS4 Permit requires the Copermittees to control pollutants originating from non-MS4 or non-municipal lands if those pollutants ultimately discharge into the MS4. Therefore, the Copermittees recognize the need to collaborate with and improve communication between non-municipal entities within the WMA and the appropriate regulatory agencies to ensure that discharges are appropriately regulated before entering the MS4, and to improve water quality throughout the Los Peñasquitos WMA.

To help identify non-municipal sources, the Copermittees are participating in special source identification studies to determine potential sources (including non-municipal sources) of pollutants entering the MS4; these studies are presented in Section 5. Additionally, the Copermittees are conducting additional watershed modeling to quantify the amount of pollutant loads coming from non-municipal sources and activities, and the results are presented in Section 4.

This document also serves as the *Comprehensive Load Reduction Plan (CLRP) for the Total Maximum Daily Load (TMDL) for Sedimentation in Los Peñasquitos Lagoon*, Resolution No. R9-2012-0033 (Sediment TMDL) (Regional Board, 2012), which is due to the Regional Board within 18 months of California Office of Administrative Law (OAL) approval of the Sediment TMDL. The goal of a CLRP is to describe in detail the programmatic and adaptive management approach developed by the Responsible Agencies to meet the requirements of the Sediment TMDL. A CLRP should outline the strategies planned to attain the necessary load reductions spelled out in the TMDL and this plan will meet these requirements, as described in Section 4 of the document.

Caltrans has partial responsibility for the implementation of the Sediment TMDL along with the CLRP for the TMDL for indicator bacteria, *Project I—Twenty Beaches and Creeks in the San Diego Region (Including Tecolote Creek),* Resolution No. R9-2010-0001 (Regional Board, 2010), referred to as the Bacteria TMDL. Note that while Caltrans has its own separate NPDES permit (Order No. 2012-0011-DWQ) (State Board, 2012b) and is not subject to the MS4 Permit, it is participating voluntarily along with the Copermittees in the development of the Water Quality Improvement Plan for the Los Peñasquitos WMA and other WMAs across the region.

This plan has been prepared, as required by the MS4 Permit, by the Responsible Agencies in the Los Peñasquitos WMA. The Responsible Agencies that are party to the development of this Water Quality Improvement Plan are:

- City of Del Mar
- City of Poway
- City of San Diego
- County of San Diego

- Caltrans

Collectively, the Copermittees and Caltrans are referred to as Responsible Agencies.

Currently, some of the Copermittees are pursuing a subvention of funds from the State to pay for certain activities required by the 2007 MS4 Permit, including activities that require Copermittees to perform activities outside their jurisdictional boundaries and on a regional or watershed basis. Nothing in this Water Quality Improvement Plan should be viewed as a waiver of those claims or as a waiver of the rights of Copermittees to pursue a subvention of funds from the State to pay for certain activities required by the 2013 MS4 Permit, including the preparation and implementation of the Water Quality Improvement Plan. In addition, several Copermittees have filed petitions with the State Board challenging the requirement to prepare Water Quality Improvement Plans that are not voluntary and that are not linked to a receiving water limitations language compliance path. Nothing in this Water Quality Improvement Plan should be viewed as a waiver of those claims. Because the State Board has not issued a stay of the 2013 MS4 Permit, Copermittees must comply with the MS4 Permit's requirements while the State Board process is pending.

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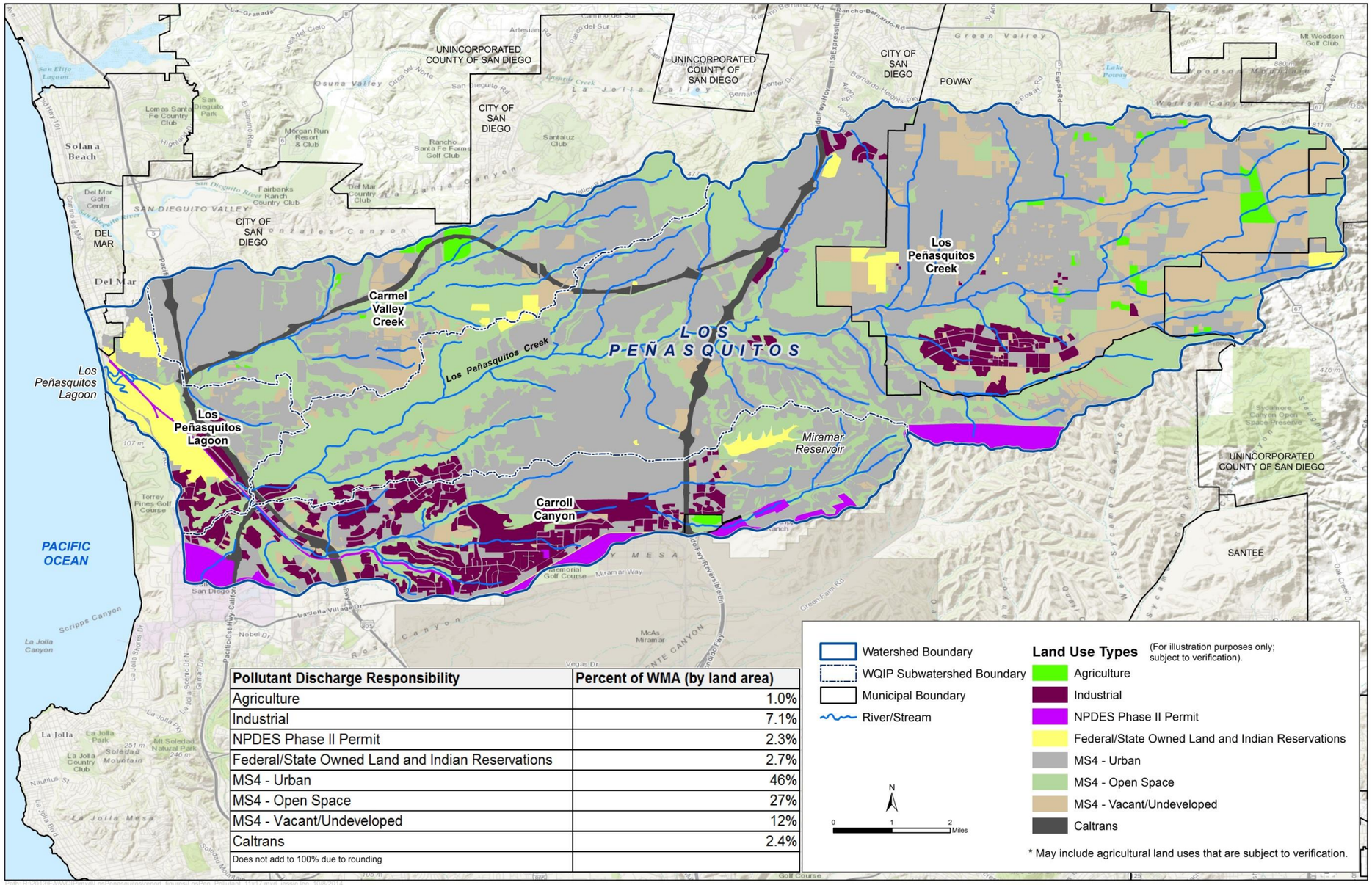

Pollutant Discharge Responsibility	Percent of WMA (by land area)
Agriculture	1.0%
Industrial	7.1%
NPDES Phase II Permit	2.3%
Federal/State Owned Land and Indian Reservations	2.7%
MS4 - Urban	46%
MS4 - Open Space	27%
MS4 - Vacant/Undeveloped	12%
Caltrans	2.4%
Does not add to 100% due to rounding	

Figure 1-1
Los Peñasquitos WMA
Pollutant Discharge Responsibilities

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1.2 Regulatory Background

In 1972, the CWA amended the Federal Water Pollution Control Act in 1972, providing the mechanism for regulating discharges to waters of the United States through the NPDES permit program. The CWA requires appropriate NPDES permits for specific types of discharges (e.g., municipal and industrial storm water) to surface waters of the United States. Individual states may administer the federal law through their own legislation, in addition to regulating other types of discharges, such as those to land and irrigated agriculture.

California passed the Porter-Cologne Water Quality Control Act (Porter-Cologne) to control water pollution in 1969 (prior to the CWA), and has since amended it to comply with and implement the CWA. Porter-Cologne gave the State Board and the nine Regional Water Quality Control Boards the authority to regulate discharges to waters of the state (which include all waters of the United States) and to issue NPDES permits.

The jurisdictions of the nine Regional Water Quality Control Boards correspond to nine large watershed areas across the state, which are referred to as basins. These basins are delineated using topographical maps surveyed by the United States Geological Survey and are further subdivided into (smaller) watersheds and subwatersheds. The water quality standards, including the beneficial uses and water quality objectives, for each basin are detailed in the Basin Plan for each region. For the San Diego region (Region 9), the Water Quality Control Plan for the San Diego Region (Basin Plan) was adopted in 1994 and has been amended several times since. The Los Peñasquitos WMA is one of ten watersheds (otherwise known as a WMA) within the San Diego Basin and is regulated by the Regional Board using its authority under Porter-Cologne in conjunction with the water quality standards described in the Basin Plan.

For approximately 20 years after the CWA's passage, NPDES permits were primarily issued to wastewater and industrial facilities (such as publicly owned treatment works [POTWs], paper mills, and power plants) that discharged waste to natural surface waterbodies as part of their operations. These regulations substantially improved surface water quality throughout the country. However, many waterbodies still suffered from suboptimal water quality and their benefits (termed "beneficial uses" in the CWA) were not always attained.

The pathways by which pollutants can enter waters of the state are not limited to wastewater discharging from a pipe. In the early 1990s, the Regional Water Quality Control Boards began to issue NPDES permits to municipalities and other agencies that discharge water via a storm drain system (identified as an MS4). The MS4s, which are systems of conveyances that may include the storm drains and flood control structures associated with land development, are primarily owned and operated by municipalities. MS4s are distinguished from combined sewers, which direct storm drain flows to a wastewater treatment plant. In contrast, MS4s convey water flowing from streets, buildings, and other land areas directly and indirectly into surface waters; they may convey both storm water and authorized non-storm water discharges.

The initial ("Phase I") MS4 Permits, typically issued for a five-year term, focused on actions to be taken by Copermittees. These actions included regulation of residential and commercial activities, new and existing development, other construction activities, facility inspections, water quality monitoring, and programs to detect and eliminate illegal discharges.

The Phase I MS4 Permits also established the following regulatory mechanisms:

- ***Receiving water limitations*** prohibit discharges from MS4s that cause or contribute to the violation of water quality standards or water quality objectives.
- ***Effluent limitations*** are based on either technology, to require pollutants to be reduced to the maximum extent practicable (MEP), or on water quality, to specify the maximum concentration of pollutants in storm water discharges from MS4s.
- ***Discharge prohibitions*** detail what may and may not be legally discharged to a state waterbody in a manner causing, or threatening to cause, a condition of pollution, contamination, or nuisance.

Monitoring programs required by these early permits were effective in characterizing the receiving waters in urban areas and the pollutants typically found in MS4 discharges. Furthermore, the permit programs developed and implemented numerous BMPs, ranging from street sweeping to public education and outreach to true source control (e.g., eliminating copper from automotive brake pads through state legislation). However, despite the implementation of program activities meeting the MEP standard, impairments of beneficial uses remain. Because the impairments exist, the Regional Board is required to review existing policies and develop new policies, such as TMDLs. A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards, and an allocation of that load among the various sources of the pollutant.

The Regional Board worked closely with the Copermittees and interested parties during development of the most recent version of the MS4 Permit to institute a new scientifically based approach to water quality management. The new approach is based on water quality outcomes, rather than on fulfillment of prescriptive activities. While maintaining each jurisdiction's authority and accountability, monitoring is conducted to answer specific questions and provide the basis for implementation actions in the Los Peñasquitos WMA.

1.3 Water Quality Improvement Plan Process

During development of the Water Quality Improvement Plan, the Responsible Agencies solicited data, information, and recommendations through a public participation process, as mandated by Provision F.1.a of the MS4 Permit. The public participation process included public workshops (described in Sections 2 and 3 of this document) and the creation of a Water Quality Improvement Consultation Committee (Consultation Committee), which provided recommendations during the development of this Water Quality Improvement Plan.

The Consultation Committee included the following required representatives:

- A representative of the Regional Board
- A representative of the environmental community (i.e., a non-governmental organization) associated with a waterbody within the WMA
- A representative of the development community familiar with the opportunities and constraints of implementing structural BMPs, retrofitting projects, and stream, channel, or habitat rehabilitation projects in the WMA

In addition to the three required Consultation Committee members, the Responsible Agencies chose six members at-large based on interest forms received after the first public workshop.

The Consultation Committee reviews drafts of key sections of this Water Quality Improvement Plan, and will meet periodically during the two-year development process to discuss the following topics:

- Priorities, potential strategies, and sources of pollutants and stressors (November 2013 [completed])
- Numeric goals, strategies, and schedules (July 2014 [completed] and October 2014 [completed])
- Final Water Quality Improvement Plan (June 2015, 30-day comment period)

1.4 Water Quality Improvement Plan Goal and Approach

The goal of the Water Quality Improvement Plan is to reduce pollutants and stressors from MS4 discharges to further the CWA's objective to protect, preserve, enhance, and restore the water quality and designated beneficial uses of waters of the state. As schedules allow, the Water Quality Improvement Plan is being developed in coordination with the Lagoon Enhancement Program currently being designed by the Los Peñasquitos Lagoon Foundation.

Since the inception of Phase I MS4 Permits more than 20 years ago, the Copermittees have directed substantial resources (through the Watershed Urban Runoff Management Program [WURMP], the Jurisdictional Urban Runoff Management Programs [JURMPs], and other various programs) to improve water quality in the WMA. This Water Quality Improvement Plan represents the next phase in watershed management and enhancement following many years of monitoring and program implementation. Additionally, this Water Quality Improvement Plan serves as the comprehensive planning document for the proposed management program that will be implemented within the Los Peñasquitos WMA. As the comprehensive planning document, this Water Quality Improvement Plan incorporates and replaces all previously submitted comprehensive planning documents for this WMA.

This Water Quality Improvement Plan is intended to be a living document and proposes an iterative and adaptive management process to meet the MS4 Permit goal. The overall process is shown in Figure 1-2 and described in this section.

Figure 1-2
Water Quality Condition Improvement Plan Process

The initial step in developing this plan was reviewing known receiving water impairments and the water quality data that had been collected during prior MS4 Permit cycles, along with other available data and public input. This process identified a set of receiving water conditions within the Los Peñasquitos WMA (Section 2.1).

For each identified receiving water condition, available data from upstream MS4 discharges were reviewed to determine whether there was evidence that the MS4 discharges may be a source of pollutants to the receiving water condition (Section 2.2). When evidence of a potential linkage was found, the receiving water condition became a "priority water quality condition" (Section 2.3). A subset of these priority water quality conditions was selected to represent the highest priority water quality conditions (Section 2.4). The CWA regulatory process and the NPDES monitoring programs performed to date have generally been successful in identifying the highest priorities in the Los Peñasquitos WMA. Selection of the highest priority water quality conditions is based on the methodology developed by the Responsible Agencies (Appendix A) and these conditions reflect some of the most challenging water quality issues to address in the WMA. The highest priority water quality conditions identified in this plan were subject to review and input from the Regional Board; environmental, business, and development organizations; and the public.

Current water quality issues identified by the Responsible include impaired waterbodies with designations that have been approved by the USEPA per CWA Section 303(d) (303(d) or 303(d) list or listing). Goals and schedules for addressing these issues have been developed and included in the Basin Plan as TMDLs for certain 303(d) listings.

With the highest priority water quality conditions established, the next step was to identify the potential sources of the pollutants and stressors contributing to the highest priority water quality conditions (Section 3). Concurrently, potential strategies to address the highest priority water quality conditions were identified. These potential strategies ranged from activities such as street sweeping, public outreach, and construction of water quality treatment structures to the development of standards and regulatory initiatives. The potential strategies were selected from existing plans, public feedback, and suggestions from the Consultation Committee.

Given the potential strategies and final Water Quality Improvement Plan goals, interim numeric goals have been developed using the latest research and currently available technology (Section 4). These interim goals provide a schedule for measuring progress toward final numeric goals. Final numeric goals are intended to protect and restore beneficial uses when achieved. According to the MS4 Permit (Provision B.3), "the water quality improvement goals and strategies must address the highest priority water quality conditions by effectively prohibiting non-storm water discharges to the MS4, reducing pollutants in storm water discharges from the MS4 to the MEP, and protecting the water quality standards of receiving waters." Numeric goals and schedules have been developed to track improvements related to the highest priority water quality conditions detailed in this plan, while prioritizing strategies that can address multiple pollutants at one time.

In coordination with the Regional Board and other interested parties, the Responsible Agencies have developed a list of recommended strategies with an implementation schedule and the estimated date for achievement of interim and final numeric goals. The list of recommended strategies has been developed by evaluating the potential strategies developed under the previous step for their estimated ability to ultimately achieve the numeric goals, while providing a multi-pollutant benefit. The Responsible Agencies have prioritized the list of recommended strategies by incorporating a comprehensive approach to all pollutants and conditions. The end goal is to optimize the improvement to water quality in relation to the overall cost of implementation and assessment. The Responsible Agencies are committed to contributing to improved water quality in the Los Peñasquitos WMA by reducing the discharge of pollutants from their MS4s through implementation of the recommended strategies identified in this Water Quality Improvement Plan.

To evaluate progress toward improving water quality and meeting scheduled goals, a question-based program to monitor and assess water quality improvement has been developed (Section 5). The program will be implemented on a watershed basis so that the Responsible Agencies can efficiently combine their resources.

This Water Quality Improvement Plan includes an iterative and adaptive management process for Responsible Agencies to re-evaluate conditions and improve strategies and assessments (Section 6). The process will draw from the data collected as part of the Monitoring and Assessment Program and the JRMP to create a water quality improvement program that is dynamic and proactive.

The Water Quality Improvement Plan is being developed in collaboration with the updates to the Los Peñasquitos Lagoon Enhancement Plan. The Los Peñasquitos Lagoon Enhancement Plan provides the Los Peñasquitos Lagoon historical background, baseline conditions, current activities, and accomplishments to date, and the development and assessment of conceptual restoration alternatives. The Los Peñasquitos Lagoon Enhancement Plan update is based on a stakeholder process that included eight workshops to update restoration goals and objectives, identify opportunities and constraints, and develop preliminary phased alternatives.

1.5 The Los Peñasquitos WMA

The Los Peñasquitos WMA drains an area of approximately 94 square miles in central San Diego County. The WMA includes portions of the cities of San Diego, Poway, and Del Mar; a small portion of San Diego County (in the eastern headwaters area); and several major transportation corridors maintained by Caltrans. Respective jurisdictional land areas are provided in Table 1-1.

Table 1-1
Jurisdictional Land Areas
for the Los Peñasquitos WMA

Responsible Agencies	Land Area (Acres)
City of Del Mar	151
City of Poway	15,441
City of San Diego	41,548
County of San Diego	1,834
Caltrans	1,445

To develop this Water Quality Improvement Plan, the Los Peñasquitos WMA was separated into four main subwatersheds to focus on receiving waters when selecting priority water quality conditions and implementing jurisdictional programs. These subwatersheds are used to aid organization and to help give geographical context to the conditions and strategies. However, the locations of the receiving waters were not a factor in the determination of the priority water quality conditions.

Three major streams drain the WMA and flow into the Los Peñasquitos Lagoon (Lagoon), which is a State Marsh Natural Preserve in the Torrey Pines State Reserve, before discharging to the Pacific Ocean. These subwatersheds, which are delineated by the major hydrologic boundaries in the WMA, encompass the drainage areas of the three main tributaries in the Los Peñasquitos WMA. These three subwatersheds are Carmel Valley Creek, Los Peñasquitos Creek, and Carroll Canyon Creek. The area around the Lagoon also encompasses many small drainage areas that drain directly to the Lagoon, comprising a fourth subwatershed referred to as Los Peñasquitos Lagoon subwatershed in this document.

In Carroll Canyon, Carroll Creek flows from its headwaters near Miramar Reservoir until it reaches Highway 805. After crossing under Highway 805, it is known as Soledad Canyon Creek or sometimes Sorrento Valley Creek. Soledad Canyon Creek continues under Interstate 5 and joins Los Peñasquitos Creek in Sorrento Valley before flowing into the Los Peñasquitos Lagoon. A figure providing an overview of the subwatersheds and the jurisdictions within the WMA is included in Appendix B.

Many of the natural vegetative communities in the watershed and the floodplain have been altered by development. Historically, the floodplain was a natural, braided system, dissipating storm water runoff and sediment (Prestegaard, 1979). As the floodplain and tributaries were developed and urbanized, storm water runoff and sediment now continue in more channelized paths toward the Lagoon. However, native chaparral scrub habitats remain in the headwaters and in the lower portion of the watershed near the Lagoon (Appendix B). The Lagoon is one of the last remaining native salt marsh lagoons in California and is home to several endangered species and 25 sensitive plant species.

Although more than 50 percent of the WMA has been developed, open space/recreation is the single largest land use type (approximately 33 percent). Table 1-2 shows the breakdown of land uses in the Los Peñasquitos WMA (San Diego Association of Governments [SANDAG], 2009). A figure illustrating land use is also included in Appendix B. Land use information was obtained from the Land Layer of the SANDAG geographical information system (GIS), which contains over 80 different land use classifications. These land use classifications were aggregated into nine general land use classifications.

Table 1-2
Los Peñasquitos WMA Land Uses

Aggregate Land Use	Area (Acres)	Percentage of Total (%)[1]
Open Space/Recreation	19,841	32.84
Residential	16,589	27.46
Vacant/Undeveloped	8,043	13.31
Freeway/Road/Transportation	7,510	12.43
Industrial	3,721	6.16
Office/Institutional	2,855	4.73
Commercial	1,109	1.84
Agriculture	583	0.97
Water	166	0.27

1. Does not add to 100.00% due to rounding.

The map illustrating the impervious areas of the Los Peñasquitos WMA is provided in Appendix B. Impervious cover in this map is any surface in the landscape that cannot effectively absorb or infiltrate rainfall. Impervious areas include driveways, roads, parking lots, rooftops, and sidewalks. The amount of impervious cover reflects the amount of urbanization in a watershed. Increased impervious cover adds to the rainfall runoff potential in the WMA, with implications for water quality and flood control. Soils

on this map are depicted as pervious; however, some local soil types may exhibit such low infiltration rates that they may be nearly impermeable.

1.6 Water Quality Improvement Plan Organization

The organization of the Water Quality Improvement Plan follows the requirements of the MS4 Permit. The Water Quality Improvement Plan sections and the corresponding MS4 Permit Provisions are organized as follows:

Section 1, Introduction—This section provides the purpose of the Water Quality Improvement Plan and summarizes the spatial context of the WMA.

Section 2, Priority Water Quality Conditions—This section describes the process for selecting the priority water quality conditions, including assessing receiving water conditions (Provision B.2.a), assessing impacts of the MS4 discharges (Provision B.2.b), and identifying the priority water quality conditions (Provision B.2.c(1)). This section also identifies the highest priority water quality conditions (Provision B.2.c(2)).

Section 3, MS4 Sources of Pollutants and/or Stressors—This section identifies known and suspected sources of pollutants or other stressors that cause or contribute to the highest priority water quality conditions, describes the prioritization process of the sources or stressors, and summarizes the priority sources or stressors by jurisdictions (Provision B.2.d).

Section 4, Water Quality Goals, Strategies, and Schedules—For the highest priority water quality conditions, this section details the WMA interim and final numeric goals and the schedule for measuring progress toward achieving these goals (Provision B.3.a(1)). These goals are used to develop the jurisdictional specific water quality improvement strategies (Provision B.3.b(1)) and the schedules for jurisdictional specific water quality improvement strategies (Provisions B.3.a(2) and B.3.b(3)). A watershed model will be created to help develop strategies. This section will also address how the Responsible Agencies will meet the load reductions required by the Sediment TMDL.

Section 5, Water Quality Improvement Monitoring and Assessment Program—This section summarizes the integrated Monitoring and Assessment Program (Provision B.4).

Section 6, Iterative Approach and Adaptive Management Process—This section describes the methodology to re-evaluate the priority water quality conditions (Provision B.5.a); adapt the goals, strategies, and schedules (Provision B.5.b); and adapt the monitoring and assessment program (Provision B.5.c). It also describes the processes to modify the Water Quality Improvement Plan (Provision B.6.b) and the JRMP (Provision F.2.a) following re-evaluation.

2 Priority Water Quality Conditions

Local agencies have long worked in partnership to protect and improve water quality throughout the Los Peñasquitos Watershed Management Area. Over the years, there have been substantial improvements to water quality in the streams and other tributaries leading to the Los Peñasquitos Lagoon. Even so, there are segments of waterbodies in the Los Peñasquitos Watershed Management Area that continue to suffer from impairments to water quality.

Working collaboratively with the Regional Board and the public, the agencies with jurisdictional responsibilities in the Los Peñasquitos WMA have identified a total of 29 priority water quality conditions associated with discharges from storm drain systems within this area. This identification effort is the first step required for the new Water Quality Improvement Plan process (illustrated in the graphic above). The plan developed for the Los Peñasquitos WMA employs a scientific process of pollutant source identification and management.

Section 2 Highlights

- Describes the process to determine priority water quality conditions and identify the highest priority water quality conditions
- Identifies the priority water quality conditions:
  - Carroll Canyon Creek – 8 priority water quality conditions (3 selected on the basis of monitoring data)
  - Los Peñasquitos Creek – 11 priority water quality conditions
  - Carmel Valley – 3 priority water quality conditions
  - Los Peñasquitos Lagoon – 7 priority water quality conditions (3 selected on the basis of monitoring data)
- Identifies the highest priority water quality conditions for all four subwatersheds:
  - Impairment of estuarine habitat and biological habitats of special significance in Los Peñasquitos Lagoon from:
    - Hydromodification and siltation/sedimentation during wet weather
    - Freshwater discharges during dry weather
  - Potential impairment of contact recreation along the Pacific Shoreline at Torrey Pines State Beach at Del Mar from indicator bacteria during wet and dry weather

Four highest priority water quality conditions were identified for the Los Peñasquitos WMA. Three of the four highest priority water quality conditions incorporate the impacts of sediment in wet weather and freshwater discharges during dry weather on the biological and estuarine environment in the Los Peñasquitos Lagoon. The potential impairment of contact recreation along the Pacific Shoreline at Torrey Pines State Beach at Del Mar from bacteria is the other highest priority water quality condition.

Discharges that are not conveyed by the MS4 are regulated separately. However, the Responsible Agencies are responsible for discharges originating from these non-MS4 lands outside of their regulatory control (industrial, agricultural, Phase II, state, federal, and Indian reservation lands) if those pollutants are ultimately discharged from the MS4 of a Responsible Agency. Non-MS4 discharges also affect water quality in the Los Peñasquitos WMA. Therefore, Responsible Agencies will seek opportunities to collaborate and improve their communication with non-municipal sources and the appropriate regulatory agencies to ensure that these discharges are regulated before they enter the Responsible Agencies' MS4s to improve water quality throughout the WMA.

A water quality condition is an impairment of a receiving water beneficial use. Priority water quality conditions are defined in this Water Quality Improvement Plan as receiving water conditions that have evidence of being caused or contributed to by MS4 discharges and may be "pollutants, stressors, and/or receiving water conditions that are the highest threat to receiving water quality or that most adversely affect the quality of receiving waters" (Provision B.2.c).

The priority water quality condition identification process began by assessing the receiving water conditions (Provision B.2.a) and then the impacts from MS4 sources (Provision B.2.b). Combining these assessments resulted in a list of priority water quality conditions. During these assessments, data gaps were discovered. A data gap is defined in this Water Quality Improvement Plan as an area where there is a lack of information needed to assess the receiving water conditions or impacts from MS4 sources. Data gaps are addressed by the Monitoring and Assessment Program and the Iterative and Adaptive Management Process. The highest priority water quality conditions were selected by the Responsible Agencies from the list of priority water quality conditions using the process detailed below and summarized in Appendix A.

Figure 2-1 summarizes the selection sequence to identify the priority and highest priority water quality conditions.

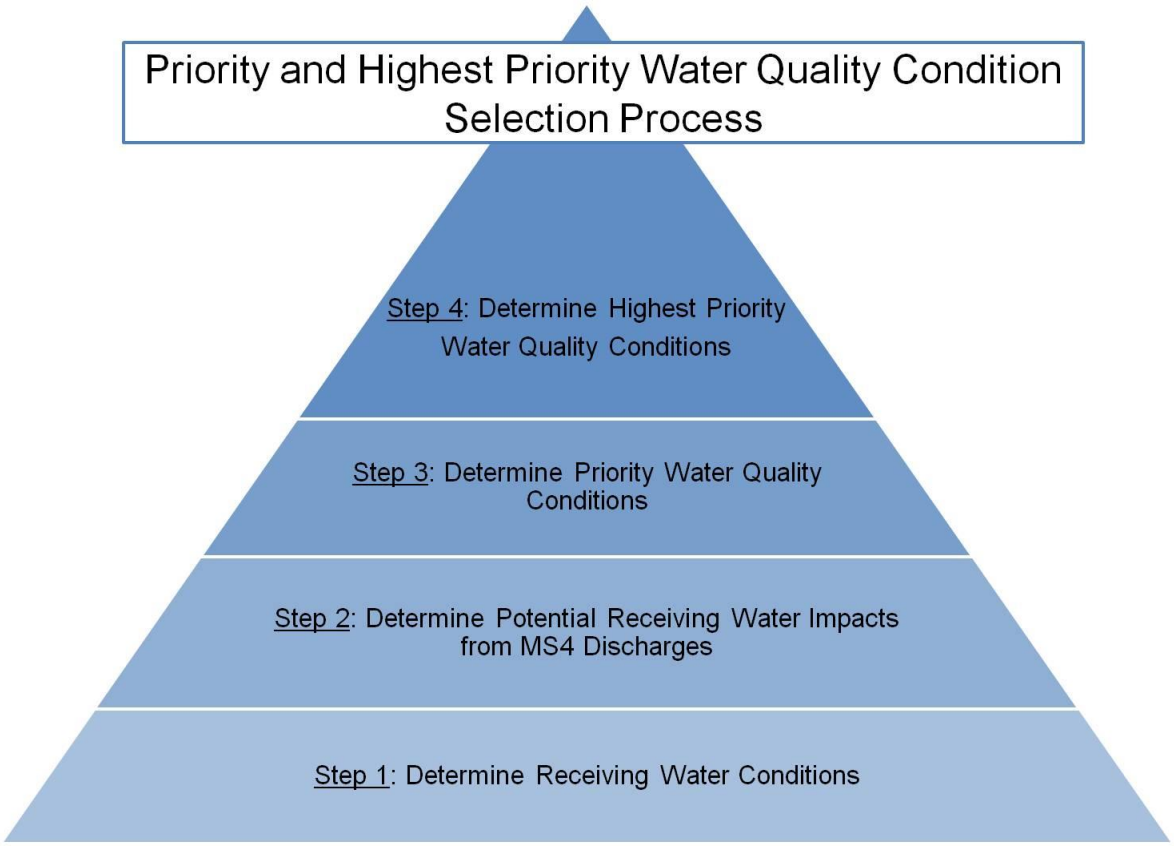

Figure 2-1
Los Peñasquitos WMA Priority and Highest Priority Water Quality Condition Selection Process

2.1 Step 1: Determine Receiving Water Conditions

As defined by the USEPA, a receiving water is any body of water (for example, a creek, river, lake, or estuary) into which surface water, treated waste, or untreated wastewater is discharged (USEPA, 2012a).

Identification of receiving water conditions is based on the following considerations, as listed in Provision B.2.a of the MS4 Permit:

(1) Receiving waters listed as impaired on the 2010 303(d) list of impaired waters

(2) TMDLs adopted or under development by the Regional Board

(3) Receiving waters recognized as sensitive or highly valued by the Copermittees, including estuaries designated under the National Estuary Program under CWA Section 320, wetlands defined by the state or U.S. Fish and Wildlife Service's National Wetlands Inventory as wetlands, waters having the Preservation of Biological Habitats of Special Significance beneficial use designation (BIOL), and receiving waters identified as Areas of Special Biological Significance (ASBS)

(4) The receiving water limitations of Provision A.2 of the MS4 Permit

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

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

(a) Chemical constituents

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

(c) Toxicity identification evaluations for both receiving water column and sediment

(d) Trash impacts

(e) Bioassessments

(f) Physical habitat

(7) Available evidence of erosional impacts on receiving waters that are due to accelerated flows (i.e., hydromodification)

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

(9) The potential improvements in the overall condition of the WMA that can be achieved

The following subsections detail how these considerations are incorporated into the assessment.

2.1.1 The 2010 303(d) List and Beneficial Uses (Consideration 1)

2010 303(d) Listings

The 303(d) list is named after the section number of the CWA that established the requirements to create a list of impaired waterbody segments. An impaired waterbody is a waterbody with "chronic or recurring monitored violations" of "applicable numeric and/or narrative water quality criteria" (USEPA, 2012a). Under the 303(d) list, states, territories, and authorized tribes are required to develop lists of impaired waters (303(d) list) and submit for USEPA approval every two years. The Regional Board is tasked with developing the 303(d) list in the San Diego region.

The latest 303(d) list was updated in 2010 and identifies these impaired waterbodies by specifying:

- The particular waterbody that is impaired (which, in the Los Peñasquitos WMA, can range in scale from an ephemeral stream to a portion of the Pacific Ocean Shoreline)
- If known, the pollutant causing the impairment (e.g., bacteria or sediment)
- The beneficial use(s) being impaired
- The potential pollutant source(s)

The Los Peñasquitos WMA has several 2010 303(d)-listed waterbodies, which are mapped in Figure 2-2. The names of the listed waterbodies are provided in Table 2-1.

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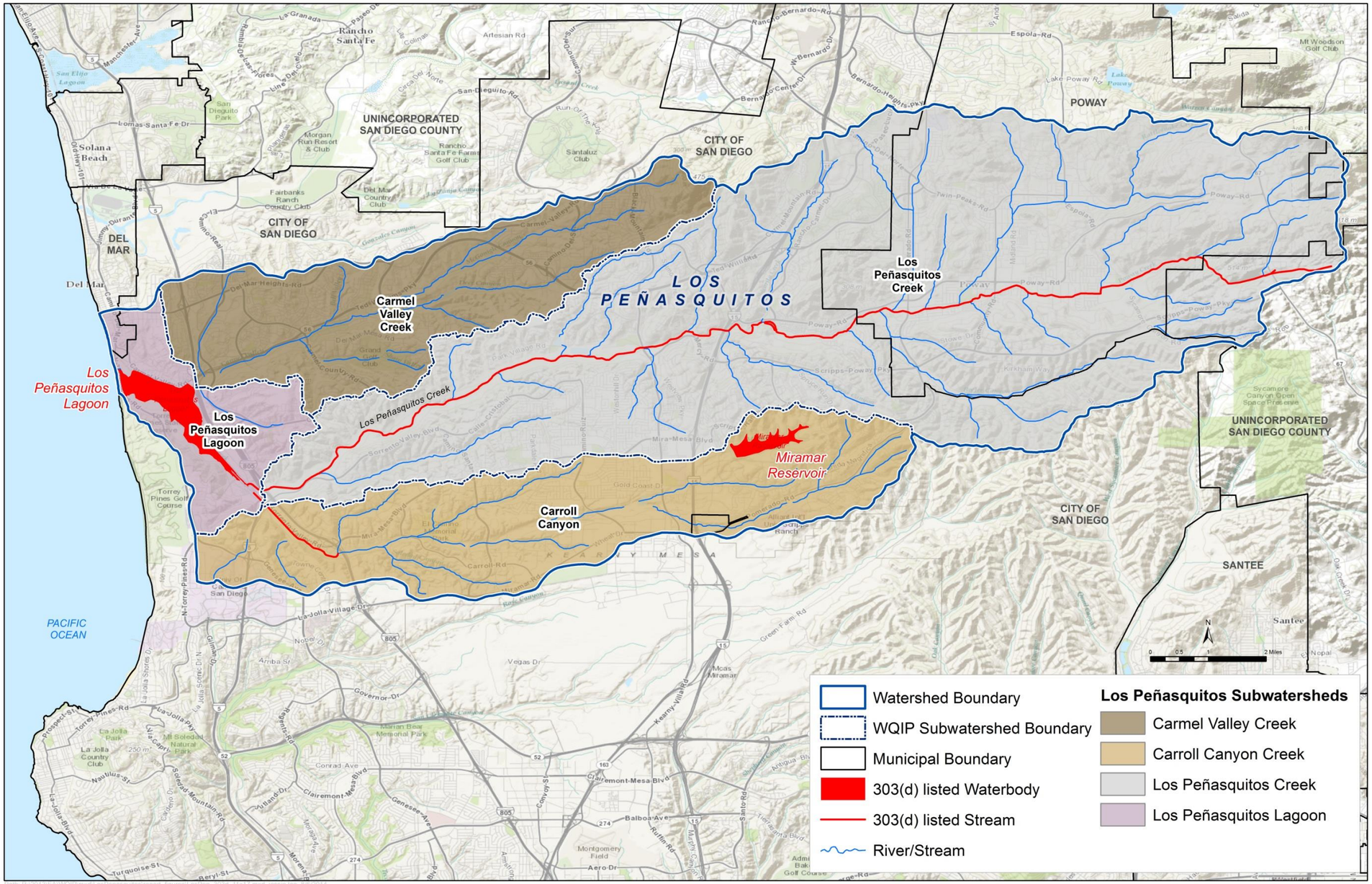

Figure 2-2
Los Peñasquitos WMA
2010 303(d)-Listed Waterbodies

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Beneficial Uses

The beneficial uses of a waterbody are designated in the Basin Plan and are defined as "the uses of a waterbody necessary for the survival or well-being of man, plants, and wildlife" (Regional Board, 1994). The development and the adoption of the Basin Plan are the responsibility of the Regional Board. The beneficial uses listed as impaired on the 303(d) list of impaired waterbodies within the Los Peñasquitos WMA are described in Appendix C. A total of 92 percent of the waterbodies in the Los Peñasquitos WMA are not impaired or have not been assessed by the Regional Board. Of those waterbodies that are listed in Appendix C as having impairments, most beneficial uses are attained. The Basin Plan provides additional details on the beneficial uses in the Los Peñasquitos WMA, is online at (http://www.waterboards.ca.gov/sandiego/water_issues/programs/ basin_plan/).

Beneficial uses may be impaired by various pollutants and stressors, which may be biological (e.g., indicator bacteria), physical (e.g., sedimentation), or chemical (e.g., metals) in nature. Pollutants, stressors, and conditions that may indicate impairment of beneficial uses in the Los Peñasquitos WMA include the following:

Bifenthrin is a pyrethroid pesticide that is highly toxic to aquatic organisms and is currently regulated as a restricted use pesticide (California Department of Pesticide Regulation [DPR], 1999; USEPA, 2006).

Chloride is a common mineral that is highly soluble in water. Chlorides may also come from seawater intrusion, agricultural processes, and industrial wastes. Elevated levels of chloride may harm plant life and corrode metals (Regional Board, 1994).

Freshwater discharges are releases of freshwater into the surrounding environment from sources such as irrigation runoff. Freshwater discharges may cause an impairment to saline habitats when levels are higher than natural conditions (Regional Board, 1994).

The **Index of Biological Integrity (IBI)** is a comprehensive method used to evaluate the health of the benthic macroinvertebrate community on a scale of 0 to 100, where 100 is very good condition and 0 is very poor condition. This information can be used to assess the health of the stream and is commonly used with bioassessment (State Board, 2013b). The IBI score is not a pollutant or stressor itself, but instead is a measure of the biological condition of a waterbody. It is used as a surrogate for anthropogenic impacts on receiving water health.

Indicator bacteria are surrogates used to measure the potential presence of harmful bacteria, fecal material, and associated fecal pathogens. The common indicator bacteria include total coliform, fecal coliform, *Escherichia (E.) coli*, and *Enterococcus*. Indicator bacteria may include non-fecal bacteria or be non-fecal in origin (Regional Board, 1994; Southern California Coastal Water Research Project (SCCWRP, 2012a).

Potential eutrophication (nitrogen and phosphorous) conditions exist when excessive amounts of nutrients (commonly nitrogen and phosphorus) are in an aquatic environment. Nutrients can accelerate the growth of algae and phytoplankton, which can reduce dissolved oxygen content and harm aquatic organisms (World Resources Institute [WRI], 2013). This condition can unbalance the aquatic system and so harm fish, wildlife, and human health.

Sedimentation is an excessive buildup of sediment in downstream waterbodies resulting from high-flow events. Increased sedimentation can affect tidal lagoons and salt marsh habitats (Regional Board, 1994).

Sediment toxicity is the measure of sediment quality to assess the adverse biological effects of pollutants. Many pollutants bind to sediment, which can produce toxicity in the surface and near-surface sediment (Regional Board, 1994).

Selenium occurs naturally in sulfide ores and volcanic deposits, and may be in receiving waters through interaction with groundwater. It can also be related to the irrigation of soil, discharge of coal-fired power plants, mining activities, and petroleum refineries (USEPA, 2014b). Acute and chronic exposure can lead to health effects such as damage to the circulatory and nervous systems (USEPA, 2012b). However, selenium is an essential micronutrient for human health and selenium deficiency may play a role in cancer, cardiovascular disease, cognitive decline, and thyroid disease (National Institutes of Health [NIH], 2013)

Sulfate is a common anion in water that can occur naturally from gypsiferous deposits and sulfide minerals associated with crystalline rock. High sulfate concentrations in drinking water can cause laxative effects (Regional Board, 1994).

Toxicity, as defined in the Basin Plan, is the adverse response of organisms to chemicals or physical agents. Toxic substances or concentrations thereof produce harmful physiological responses in humans, plants, animals, or other aquatic life (Regional Board, 1994). Toxicity is measured in terms of the lethality (acute) or reproductive impacts (chronic) of the waterbody to aquatic organisms.

Total dissolved solids (TDS) consist of carbonates, bicarbonates, chlorides, sulphates, phosphates, nitrates, magnesium, sodium, iron, manganese, and other substances. TDS can affect the water based in the cells of aquatic organisms. High TDS concentrations can change soil permeability, thereby affecting vegetation (Regional Board, 1994).

Total suspended solids (TSS) include particles in water that will not pass through a 2-micron filter. Increased TSS levels lead to increased turbidity, which can reduce light and photosynthesis and harm aquatic life (USEPA, 2012c).

Turbidity is a measure of the clarity of water, which is attributed to the amount of suspended particles. Increased turbidity can reduce light penetration, which can reduce photosynthesis and adversely affect aquatic life. High levels of turbidity may also affect drinking water (Regional Board, 1994).

2.1.2 Applicable TMDLs, Special Biological Habitats, and Receiving Water Limitations (Considerations 2, 3, and 4)

Los Peñasquitos WMA TMDLs

TMDLs identify the total pollutant loading that a receiving water can accept and still meet water quality standards. The Regional Board is required to develop TMDLs or follow an alternative regulatory process to address 303(d)-listed impairments. Two TMDLs have been adopted in the Los Peñasquitos WMA. Table 2-1 summarizes the impaired 2010 303(d)-listed waterbodies in the Los Peñasquitos WMA, the assessed length or area of the impairment in the waterbody, and the pollutants listed as causing the impairment. The locations of these waterbodies are mapped in Figure 2-2.

Table 2-1
2010 303(d)-Listed Waterbodies and Total Maximum Daily Loads (TMDLS) in the Los Peñasquitos WMA

Waterbody Name	Assessed Length or Area	Pollutant or Stressor	TMDL Approved by OAL
Miramar Reservoir	138 acres	Total nitrogen as N	To be developed
Soledad Canyon	1.8 miles	Sediment toxicity	To be developed
		Selenium	To be developed
Poway Creek	7.3 miles	Selenium and toxicity	To be developed
Los Peñasquitos Creek	12 miles	*Enterococcus*, fecal coliform, selenium, total dissolved solids (TDS), and total nitrogen as N	To be developed
		Toxicity	To be developed
Los Peñasquitos Lagoon	469 acres	Sedimentation and siltation	July 2014

Table 2-1 (continued)
2010 303(d)-Listed Waterbodies and Total Maximum Daily Loads (TMDLS) in the Los Peñasquitos WMA

Waterbody Name	Assessed Length or Area	Pollutant or Stressor	TMDL Approved by OAL
Pacific Ocean Shoreline at Torrey Pines State Beach, Del Mar	0.39 mile	*Enterococcus,* fecal coliform, and total coliform[1]	June 2011
Pacific Ocean Shoreline at Los Peñasquitos River Mouth	0.39 mile	Total coliform[2]	To be developed

1. Pollutants are not on the 303(d) list but are included in the Bacteria TMDL as potential stressors to Contact Water Recreation (REC-1) beneficial use.
2. Potential stressor for impairment of Shellfish Harvesting beneficial use (SHELL).

Note: See Figure 2-2 for a map of the 303(d)-listed waterbodies.

OAL = California Office of Administrative Law

The Pacific Ocean Shoreline at Torrey Pines State Beach at Del Mar was 303(d)-listed in 2002 for bacterial indicators as impaired for contact recreation. The 2010 303(d) listing was clarified by individually analyzing for the bacteria indicators (*Enterococcus*, fecal coliform, and total coliform) and narrowing down the listing area into a smaller segment near the sampling point of the data being assessed. In this individual data analysis, *Enterococcus* and fecal coliform were removed from the 303(d) listing, leaving only total coliform (as impairing shellfish beneficial use) on the 2010 303(d) list. The Bacteria TMDL included the Pacific Ocean Shoreline at Torrey Pines State Beach at Del Mar prior to its delisting (Regional Board, 2010). The Bacteria TMDL was considered a receiving water condition to develop goals and strategies to continue compliance with the Bacteria TMDL requirements and to meet water quality-based effluent limits (WQBELs), as required by the MS4 Permit. Therefore, *Enterococcus* and fecal coliform are still considered as potential stressors at the Pacific Ocean Shoreline per the TMDL, although they are no longer on the 2010 303(d) list.

The Sediment TMDL for the Lagoon (Regional Board, 2012) was adopted on June 13, 2012. This TMDL Basin Plan amendment was approved by the State Board on January 21, 2014, and by the California Office of Administrative Law (OAL) on July 14, 2014; it is now pending approval by the USEPA. The Sediment TMDL assigns a single wasteload allocation (WLA) to all subwatersheds draining into the Los Peñasquitos Lagoon. The WLA will address upstream sources of sediment, which are conveyed to the Lagoon via direct discharge from Carmel Valley Creek, Los Peñasquitos Creek, and Carroll Creek (Regional Board, 2012).

Special Biological Habitats

Biological habitats of special significance are areas designated with the BIOL beneficial use. In the Los Peñasquitos WMA, the following waterbodies and areas are of special significance and can be classified as (1) impaired for BIOL beneficial use; (2) impaired for other beneficial use(s); or (3) not impaired or assessed:

- Impairment of BIOL:
  - Los Peñasquitos Lagoon (2010 303(d) listed for sedimentation and siltation)
- Impairment of other beneficial use(s):
  - Pacific Ocean Shoreline at Los Peñasquitos River Mouth (2010 303(d) listed for impairment of Shellfish Harvesting (SHELL) due to total coliform)
  - Los Peñasquitos Creek (2010 303(d) listed for impairment of Warm Freshwater Habitat (WARM) because of *Enterococcus*, fecal coliform, and total nitrogen, and impairment of Agricultural Supply [AGR] due to TDS)
- Not impaired or assessed:
  - Del Mar Mesa/Lopez Ridge Ecological Reserve
  - Meadowbrook Ecological Reserve

Receiving Water Limitations

Under the receiving water limitations provision of the MS4 Permit (Provision A.2), discharges from MS4s must not cause or contribute to the violation of water quality standards in any receiving waters. Water quality standards are defined in various regulations, including the Basin Plan. Waterbodies that do not meet water quality standards are identified on the 2010 303(d) list (Table 2-1).

2.1.3 Data Sources Used To Assess Receiving Water Conditions (Considerations 5 and 6)

The Copermittees participated in the MS4 Permit Regional Monitoring Program under the two previous MS4 Permits. This monitoring program used a triad approach to evaluate receiving water chemistry, toxicity, and benthic community data. It was designed to meet the requirements of previous MS4 Permits. Monitoring plans were submitted to the Regional Board to document sampling and analytical methodology and data quality requirements consistent with USEPA regulations and guidance and regional standard operating procedures (SOPs) such as the Surface Water Ambient Monitoring Program (SWAMP) or the SCCWRP, when appropriate.

Since 2005, three primary documents containing biological, physical, and chemical receiving water monitoring data collected under the MS4 Permit monitoring program have been developed. High priority and medium priority pollutants and stressors were identified in these documents by following the WMA Assessment Methodology developed by the Copermittees in 2010. Waterbodies for which monitoring data indicate

a failure to meet standards or which are 303(d) listed have been identified as receiving water conditions. Data generated from these monitoring programs provided the basis for the assessments and conclusions of the Long-Term Effectiveness Assessment (LTEA) and the WURMP Annual Reports. These primary data sources as described below were used to identify or assess receiving water conditions for this Water Quality Improvement Plan.

Primary Source 1: Long-term Effectiveness Assessment

The comprehensive LTEA was developed by the San Diego Municipal Copermittees in 2011 as a precursor to the 2012 Report of Waste Discharge (San Diego County Municipal Copermittees, 2011a). It presents and summarizes data for each WMA between 2005 and 2010, and considers historical trends. In addition to NPDES and MS4 outfall monitoring program data collected by the Copermittees directly, the LTEA includes third-party data from agencies and non-governmental organizations. Examples of third parties are the Southern California Stormwater Monitoring Coalition (SMC) (additional data on dry weather receiving water quality) and Coastkeeper (water quality data and observational condition assessments).

Primary Sources 2 and 3: Fiscal Year 2011 and Fiscal Year 2012 Watershed Urban Runoff Management Program Annual Reports

The two most recent Annual Reports produced by the Los Peñasquitos Watershed Copermittees under the WURMP, for Fiscal Years (FY) 2011 and 2012 (FY11 and FY12), were consulted as primary data sources. These Annual Reports include monitoring and inspection data and the activities conducted under the WURMP. The reports assess pollutants for the annual receiving water and outfall data collected since the publication of the 2011 LTEA (Los Peñasquitos Watershed Copermittees, 2012a and 2013).

Secondary Data Sources

Numerous secondary data sources augment the LTEA and the WURMP Annual Reports and are listed in Appendix D. These data sources, along with the LTEA and WURMP Annual Reports, were categorized as observational, plan-based, and quality-assured, as follows:

- Observational data may include unplanned visual record(s) of a condition or source or evidence of a condition or source from a single sample or measurement.
- Plan-based data include a structured monitoring plan that bases sampling on standard clean practices, but these data may not have associated data quality and control requirements.
- Quality-assured data include quality assurance protocols and following described procedures to collect representative samples and to certify that quality control has been performed.

One such secondary source, the City of San Diego Strategic Plan for Watershed Activity Implementation (City of San Diego, 2007), identified priority water quality problems on the basis of an assessment of the 2005 Baseline LTEA, monitoring data from the City's annual storm water monitoring reports, and additional water quality data. The priorities identified from the Strategic Plan are:

- Bacteria
- Nutrients
- Sediment
- TDS
- Benthic alterations

Since the Strategic Plan was completed in 2007, the updated (2011) LTEA and the 2011 and 2012 WURMP Annual Reports are more recent assessments of the data available for the Los Peñasquitos WMA. The priorities identified by the Strategic Plan are similar to those of the two primary data sources.

The primary documents provide current and historical monitoring data for three receiving water monitoring stations per the requirements of the previous NPDES permit monitoring program, with the data reported and evaluated independently for wet weather and dry weather. During the previous two MS4 Permit cycles, the stations have been operated and maintained by the Copermittees as part of the monitoring programs. Monitoring included rapid stream bioassessments, toxicity analysis, flow monitoring, trash surveys, and analytical analysis of samples. One station, in the Los Peñasquitos Creek subwatershed, has been monitored periodically since 2001, providing one of the longer data sets in the watershed. The other two stations, in the Los Peñasquitos Creek and Carroll Canyon Creek subwatersheds, have been monitored biennially since 2008. Figure 2-3 shows the location of the NPDES monitoring stations in the Los Peñasquitos WMA. Table 2-2 provides additional details on the NPDES monitoring stations.

The Los Peñasquitos Lagoon Foundation has been conducting monitoring in the Los Peñasquitos Lagoon continuously since 1987, including bacteria sampling, analytical sampling, and vegetation monitoring. These data were also considered in development of the Water Quality Improvement Plan.

The LTEA and WURMP Annual Reports have no receiving water monitoring data from the Carmel Valley Creek subwatershed. The limited amount of receiving water quality data from the Carmel Valley Creek subwatershed is identified as a data gap in the development of this Water Quality Improvement Plan.

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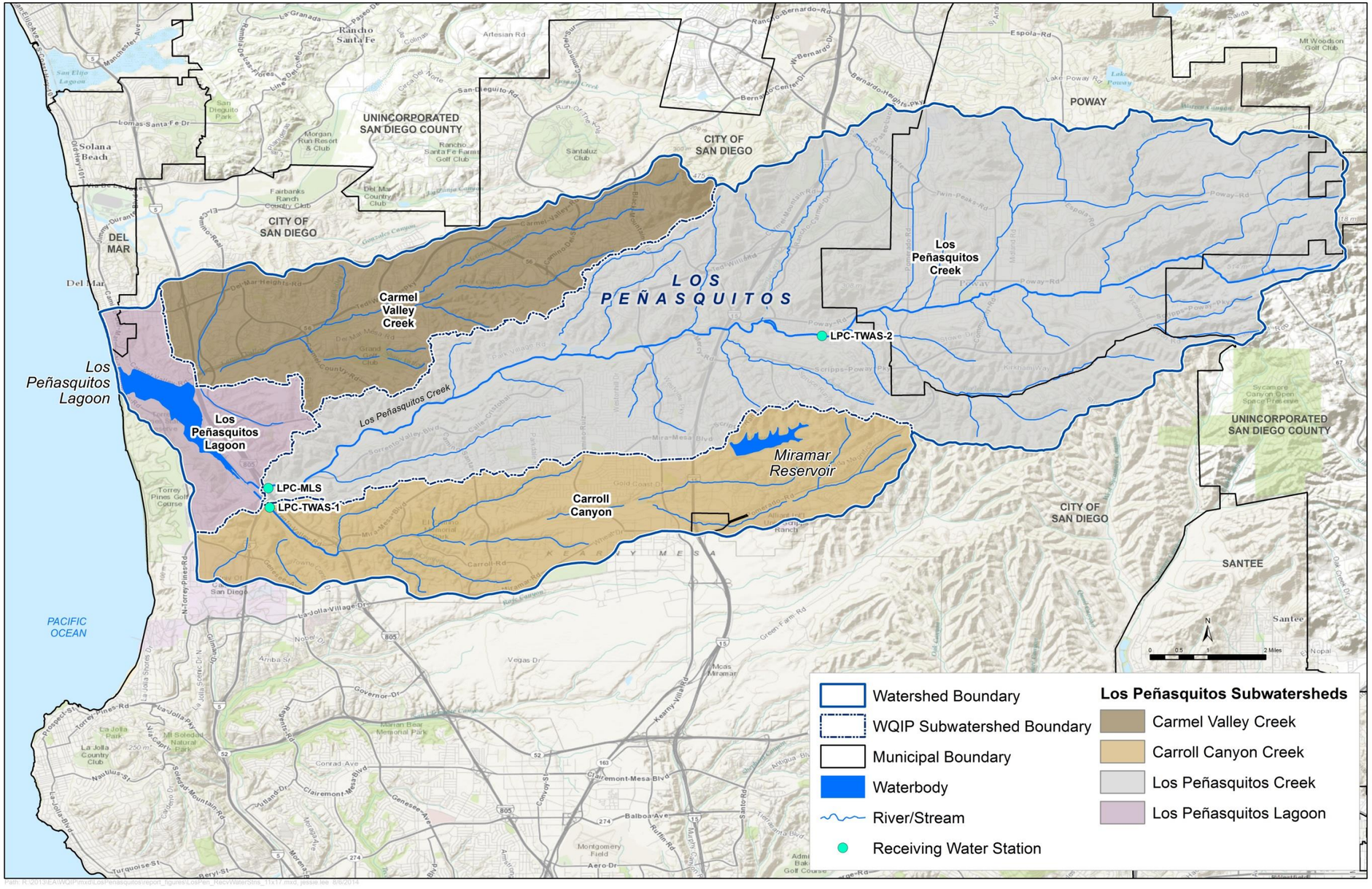

Figure 2-3
Los Peñasquitos WMA
NPDES Monitoring Stations

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Table 2-2
NPDES Monitoring Stations in the Los Peñasquitos WMA

Subwatershed	Station Name	Waterbody	Latitude	Longitude
Carroll Canyon Creek	LPC-TWAS1	Soledad Canyon Creek	32.89959	−117.22249
Los Peñasquitos Creek	LPC-TWAS2	Los Peñasquitos Creek	32.94262	−117.08404
Los Peñasquitos Creek	LPC-MLS	Los Peñasquitos Creek	32.90444	−117.22283

MLS = mass loading station; TWAS = temporary watershed assessment station

Data from these three NPDES monitoring stations were considered to represent the receiving water quality of the subwatershed in which they were collected. The data are considered quality-assured, given the MS4 Permit monitoring program requirements. Note that water quality monitoring data can be highly variable, and water quality at any specific point in a subwatershed may vary considerably from that of the samples collected at these stations. Medium or high priorities provided in two or more of the regional monitoring reports, including the LTEA, the MS4 Permit Regional Monitoring Program (which includes the SMC program), and recent WURMP Annual Reports, are presented in Table 2-3. This table accounts for historical and current water quality monitoring findings used to inform the determination of the receiving water conditions presented in Section 2.1.7.

Table 2-3
Medium and High Priority Pollutants For Receiving Waters

Subwatershed	Dry Weather Conditions	Wet Weather Conditions
Carmel Valley Creek	No receiving water data are available	No receiving water data are available
Carroll Canyon Creek	*Enterococcus*, poor Index of Biological Integrity (IBI), total dissolved solids (TDS), and toxicity	Bifenthrin, fecal coliform, very poor IBI, pH, TDS, total suspended solids (TSS), and turbidity
Los Peñasquitos Creek	Benthic algae, *Enterococcus*, poor IBI, total nitrogen, total and dissolved phosphorus, TDS, and toxicity	Bifenthrin, diazinon, fecal coliform, very poor IBI, TDS, TSS, toxicity, and turbidity
Los Peñasquitos Lagoon	Benthic algae, *Enterococcus*, poor IBI, total nitrogen, total and dissolved phosphorus, TDS, and toxicity	Bifenthrin, fecal coliform, very poor IBI, TDS, TSS, and turbidity

All conditions are identified in either the LTEA or recent WURMP Annual Reports.

2.1.4 Evidence of Erosional Impacts (Consideration 7)

Attachment A of the LTEA identified hydromodification and scouring of stream banks as well as TSS and turbidity transported via storm flows as potential causes of low to poor benthic community structure as measured by the IBI. This information is considered evidence of erosional impacts in the Los Peñasquitos WMA. The Regional Monitoring Program was not designed to identify specific areas of erosion or hydromodification; more information is needed to characterize the spatial extent of these impacts and their potential sources.

The Hydromodification Management Plan (HMP) outlines a monitoring program to assess the effectiveness of hydromodification management facilities (County of San Diego, 2011). Monitoring activities are ongoing and include inflow and outflow monitoring from BMPs, baseline cross-sectional monitoring, and flow-based sediment monitoring. Monitoring data generated by the HMP Monitoring Program will be considered in future iterations of the Water Quality Improvement Plan.

The Copermittees within the Los Peñasquitos WMA are participating in a regional effort to develop the Watershed Management Area Analysis (WMAA), as required by the MS4 Permit. The purpose of developing the WMAA at the regional level is to ensure consistency among the Copermittees and between WMAs The WMAA will develop WMA-specific requirements for structural BMPs and identify a list of candidate projects related to hydromodification, stream restoration, or structural BMPs. The WMAA is being conducted simultaneously with the development of the Water Quality Improvement Plan. The results of the WMAA have been incorporated into Section 4 of the Water Quality Improvement Plan and are submitted as part of this submittal.

2.1.5 Evidence of Adverse Impacts (Consideration 8)

The data sources used in Section 2.1.3 (Considerations 5 and 6) were supplemented with the information gathered during the public workshop and data call to evaluate overall evidence of adverse impacts on the receiving waters. Examples of potential receiving water conditions were presented to the public in a workshop on September 4, 2013, on the basis of evaluation of the key data sources. Public input was received during and after the workshop along with a call for data. The public was asked to respond with final data by September 13, 2013.

Data provided by the public consisted of observational data and email messages from members of the public, information from regional non-governmental organizations, and additional reports provided by the Responsible Agencies. The data provided information on the evidence of pollutants and stressors at several locations. Most of the data supported the initial list of receiving water conditions. These data sources are summarized in Appendix D. Unless specified, the receiving water conditions identified by the public generally apply to the Los Peñasquitos WMA as a whole.

A list of the receiving water concerns provided by the public is as follows:

- Erosion
- Velocity
- Sedimentation and siltation
- Freshwater discharges (dry weather flows)
- Nutrients
- Bacteria

2.1.6 Potential improvements in the Overall Condition of the WMA That Can Be Achieved (Consideration 9)

The potential improvements in the overall condition of the WMA are discussed in Section 2.3. For the purposes of this Water Quality Improvement Plan, the potential improvements in the receiving waters and overall WMA are directly related to the potential improvements in the quality of the MS4 discharges and therefore these considerations were combined in the evaluation of the priority conditions.

2.1.7 Receiving Water Conditions

An initial list of receiving water conditions was developed on the basis of the evaluation of the 2010 303(d) list, associated TMDLs, waterbodies with special biological significance, priority pollutants or stressors identified from current and historical receiving water monitoring data, and public input. The criteria and data used to evaluate the receiving water conditions are detailed in Appendix E.

A receiving water condition was defined using the following four factors:

(1) The beneficial use(s) that may be associated with the water quality impairment, as determined by the 303(d) listing

(2) The type of pollutant or stressor causing the impairment

(3) The spatial extent of the impairment, based on the 2010 303(d) listing or the area near the NPDES monitoring location

(4) The temporal extents of the impairment (i.e., wet or dry weather); receiving water conditions, which were based on the evaluation of the 2010 303(d) list, and were assigned both dry and wet weather temporal extents

In some instances, this was not the case and only one temporal extent (i.e., dry weather only) was defined on the basis of best professional judgment.

When additional data become available that may change the assessment of the receiving water conditions, they will be incorporated per the iterative and adaptive management processes described in Section 6. The list of receiving water conditions identified in the Los Peñasquitos WMA and the determining factors for each condition are summarized in Appendix F. The beneficial uses identified as impaired in Appendix F are defined in Appendix C.

2.2 Step 2: Determine Potential Receiving Water Impacts from MS4 Discharges

Receiving water conditions may be caused by a wide variety of pollutants and stressors, which may or may not result from human activity or urban development. The primary focus of the MS4 Permit is to regulate discharges from MS4 outfalls into receiving waterbodies. Priority water quality conditions in the WMA are defined as receiving water conditions that are impacted by MS4 discharges. Step 1 identified the receiving water conditions in the WMA. Step 2 was to assess whether MS4 discharges may cause or contribute to receiving water conditions.

Identification of the potential impacts on receiving waters from MS4 discharges was based on the following considerations, under MS4 Permit Provision B.2.b:

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

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

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

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

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

(6) Potential improvements in the quality of discharges from the MS4 that can be achieved

The following subsections detail how Considerations 1 through 6 are incorporated into the assessment.

2.2.1 Discharge Prohibitions (Consideration 1)

MS4 Permit Provisions A.1 and A.3 prohibit discharges from MS4s that cause or contribute to a receiving water condition, and effectively prohibit all discharges of non-storm water into an MS4. Storm water discharges from an MS4 must be free of pollutants to the MEP and all discharges must comply with applicable WQBELs defined in the MS4 Permit. As described below, potential impacts from MS4 discharges were

identified by assessing MS4 outfalls with data that exceeded water quality standards or that persistently discharged non-storm water related to receiving water conditions identified in the previous section.

2.2.2 Available MS4 Monitoring Data (Consideration 2)

The LTEA and the WURMP Annual Reports described in Section 2.1 were the primary sources of monitoring data from MS4 outfalls in the Los Peñasquitos WMA. The secondary sources listed in Appendix D.1 were also considered. The WURMP Annual Reports did not contain non-storm water MS4 outfall monitoring data, so the LTEA was the primary source of dry weather outfall data for assessing MS4 impacts.

The water quality results from one or more MS4 outfalls were compiled in the LTEA and WURMP Annual Reports and considered representative of the MS4 within the subwatershed area related to the receiving water stations. The MS4 outfall data were applied in a manner consistent with that of the LTEA and WURMP Annual Reports, where the data were used to characterize MS4 water quality in general areas of the WMA. The MS4 outfall data were considered representative of the MS4 to potentially cause or contribute to a receiving water condition on a subwatershed scale. However, data for direct MS4 discharges to a specific receiving water are not typically available.

Monitoring data were compiled from these documents and are summarized at the end of this section. The complete compilation is provided in Appendix D. In Section 2.3, these data are correlated with the receiving water conditions to determine priority water quality conditions.

Table 2-4 summarizes the constituents identified as a high or medium priority in the LTEA and recent WURMP Annual Reports.

Table 2-4
Medium and High Priority Pollutants for Receiving Waters

Subwatershed	Dry Weather Conditions	Wet Weather Conditions
Carmel Valley Creek	No MS4 monitoring data are available.	No MS4 monitoring data are available.
Carroll Canyon Creek	*Enterococcus*, fecal coliform, total nitrogen, total phosphorus, total dissolved solids (TDS), and dissolved copper	Fecal coliform
Los Peñasquitos Creek	*Enterococcus*, fecal coliform, total nitrogen, total phosphorus, and TDS	Fecal coliform and TDS
Los Peñasquitos Lagoon	*Enterococcus*, fecal coliform, total nitrogen, total phosphorus, TDS, and dissolved copper	Fecal coliform and TDS

All conditions are identified in both the LTEA and recent WURMP Annual Reports.

The regional MS4 outfall monitoring program, as currently designed, was not able to directly link the MS4 outfall data to the water quality of downstream receiving water because the data set available to correlate MS4 impacts to receiving water conditions was limited. This limited data availability is identified as a data gap. The MS4 outfall monitoring program was designed to monitor the high priority constituents of concern, on the basis of priorities when the program plan was developed. The constituents monitored under the MS4 outfall monitoring program include general physical and inorganic non-metals, organics, dissolved and total metals, and bacteriological parameters. As a result, some receiving water conditions lack supporting MS4 impact evidence because of the limited constituent list monitored under the MS4 outfall monitoring program. It is at the discretion of the Responsible Agencies to determine whether a receiving water condition merits additional monitoring to assess MS4 impact.

2.2.3 Location of MS4 Outfalls (Considerations 3, 4, and 5)

The Responsible Agencies maintain maps of the conveyance systems within their jurisdictions. The locations and density of the outfalls may be a general indicator of MS4 sources in the WMA. Based on available data, Figure 2-4 illustrates the MS4 within the Los Peñasquitos WMA and identifies major MS4 outfalls that discharge to receiving waters. The Responsible Agencies have updated their current inventories to only contain outfalls that meet the definition of a major MS4 outfall per the MS4 Permit.

The Responsible Agencies have reviewed their updated major MS4 outfall inventories to determine which of these outfalls have persistent discharges of non-storm water, on the basis of the requirements of the MS4 Permit. This review involved visiting major outfalls during dry weather and recording observations including whether there was flow or ponding at each site. When determining if a site had persistent flow, the Responsible Agencies referred to the most recent three monitoring visits in their flow databases. If a site had flow and/or ponding during the most recent three visits, it was determined to be persistent. If one of the visits had dry conditions, the site was considered transient. If all three visits were dry, it was considered a dry site. Dry weather field screening will continue during subsequent monitoring years according to the schedule provided in Section 5.1.3. The persistent flow outfall inventory will be updated accordingly.

> The MS4 Permit defines persistent flow as "…*the presence of flowing, pooled, or ponded water more than 72 hours after a measureable rainfall event of 0.10 inch or greater during three consecutive monitoring and/or inspection events. All other flowing, pooled, or ponded water is considered transient*."

The Responsible Agencies have provided a preliminary list of major MS4 outfalls that may have persistent flow based on their Fall 2014 inventory. These outfalls are summarized in Appendix D.3. There are 34 outfalls in the Los Peñasquitos WMA that may persistently discharge non-storm water:

- Caltrans: No outfalls with identified persistent non-storm water discharge at this time
- City of Del Mar: 1 outfall
- City of Poway: 5 outfalls
- County of San Diego: No outfalls with identified persistent non-storm water discharge at this time
- City of San Diego: 28 outfalls

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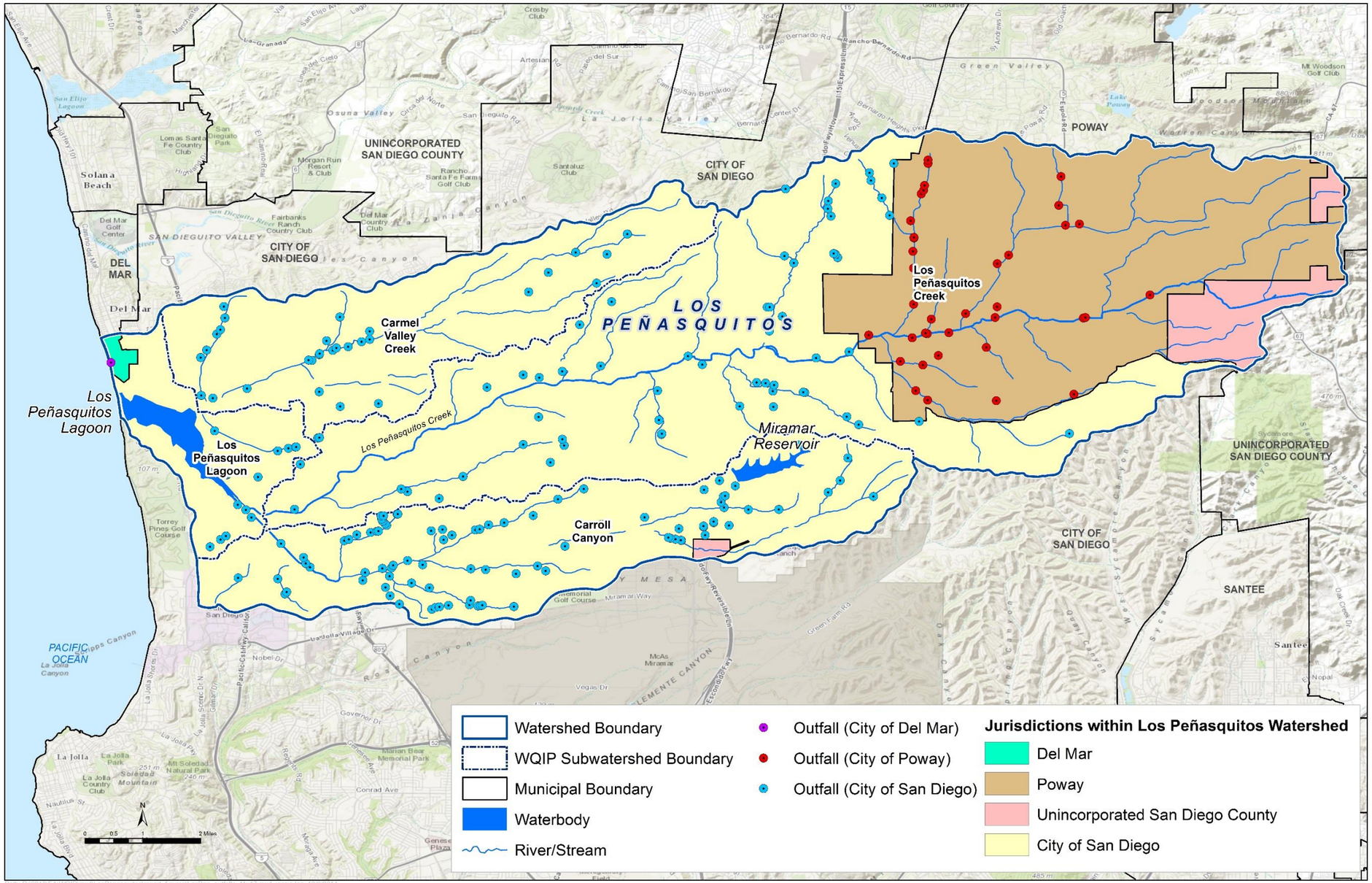

Figure 2-4
Los Peñasquitos WMA
Major MS4 Outfalls

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2.2.4 Potential Improvements in the MS4 Discharges That Can Be Achieved (Consideration 6)

Existing water quality regulations, such as TMDLs, have mandated water quality goals and schedules. The Responsible Agencies have diligently planned, developed, and implemented BMP programs throughout the WMA on the basis of the resources available to meet the requirements of these regulations. These programs highlight where potential improvements in the MS4 discharges are forthcoming and provide an opportunity to build on previous and planned efforts. The potential improvements in the quality of MS4 discharges are directly linked to the potential for improvements in the receiving waters for the purposes of the Water Quality Improvement Plan. Therefore, potential improvements are integral to the evaluation of potential conditions and are included in this report as Section 2.3.1.

2.2.5 Potential Receiving Water Impacts from MS4 Discharges

An initial list of potential impacts from MS4 discharges on receiving water conditions was developed from the evaluation of MS4 outfall monitoring data and the MS4 maps. Impacts from MS4 discharges were identified when one or both of the following criteria were met:

(1) MS4 outfalls exhibit current or historical monitoring results that exceed water quality standards related to the receiving water condition, based on the subwatershed analysis allowed by the data presented in the LTEA or WURMP Annual Report.

(2) The MS4 or urban runoff was named as a source or potential source in the 2010 303(d) list of impaired waterbodies or in a TMDL.

The final list of potential impacts from MS4 discharges in the Los Peñasquitos WMA is provided in Appendix F. The estimated temporal extent of the MS4 impact is based on the monitoring data or best professional judgment, because the 303(d) list does not provide temporal extent. When additional data that may change assessment of the potential impacts from MS4 discharges become available, the data will be incorporated per the iterative and adaptive management processes described in Section 6.

2.3 Step 3: Determine Priority Water Quality Conditions

The information gathered to identify receiving water conditions (Section 2.1, MS4 Permit Provision B.2.a) and impacts from MS4 discharges (Section 2.2, MS4 Permit Provision B.2.b) was assessed to “develop a list of priority water quality conditions as pollutants, stressors, or receiving water conditions that are the highest threat to receiving water quality or that most adversely affect the quality of receiving waters” (MS4 Permit Provision B.2.c (1)).

Priority water quality conditions are defined as receiving water conditions for which there is evidence that MS4 discharges may cause or contribute to the condition. They are selected on the basis of (1) analysis of the receiving water conditions, and (2) assessment of the MS4 discharges.

An initial list of priority water quality conditions was developed by comparing receiving water conditions with evidence of MS4 contributions. Characterizing the receiving water quality and identifying the potential impacts caused by MS4 discharges to receiving waters in the WMA was necessary to identify the impacts to receiving waters associated with MS4 discharges that were of the most concern to the Responsible Agencies. This initial list was created in compliance with Provisions B.2.c(1)(a)-(e). The initial list was then compared with the public input that was provided during the September 4, 2013, workshop and the public data call. The priorities identified in previous planning documents were also considered. Many of the same concerns were provided during the workshop and were evident in the third-party data. Finally, the overall potential for improvement of MS4 discharges and the overall WMA was considered. The list of priority water quality conditions was then finalized on the basis of these factors. The final list of priority water quality conditions is included in Appendix F.

2.3.1 Potential Improvements in MS4 Discharges and the Overall WMA

Regional Reference Studies led by Copermittees are underway to better understand the potential improvements in the Los Peñasquitos WMA on the basis of reference receiving water conditions in the San Diego region. Reference receiving water conditions are determined by assessing the water quality in areas with minimal human impact. These conditions will provide an important background to understand and characterize the health of receiving waters affected by human activities (SCCWRP, 2010). Copermittees have committed funds to study bacteria and other stressors throughout the San Diego region in the natural environment in wet and dry weather conditions to better inform solutions and regulations.

The physical features of the Los Peñasquitos Lagoon must be taken into account when considering potential improvements in the WMA. This includes the railway berm constructed in 1925 that runs through the middle of the lagoon. It is known to impact tidal circulation in the lagoon.

Given current regulations, the Bacteria TMDL, the Sediment TMDL, monitoring data, and public input, there are four primary concerns in the WMA receiving waters that are well documented: freshwater inputs, hydromodification, sediment, and bacteria. Since the Bacteria TMDL was adopted in 2011, the Responsible Agencies have been developing strategies and programs to address bacteria and to maintain Contact Water Recreation (REC-1) and Non-Contact Water Recreation (REC-2) beneficial uses throughout the Los Peñasquitos WMA. Since 2011, studies have been initiated by the City of San Diego to determine sediment loadings within in its jurisdiction in the WMA. The WMA strategies included in Section 4 target freshwater inputs, hydromodification, sediment, and bacteria stressors, and provide secondary benefits for water quality by

potentially reducing other pollutants and stressors. Most of the strategies that will be implemented through this Water Quality Improvement Plan are expected to address multiple receiving water conditions.

The Responsible Agencies are responsible for controlling their MS4 discharges and the impact of these discharges on the receiving waters. The potential improvement in MS4 discharge quality and how it will affect the health of the overall WMA is often unclear. In addition to the MS4 discharges, many factors, such as discharges outside the Responsible Agencies' jurisdictions, natural conditions, or climatic conditions such as drought, influence the receiving water quality. Therefore, it is important clearly understand the relationship between the MS4 discharges and receiving water conditions. The previous MS4 Permit monitoring program design began to link the MS4 outfall data to the quality of downstream receiving waters and generated a limited data set that can begin to correlate MS4 impacts on receiving water conditions. However, the contributions from MS4 discharges are not well known for certain priority conditions, and therefore the potential for improvement is unknown. These limitations were considered to be data gaps for these priority water quality conditions and are described in Section 2.3.3.

2.3.2 Priority Water Quality Conditions

The identified priority water quality conditions are summarized in Appendix F. The following information is included for each priority water quality condition, per the MS4 Permit:

(1) The beneficial use impairment(s) associated with the priority water quality condition

(2) The pollutant or stressor causing the beneficial use impairment, if known

(3) The temporal extent of the priority water quality condition (dry and/or wet weather)

(4) The geographical extent of the priority water quality condition within the WMA, if known

(5) Lines of evidence leading to identification as a priority water quality condition, including evidence of MS4 discharges that may cause or contribute to the condition

(6) An assessment of the adequacy of the monitoring data to characterize the factors causing or contributing to the priority water quality condition, including consideration of spatial and temporal variation

The impaired beneficial use, potential stressor, temporal extent of the priority water quality condition, lines of evidence clarifying the selection as a priority water quality condition (i.e., determining factors), and data gaps were determined during the assessment of the receiving water conditions and the MS4 impacts. Data gaps are discussed in more detail in Section 2.3.3. The geographical extent of the priority water quality conditions is based on the extent of the associated 303(d) listing or the location of the associated NPDES monitoring site. For each priority water quality condition, the Responsible Agencies were determined through an analysis of the geographical extent of the condition and jurisdictional boundaries.

2.3.3 Priority Water Quality Condition Data Gaps

From a review of the priority water quality conditions presented in Appendix F, some of monitoring data associated with a number of conditions are not adequate to represent the spatial and temporal variations of the conditions. Additionally, there may be other considerations that should be taken into account when analyzing the data gaps. The priority water quality conditions with data gaps and considerations, where applicable, are as follows:

- Impairment of WARM in the Los Peñasquitos Creek subwatershed:
  - The physical and biological impacts within receiving waters for the affected waterbodies have not been adequately characterized in relation to nutrient impacts.
  - MS4 data collected on the subwatershed level do not directly link outfall discharges with the impairment. MS4 outfall monitoring conducted under previous MS4 Permit monitoring programs varied the suite of potential pollutants or stressors analyzed or did not include the stressors monitored in the receiving waters, based on priorities at the time of program development.

  <u>Consideration</u>

  - There are potential non-MS4 sources that may contribute to the receiving water condition and these sources have not been evaluated, as follows:
    - For selenium, natural geology may be a contributing source in the San Diego region.
    - For toxicity in the receiving water, the source is unknown.
    - There is a potential contribution from agricultural activities to the MS4; Responsible Agencies may collaborate with the agricultural agencies to address water quality concerns in the WMA.
- Impairment of AGR in Los Peñasquitos Creek subwatershed:
  - MS4 data collected on the subwatershed level do not directly link outfall discharges with the impairment.

Considerations

- The agricultural agencies monitor their activities, facilities, and discharges in accordance with the current Agricultural Waiver, issued by the Regional Board.
- Groundwater may be a contributing source, as noted throughout the San Diego region (City of San Diego, 2011a).

- Impairment of REC-1 in Los Peñasquitos Creek subwatershed:
  - MS4 data collected on the subwatershed level do not directly link outfall discharges with the impairment.
- Impairment of WARM in Carroll Canyon Creek subwatershed:
  - The physical and biological impacts within receiving waters for the affected waterbodies have not been adequately characterized in relation to nutrient impacts.
  - MS4 data collected on the subwatershed level do not directly link outfall discharges with the impairment because MS4 outfall monitoring conducted under previous MS4 Permit monitoring programs varied the suite of potential pollutants or stressors analyzed or did not include stressors monitored in the receiving waters based on priorities at the time of program development; specifically, selenium was not consistently monitored as part of the MS4 monitoring program.

  Consideration

  - There are potential non-MS4 sources that may contribute to the receiving water condition, including the following:
    - For TDS and nutrients, groundwater may be a contributing source, as noted throughout the San Diego region (City of San Diego, 2011a).
    - There is a potential contribution from agricultural activities to the MS4, and Responsible Agencies may collaborate with the agricultural agencies to address water quality concerns in the WMA.
- Impairment of REC-1 in Carroll Canyon Creek subwatershed:
  - MS4 data collected on the subwatershed level do not directly link outfall discharges with the impairment.
- Impairment of Estuarine Habitat (EST), BIOL, and REC-1 in the Carmel Valley Creek subwatershed:
  - There are no receiving water monitoring data for this subwatershed, nor has any evidence of receiving water impairment been provided by the public.
  - MS4 data collected on the subwatershed level do not directly link outfall discharges with the impairment.

- Potential Impairment of WARM/BIOL in the Los Peñasquitos Lagoon:
  - The receiving water condition is not characterized well enough to validate the potential for impairment; this condition is based on monitoring data collected upstream of the Lagoon.
  - MS4 data collected on the subwatershed level do not directly link outfall discharges with the impairment because MS4 data were collected upstream of the Lagoon and do not represent direct discharges to the Lagoon.

  Consideration

  - The Sediment TMDL is designed to address the restoration of WARM and BIOL beneficial uses in the Lagoon.
- Potential Impairment of REC-1 in Los Peñasquitos Lagoon:
  - The receiving water condition is not characterized well enough to validate the potential for impairment; this condition is based on monitoring data collected upstream of the Lagoon.
  - MS4 data collected on the subwatershed level do not directly link outfall discharges with the impairment because MS4 data were collected upstream of the Lagoon and do not represent direct discharges to the Lagoon.

2.4 Step 4: Determine Highest Priority Water Quality Conditions

Once the list of priority water quality conditions was developed, "a subset of the water quality conditions (pursuant to Provision B.2.c(1))" was identified as the highest priority. The MS4 Permit provides the Copermittees with the discretion to justify the highest priority water quality conditions for program development and implementation on the basis of a number of factors, including the potential to improve watershed health, available resources, and best professional judgment. The methodology used to select the priority and highest priority water quality conditions is described in Appendix A. According to the methodology, the highest priority water quality conditions are priority water quality conditions that either (1) are associated with a TMDL, ASBS requirements, or other water quality regulations, or (2) have been elevated to highest priority on the basis of an evaluation of four additional selection criteria discussed later in this section. Each priority water quality condition identified in Appendix F was screened against these criteria and the results are summarized below.

Based on a review of TMDLs, ASBS requirements, and other water quality regulations, the two highest priority water quality conditions in the Los Peñasquitos WMA are the impairment (by several stressors) of EST and BIOL beneficial uses in the Los Peñasquitos Lagoon and the potential impairment (by indicator bacteria) of REC-1 beneficial uses along the Pacific Ocean Shoreline at Torrey Pines State Beach at Del Mar (Table 2-5). The highest priority water quality conditions are associated with the Sediment TMDL and Bacteria TMDL. Research has been conducted and plans drafted to reduce the contribution of MS4 discharges to these impairments. Of important note is that impairments related to the Sediment TMDL are largely tied historical inputs. The

bacteria impairment has the greatest potential for near-term improvement in water quality that can be achieved by controlling discharges from the MS4. Over the past five years, tremendous effort has been invested by the Responsible Agencies to develop and plan BMPs to control bacteria. With the development of this Water Quality Improvement Plan (which serves as a CLRP for the implementation of the Sediment TMDL), strategies and schedules will be developed to control discharges of freshwater and sediment from the MS4 to restore saltwater habitat in the Los Peñasquitos Lagoon. The selection of these highest priority water quality conditions will provide water quality benefits to the remaining priority water quality conditions. The strategies described in Section 4 will help address other priority water quality conditions, because many of the strategies needed to reduce freshwater discharge, hydromodification, sediment, and bacteria also target other pollutants.

Table 2-5
Highest Priority Water Quality Conditions in the Los Peñasquitos WMA

Highest Priority Condition	Potential Stressor	Temporal Extent		Subwatershed(s)
		Wet	Dry	
Impairment of EST and BIOL in Los Peñasquitos Lagoon	Hydromodification, Siltation/ Sedimentation	✓	—	Carroll Canyon Creek, Carmel Valley Creek, Los Peñasquitos Creek, Los Peñasquitos Lagoon
Impairment of EST and BIOL in Los Peñasquitos Lagoon	Freshwater Discharges	—	✓	
Potential impairment of REC-1 along the Pacific Ocean Shoreline at Torrey Pines State Beach at Del Mar[1]	Indicator Bacteria	✓	✓	

1. This condition applies to all four subwatersheds during wet weather because of the potential for flow to the shoreline from the upper watershed.

The highest priority water quality conditions apply to all four subwatersheds in the WMA during wet and dry weather because each subwatershed discharges to or encompasses the Los Peñasquitos Lagoon. Freshwater intrusion affects the Lagoon during dry weather and hydromodification and siltation/sedimentation impact the Lagoon in wet weather. Discharges of indicator bacteria may affect the Pacific Ocean Shoreline at Torrey Pines State Beach at Del Mar during both wet and dry weather. There is a data gap for the impairment of EST and BIOL beneficial uses in the Los Peñasquitos Lagoon and REC-1 along the Pacific Ocean Shoreline at Torrey Pines State Beach at Del Mar from the Carmel Valley Creek subwatershed. There are no monitoring data or public information provided regarding contributions to the receiving water impairments for this subwatershed.

Priority water quality conditions not associated with regulatory drivers were further considered for elevation to a highest priority on the basis of four additional factors:

(1) The supporting data set is sufficient to adequately characterize the degree to which the priority water quality condition changes seasonally, and over the geographic area, to support its consideration as a highest priority water quality condition.

(2) Storm water/non-storm water runoff is a predominant source for the priority water quality condition.

(3) The priority water quality condition is controllable by the Responsible Agencies.

(4) The priority water quality condition would not be addressed by strategies identified for other highest priority water quality conditions in this Water Quality Improvement Plan.

Each of these additional factors must be evaluated to determine whether the priority water quality condition should be elevated to a highest priority water quality condition. Appendix F summarizes the evaluation of the priority water quality conditions not associated with a regulatory driver. This analysis determined that most of the priority water quality conditions will be addressed by strategies applicable to the highest priority water quality conditions, which justifies not elevating these conditions to highest priority. Furthermore, for some priority water quality conditions, there is a lack of data to adequately characterize the condition and to definitively state that storm water/non-storm water runoff is the predominant cause of the condition. These data gaps are discussed in Section 2.3.3, and further justify not elevating these conditions to highest priority. When additional data become available to assess these priority water quality conditions, the data will be incorporated per the iterative and adaptive management processes that are described in Section 6, and the conditions may be re-evaluated for potential elevation to highest priority. This Water Quality Improvement Plan is designed to concentrate efforts on the highest priority water quality conditions and to simultaneously develop programs to address the other priority water quality conditions.

3 MS4 Sources of Pollutants and/or Stressors

The previous section of this Water Quality Improvement Plan described the process for selecting the highest priority water quality conditions in the Los Peñasquitos Watershed Management Area. Those highest priority water quality conditions include:

- The potential impairment of EST and BIOL beneficial uses in the Los Peñasquitos Lagoon because of:
  - Impacts of freshwater flowing during dry weather, including their influence on water chemistry within the Lagoon
  - Hydromodification and siltation/ sedimentation caused by uncontrolled wet weather flows
- The potential limitation of REC-1 along the Pacific Ocean Shoreline at Torrey Pines State Beach at Del Mar due to the presence of bacteria indicating impairments during dry and wet weather

As shown in the graphic below, the second step of the Water Quality Improvement Plan ("Sources") is to identify and prioritize sources of stressors in the Los Peñasquitos WMA (Provision B.2.d). Source identification and prioritization in this Water Quality Improvement Plan are based upon the source assessments previously conducted as a part of the 2011 LTEA and as refined by the 2012 WURMP Annual Report. Freshwater discharges and hydromodification were found to have six high priority sources. Bacteria has only two high priority sources and

Section 3 Highlights

- Identifies and prioritizes sources of freshwater discharges, hydromodification, siltation/sedimentation, and bacteria
- High Priority Sources:
  - Freshwater Discharge – Irrigation Runoff, Outfalls with Persistent Dry Weather Flows, Parks and Recreation (including Golf Courses and Cemeteries), Residential Areas, Roads, Streets, Highways, and Parking, Sanitary Sewer Overflows
  - Hydromodification – Outfalls Discharging to Canyons and Bluffs, Flood Control Basins, Channel Drop Structures, Impervious Surfaces, and Land Development
  - Sediment – Aggregates/Mining Agriculture, Animal Facilities, Auto Parking Lots and Storage, Building Materials Retail, Concrete Manufacturing, Construction, General Contractors, General Retail, Health Services, Mobile Landscaping, Municipal, Nurseries/Greenhouses, Recycling and Junk Yards, Residential Areas, Stone/Glass Manufacturing, and Storage/Warehousing
  - Bacteria – Residential Areas, Sanitary Sewer Overflows and Septic Systems

sediment has 17 high priority sources. The goal of the source analysis is to identify and prioritize sources on the basis of the MS4 Permit requirements. It is not required or intended to be an independent source characterization.

Figure 3-1 outlines the process for identifying sources of the highest priority water quality conditions (Step 1) and the method for prioritizing the sources (Step 2). Data gaps identified as part of the source identification are highlighted to guide future analysis. As more source information is gathered, the source identification process may be refined, as described in the iterative and adaptive management processes in Section 6, and priorities may vary by Responsible Agency.

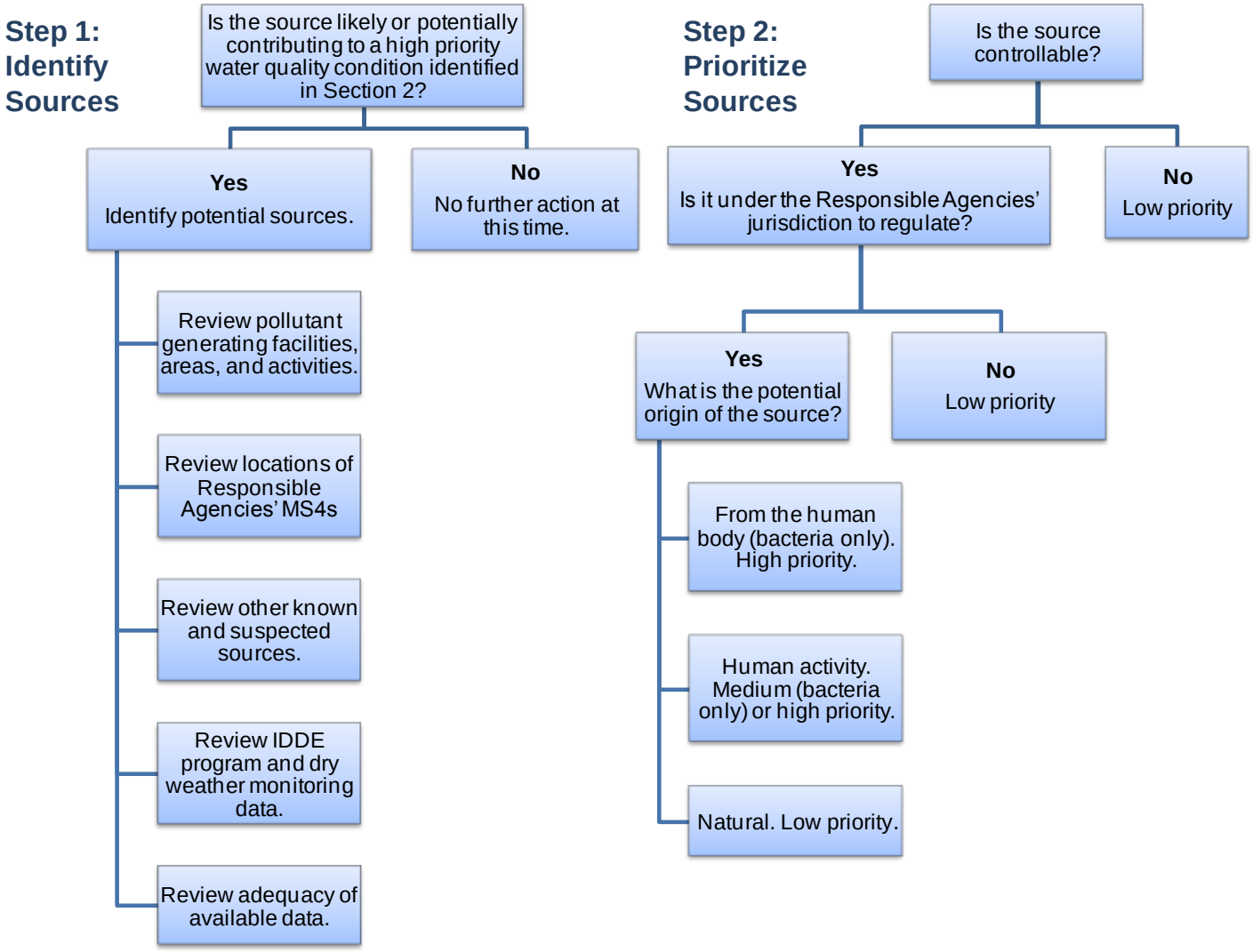

Figure 3-1
Highest Priority Water Quality Conditions Source Identification Process

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3.1 Step 1: Identification of Freshwater Discharge, Hydromodification, Sediment, and Bacteria Sources

Per the MS4 Permit, sources of freshwater discharge, hydromodification, sediment, and bacteria were identified on the basis of the following five considerations:

(1) Pollutant-generating facilities, areas, and activities within the WMA

(2) Locations of the Responsible Agencies' MS4s

(3) Other known or suspected sources of non-storm water or pollutants in storm water discharges to receiving waters

(4) Available data from the Responsible Agencies' monitoring and IDDE programs

(5) Adequacy of available data

Seven primary resources provided the information for these considerations:

(1) 2011 LTEA, as described in Section 2

(2) 2010–2011 WURMP Annual Report, as described in Section 2

(3) 2011–2012 WURMP Annual Report, as described in Section 2

(4) Maps of the MS4 system maintained by each Responsible Agency

(5) JURMP Annual Reports submitted by the Responsible Agencies, which contain agency-specific monitoring data and IDDE data, including identification of outfalls that persistently flow during dry weather; the most recent JURMP Annual Reports were utilized (City of Del Mar, 2010; City of Poway, 2012; City of San Diego, 2012a; County of San Diego, 2012)

(6) Bacterial Conceptual Models and Literature Review that were developed by the San Diego County Municipal Copermittees in 2012 and are appended to this Water Quality Improvement Plan as Appendix G of this Water Quality Improvement Plan

(7) Stakeholder input

Additional data sources were used to augment the primary sources and a complete list is provided in Appendix D. Examples of additional sources are the Sediment TMDL (Regional Board, 2012), the Bacteria TMDL (Regional Board, 2010), and the 2010 303(d) list.

3.1.1 Pollutant Generating Facilities, Areas, and Activities in the WMA

The LTEA evaluated the known pollutant-generating facilities, areas, and activities in the San Diego region, which are defined as follows:

- A **facility** is a type of existing development, such as a commercial or industrial business, a parking structure, a municipal airfield, or a landfill; an MS4 is considered to be a facility.
- An **area** is a communal area such as the trash dumpsters in a commercial strip mall, an open space, a wildlife preserve, or a residential neighborhood.
- **Activities** are practices such as irrigation, portable toilet cleaning, storage of pet wastes, and fertilizer use (Regional Board, 2013).

To identify sources, the LTEA evaluated the available wet and dry weather receiving water and outfall monitoring data and IDDE program results, as well as the adequacy of the data, pursuant to MS4 Permit Provision B.2.d.(4). The 2011 LTEA identified sources from the previous MS4 Permit (R9-2007-001) and updated the list on the basis of the 2009-2010 inventory. The sources were scored using a matrix that accounted for the number of pollutant-generating activities associated with each source (in categories of 0, 1–4, and >4 activities) and the potential for wet weather discharge from each source (from 1 = no discharge potential to 5 = high discharge potential). These scores were then converted into the following qualitative source loading potentials:

- **None (N)** includes sources with no identified pollutant-generating activities and low discharge potential.
- **Unknown (UK)** includes sources with one or more identified pollutant-generating activities, but very low discharge potential.
- **Unlikely (UL)** includes sources with no pollutant-generating activities, but high discharge potential, or sources with moderate discharge potential and one or more pollutant-generating activities.
- **Likely (L)** includes sources with high discharge potential and identified-pollutant generating activities.

Beginning with the sources identified in the 2007 MS4 Permit and updating the list with the most recent inventory, the 2011 LTEA evaluated 37 facilities, areas, and activities (sources) and identified a number of likely sources of sediment and bacteria. The WURMP Annual Reports identify the likely sources from the LTEA that are within the Los Peñasquitos WMA, as well as the quantity of each source that is in the WMA. These sources, land use categories, quantities, and impairments of sources are summarized in Table 3-1. Sources classified as having an unknown loading potential in the 2011 LTEA are included in the assessment of the adequacy of available data (Section 3.1.6).

Table 3-1
Likely Sources of Sediment and Bacteria Identified in WURMP Annual Reports

Source Type	Category	Number of Identified Likely Sources in Los Peñasquitos WMA[1]	Highest Priority Water Quality Conditions[2]	
			Sediment	Bacteria
Aggregates/Mining	Industrial	3 facilities	✓	—
Agriculture	Other	3 facilities (583 acres)	✓	✓
Animal Facilities	Commercial	78 facilities	✓	✓
Auto Parking Lots and Storage	Commercial	14 facilities	✓	—
Building Materials Retail	Commercial	66 facilities	✓	—
Concrete Manufacturing	Industrial	20 facilities	✓	—
Eating or Drinking Establishments	Commercial	980 facilities	—	✓
General Contractors	Commercial	399 facilities	✓	—
General Retail	Commercial	228 facilities	✓	—
Health Services	Commercial	4 facilities	✓	—
Mobile Landscaping	Commercial	41 facilities	✓	✓
Nurseries/Greenhouses	Commercial	8 facilities	✓	✓
Recycling and Junk Yards	Industrial	9 facilities	✓	—
Stone/Glass Manufacturing	Industrial	13 facilities	✓	—
Storage/Warehousing	Commercial	657 facilities	✓	—
Municipal	Municipal	171 facilities	✓	—
Construction	Other	2,088 facilities	✓	—
Residential Areas	Residential	16,351 acres	✓	✓

1. Sources are quantified by facility counts or acreage. Facility counts help define the sources during dry weather and land uses help define sources during wet weather. Counts are based on the 2010 JURMP Annual Reports.
2. Freshwater discharge and hydromodification are not directly addressed in WURMP and so are not listed in this table.

"✓" = Source applies to highest priority water quality condition.
"—" = Source does not apply to highest priority water quality condition.

The WURMP identified sanitary sewer overflows and bacteria regrowth in the MS4 as potential sources of bacteria. The WURMP also identified irrigation runoff and sanitary sewer overflows as potential sources of freshwater discharge from dry weather flows, although they are not identified as likely sources. Responsible Agency monitoring data from the dry weather transitional monitoring program have also identified potential outfalls with persistent flow; these outfalls are currently being reviewed to determine which of them meet the MS4 Permit-defined requirements. The outfall locations were mapped using a GIS and were compared with the Responsible Agencies' land use data.

Of the potential outfalls with persistent flow, 50 percent of the outfalls were in parks and recreation land use (including open space), 23 percent were associated with the roads land use, and 12 percent were in residential areas. All three areas have been identified as potential sources of dry weather freshwater discharge. It is not assumed that these persistently flowing outfalls are potentially contributing to sediment or bacteria priority conditions; additional monitoring data are needed to identify persistently flowing outfalls as potential or likely sources of sediment or bacteria.

3.1.2 Other Known and Suspected Sources

Sources other than those within the Responsible Agencies' jurisdiction and under their regulatory authority may also contribute to the freshwater discharge, hydromodification, sediment, and bacteria impairments within the Los Peñasquitos WMA. Discharges from these sources are often conveyed to receiving waters by the Responsible Agencies' MS4s. The principal sources outside the Responsible Agencies' jurisdiction are:

- Phase II MS4 outfalls
- Other permitted discharges
- Other potential point sources
- Other non-point sources

Phase II MS4s

Phase II MS4s are smaller agencies (relative to municipalities) or areas that are regulated under the State's Phase II MS4 Permit (State Board Order No. 2013-0001-DWG) (State Board, 2013a). They are outside the authority of the Responsible Agencies and, within the San Diego region, can include, but are not limited to, correctional, transit, educational, and federal facilities. Phase II MS4 permittees are responsible for only the runoff from their facilities and activities, whereas the Responsible Agencies are responsible for receiving runoff from other sources. Phase II MS4s may contribute to the impairment of beneficial uses in the Los Peñasquitos WMA. Some Phase II MS4s have been named in the Bacteria TMDL (Regional Board, 2010).

The Los Peñasquitos WMA has three Phase II MS4s:

- Marine Corps Air Station Miramar
- North County Transit District (NCTD)
- University of California, San Diego

Contributions from Phase II MS4s are a suspected source of freshwater discharge, hydromodification, sediment, and bacteria in both storm water and dry weather non-storm water conditions. The Responsible Agencies will collaborate with the Regional Board and Phase II MS4s when possible to collect data to quantify the contribution of Phase II MS4' to the freshwater discharge, hydromodification, sediment, and bacteria impairments.

Other Permitted Discharges

Other permitted discharges, such as discharges covered under the State's Construction General Permit (State Board, 2012a) and the Industrial General Permit (State Board, 2014), may also contribute to the highest priority water quality conditions. Industrial waste treatment facilities, for example, have been identified as a potential point source of freshwater discharge (which can contribute sediment by increasing erosion) and bacteria. Agricultural discharges, which are generally covered under a conditional discharge waiver from the Regional Board, are discussed below as an example of non-point source discharges. Such discharges may be conveyed to receiving waters by the Responsible Agencies' MS4s.

In addition to the MS4 Permit, four other types of storm water discharge permits are present within the Los Peñasquitos WMA, as presented in Table 3-2.

Table 3-2
Storm Water Discharge Permits

Permit Type	Number of Permits in WMA
Municipal Storm Water	5
Industrial Storm Water	75
Construction Storm Water	46
Caltrans Storm Water	1
Other Individual NPDES Discharges	0
Total:	**127**

Sources: State Board, 2011a and 2011b.

Mining operations, which are addressed under industrial permits, are located adjacent to Carroll Canyon Creek and have a high potential to contribute to the significant sediment loads in the Carroll Canyon subwatershed. Sediment loads for mining areas on steep slopes have a higher loading potential as compared other land uses in the watershed (Los Peñasquitos Watershed Copermittees, 2012b). Waste sites (e.g., landfills and waste transfer stations) and construction sites have also been identified as significant point sources of indicator bacteria in the San Diego region (Regional Board, 2010). They are also likely contributors of sediment (Los Peñasquitos Watershed Copermittees, 2013). Although there is one municipal landfill in the Los Peñasquitos WMA (CalRecycle, 2013), it was not identified as a likely source of bacteria or sediment in the 2012 WURMP Annual Report. The Responsible Agencies will collaborate with the Regional Board and other permitted dischargers when possible to collect data to quantify their contributions to the freshwater discharge, sediment, and bacteria impairments.

Other Point Sources

A point source is a discrete conveyance, such as a pipe or ditch. Private outfalls are point sources that may discharge freshwater, sediment, and bacteria to the MS4 or receiving waters, or may be a source of scouring and hydromodification; however, no private outfalls have been identified by the Responsible Agencies in the Los Peñasquitos WMA.

Other Non-point Sources

Non-point sources typically flow over land and discharge to receiving waters over a broad area, as opposed to a point location. Potential non-point source discharges may originate from a number of different activities and locations throughout the WMA. Non-point sources by their nature are diffuse sources of stressors.

The Sediment TMDL identifies excess erosion of sediment from the landscape (i.e., hydromodification) as a potential source of sediment. Hydromodification has been linked to land development, which can transform the natural landscape by exposing sediment and converting pervious surfaces to impervious. This can lead to excess volume and velocity of runoff, causing scouring below storm water outfalls in canyon and bluff areas. In particular, a 2010 geomorphic assessment of the Los Peñasquitos Lagoon subwatershed identified multiple segments of Carroll Creek that have high potential to contribute to downstream sediment (City of San Diego, 2011b).

Sediment contributions from the Pacific Ocean represent a background (natural) source in the Los Peñasquitos Lagoon itself. The Sediment TMDL also notes that sediment deposition does not adequately flush out of the Lagoon because of the impediment created by railway berms and other physical alterations. The buildup over time from potential excess erosion and inadequate flushing has impaired the habitat in the Los Peñasquitos Lagoon (Regional Board, 2012). Additionally, the Tecolote CLRP identifies aerial deposition (i.e., sediment blown and redeposited by wind) as both a natural source of sediment and a source influenced by human activity in the San Diego region.

During wet weather, storm water runoff may carry sediment and indicator bacteria from agricultural lands to the MS4. During dry weather, irrigation runoff from agricultural sites may lead to freshwater discharges. Per the Bacteria TMDL, bacteria carried by agricultural discharges that enter the MS4 conveyance system are considered to be controllable by the MS4s. Agricultural sites operate under a conditional discharge waiver from the Regional Board (Resolution No. R9-2007-0104), meaning that they are exempt from the discharge requirements of the current MS4 Permit (Regional Board, 2007). This waiver expired in 2014, and a new Agricultural Order is expected to go into effect in 2015. A draft tentative order detailing waste discharge requirements for commercial agricultural and nursery operations was released by the Regional Board on January 17, 2014. Responsible Agencies will look for opportunities to collaborate with the Regional Board and agricultural dischargers when possible and appropriate.

The Bacteria TMDL identifies wildlife areas, which include open space land uses and are sometimes not under the jurisdiction of Responsible Agencies, as sources of bacteria. The wildlife areas partially account for bacteria contributions from wild animals and decaying plant sources.

The Bacterial Conceptual Model (City of San Diego, 2012b) identifies transient encampments as a bacteria source that can directly discharge bacteria from human origins to receiving waters. Transient encampments are temporarily located in both municipal and open space land uses. The issues raised by transient encampments are socio-economic by nature. To address the sources of homelessness requires coordination with law enforcement, social services, and the legal community. Sources related to sewage infrastructure (such as sewer collection systems, sanitary sewer overflows, illicit discharges to the sewer system, and septic tanks) have also been identified by the Responsible Agencies as potential sources of bacteria. Additionally, during dry periods, bacteria can regrow within the MS4 and create biofilms (City of San Diego, 2012a). These sources may be found within the Los Peñasquitos WMA and are considered under the jurisdiction of the Responsible Agencies.

The contribution of groundwater into the MS4 through infiltration and receiving waters at areas where the groundwater table reaches surface water (rising groundwater) may also be considered a non-point source for freshwater discharges (Regional Board, 2010). During dry weather, bacteria may enter the MS4 or receiving waters through groundwater infiltration or irrigation runoff into municipal drainage channels (County of Los Angeles, 2010).

3.1.3 Locations of the Responsible Agencies' MS4s

The MS4 maps discussed in Section 2 were reviewed as part of the source identification process. The Los Peñasquitos Creek subwatershed is the area in the Los Peñasquitos WMA with the highest number of major MS4 outfalls. The Carroll Canyon Creek subwatershed has a smaller urban land use area, but is the subwatershed with the greatest density of major MS4 outfalls, urban land uses, and impervious surfaces based on urban land use per acre. The Carmel Valley Creek and Los Peñasquitos Lagoon

subwatersheds have one-third to one-sixth of the number of major MS4 outfalls as compared with the Los Peñasquitos Creek and Carroll Canyon Creek subwatersheds.

Location of major MS4 outfalls is of particular interest when considering sources of hydromodification. In some cases, strategies intended to address hydromodification and channel scouring can exacerbate the problem downstream. For example, flood control basins intended to reduce peak discharges, if they are not designed to consider downstream impacts or if hydraulic or hydrologic conditions change substantially from design conditions, can trap sediment, ultimately releasing sediment-starved and highly erosive waters. Similarly, channel drop structures, designed to stabilize the upstream reach of a channel, may destabilize and degrade the area directly downstream if they are not designed to consider downstream impacts or if conditions change substantially from design conditions (SCCWRP, 2012b). Note, however, that when designed to minimize downstream impacts and using natural materials, flood control basins and channel drop structures can play a systematic role in improving and protecting downstream habitat.

3.1.4 IDDE Program and Dry Weather Monitoring Data

In addition to the evaluation in the LTEA, data from the IDDE program and receiving water monitoring programs were reviewed to determine whether known or suspected sources of freshwater discharge, hydromodification, sediment, and bacteria may be controllable by the Responsible Agencies' MS4s. Dry weather field screening, inspections, and complaint responses have been shown to be effective means of detecting and eliminating illicit discharges (County of San Diego, 2011).

Dry Weather Field Screening and Persistent Flow

Dry weather field screening data collected as part of the MS4 Permit's transitional monitoring program were also considered on the basis of dry weather persistent flows, where available. Flow during dry weather may result from permitted, allowed, or illegal discharges. Dry weather flow provides a mechanism for transport of sediment and indicator bacteria from facilities, areas, or activities to receiving waters, and is the key source of freshwater discharges. Per the MS4 Permit Provision D.2.a.2(b)(iv),

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

Based on a review of the major MS4 outfall map in Section 2, the Responsible Agencies have identified a total of 97 major MS4 outfalls in the Los Peñasquitos Creek subwatershed, 92 major MS4 outfalls in the Carroll Canyon Creek subwatershed, 33 major MS4 outfalls in the Carmel Valley Creek subwatershed, and 15 major MS4 outfalls in the Los Peñasquitos Lagoon subwatershed. The Responsible Agencies have identified 34 major MS4 outfalls in the Los Peñasquitos WMA that may persistently discharge non-storm water. These outfalls are presented in Appendix D.3.

Facility Inspections

Facility inspections complement the IDDE program and include informing the public about storm water and dry weather runoff. Inspections also detect potential dry weather flows discharging from facilities. Inspections may confirm whether specific types of facilities are significant sources of bacteria. Although information is available on facility inspections on the basis of the previous permit JURMP annual reporting requirements, the JURMP data assessment did not provide detailed information linking facility inspections to sources. Section 5 (Monitoring and Assessment) and Section 6 (Iterative Approach) describe how JRMP report requirements will be used to answer water quality-related questions.

Storm Water Complaints

The Responsible Agencies have implemented regional and jurisdictional storm water telephone hotlines since the issuance of Order R9-2001-01 in 2001. Members of the public may call in complaints to the Regional Hotline (maintained by the County of San Diego) or report them online; the County then contacts the appropriate jurisdiction to follow up on the complaints. In addition, jurisdictions respond to complaints received by their own hotlines. Complaints received via the hotlines have helped Responsible Agencies identify and eliminate illicit discharges, particularly during dry weather (San Diego County Municipal Copermittees, 2011b).

As with facility inspections, storm water complaints were reported annually on the basis of the previous permit JURMP annual reporting requirements, but the JURMP data assessment did not provide detailed information linking storm water complaints and IDDE investigations to sources. Section 5 (Monitoring and Assessment) and Section 6 (Iterative Approach) describe how the water quality-related data associated with storm water complaints and their related follow-up IDDE investigations will be used to answer water quality related questions.

3.1.5 Summary of Freshwater Discharge, Hydromodification, Sediment, and Bacteria Sources

Freshwater discharge, hydromodification, sediment, and bacteria were identified as sources on the basis of the available resources and the considerations required by the MS4 Permit. Sources of freshwater discharge are believed to have a more significant impact during dry weather. The Sediment TMDL states that sources of hydromodification and sediment are more significant in wet weather; the Bacteria TMDL states that sources of bacteria are the same in wet and dry weather.

While the wet and dry weather sources of bacteria may be the same, the transport mechanisms are different. During wet weather, bacteria are discharged to the MS4 and then to the receiving waters via storm water runoff, which occurs over a general area and can be well represented by land use. During dry weather, discharges are conveyed by non-storm water runoff, which includes illicit discharges, irrigation runoff, groundwater infiltration, and permitted discharges, and are associated with specific facilities, areas, or activities. The different wet and dry weather transport mechanisms require varying strategies to address the impairment, and are discussed in Section 4. Consequently, both wet and dry weather sources have been identified in this section, and strategies to address the different transport mechanisms are discussed in Section 4.

Wet and dry weather sources were also categorized by land use using the Responsible Agencies' inventories of facilities and land uses to help develop the goals, strategies, and schedules described in Section 4. Table 3-3 presents facilities, areas, and activities identified by the Responsible Agencies as known or suspected sources of freshwater discharge, hydromodification, sediment, or bacteria, and typical land uses that were associated with the sources as part of the identification process.

Table 3-3
Sources of Freshwater Discharge, Hydromodification, Sediment, and Bacteria in the Los Peñasquitos WMA

Known or Suspected Source	Land Uses								
	Construction	Commercial	Industrial	Municipal	Residential	Parks and Recreational Areas	Open Space	Landfills	Other[1]
FRESHWATER DISCHARGE									
Non-WURMP Identified Sources[2]									
Outfalls with Persistent Dry Weather Flow	—	✓	✓	✓	✓	—	—	—	✓
Irrigation runoff	—	—	—	✓	—	✓	—	—	—
Parks and Recreation (Including Golf Courses and Cemeteries)	—	—	—	✓	—	✓	—	—	✓
Roads, Streets, Highways, and Parking	—	✓	—	✓	✓	—	—	—	✓
Residential Areas	—	—	—	—	✓	—	—	—	—
Sanitary Sewer Overflows	✓	✓	✓	✓	✓	✓	—	—	✓
HYDROMODIFICATION									
Non-WURMP Identified Sources[2]									
Land Development	✓	✓	✓	✓	✓	—	—	—	✓
Impervious Surfaces	✓	✓	✓	✓	✓	—	—	—	✓
Outfalls Discharging to Canyons/Bluffs	—	✓	✓	✓	✓	—	—	—	✓
Open Space Areas	—	—	—	—	—	—	✓	—	✓
Flood Control Basins	—	—	—	✓	—	—	—	—	—
Channel Drop Structures	—	—	—	✓	—	—	—	—	—

Table 3-3 (continued)
Sources of Freshwater Discharge, Hydromodification, Sediment, and Bacteria in the Los Peñasquitos WMA

Known or Suspected Source	Land Uses								
	Construction	Commercial	Industrial	Municipal	Residential	Parks and Recreational Areas	Open Space	Landfills	Other[1]
SEDIMENT									
Facility									
Aggregates/ Mining	—	—	✓	—	—	—	—	—	✓
Animal Facilities	—	✓	—	✓	—	—	—	—	✓
Building Materials Retail	—	✓	—	—	—	—	—	—	—
Nurseries and Greenhouses	—	✓	✓	✓	—	✓	—	—	✓
Health Services	—	✓	—	✓	—	—	—	—	—
Recycling and Junk Yards	—	—	✓	✓	—	—	—	✓	—
Stone/Glass Manufacturing	—	—	✓	—	—	—	—	—	—
Storage/ Warehousing	✓	✓	✓	✓	—	—	—	—	✓
Area									
Agriculture	—	—	—	✓	✓	—	—	—	✓
Auto Parking Lots or Storage	✓	✓	—	✓	✓	✓	—	—	✓
General Retail	—	✓	—	—	—	—	—	—	—
Municipal	✓	—	—	✓	✓	✓	✓	✓	—
Residential Areas	—	—	—	—	✓	—	—	—	—

Table 3-3 (continued)
Sources of Freshwater Discharge, Hydromodification, Sediment, and Bacteria in the Los Peñasquitos WMA

Known or Suspected Source	Land Uses								
	Construction	Commercial	Industrial	Municipal	Residential	Parks and Recreational Areas	Open Space	Landfills	Other[1]
Activity									
Concrete Manufacturing	✓	—	✓	—	—	—	—	—	—
Construction	✓	—	—	—	—	—	—	—	—
General Contractors	✓	—	—	—	—	—	—	—	—
Mobile Landscaping	—	✓	—	✓	✓	✓	—	—	—
Non-WURMP Identified Sources[2]									
Hydromodification	✓	✓	✓	✓	✓	✓	—	—	✓
Ocean Sediment Contribution	—	—	—	—	—	✓	—	—	✓
Open Space Areas	—	—	—	—	—	—	✓	—	—
INDICATOR BACTERIA									
Facility									
Animal Facilities	—	✓	—	✓	—	—	—	—	✓
Eating and Drinking Establishments	—	✓	—	✓	—	✓	—	—	✓
Nurseries and Greenhouses	—	✓	✓	✓	—	✓	—	—	✓

Table 3-3 (continued)
Sources of Freshwater Discharge, Hydromodification, Sediment, and Bacteria in the Los Peñasquitos WMA

Known or Suspected Source	Land Uses								
	Construction	Commercial	Industrial	Municipal	Residential	Parks and Recreational Areas	Open Space	Landfills	Other[1]
Area									
Residential Areas	—	—	—	—	✓	—	—	—	—
Agriculture	—	—	—	✓	✓	—	—	—	✓
Activity									
Mobile Landscaping	—	✓	—	✓	✓	✓	—	—	—
Non-WURMP Identified Sources[2]									
Bacteria Regrowth and Biofilms	—	—	—	✓	—	—	—	—	✓
Transient Encampments	—	—	—	—	—	—	—	—	✓
Open Space Areas	—	—	—	—	—	—	✓	—	—
Sanitary Sewer Overflows	✓	✓	✓	✓	✓	✓	—	—	✓
Wildlife	—	—	—	✓	—	✓	✓	✓	✓

1. Other sources are those sources outside of the Responsible Agencies' jurisdictions and regulatory authorities; see Section 3.1.2.
2. Non-WURMP-identified sources have been categorized separately because this information comes from secondary sources that have not gone through the same regulatory review process as have the WURMP-identified sources.

3.1.6 Adequacy of Available Data

The Copermittees' monitoring and inspections programs, along with the MS4 inventory, provide sufficient data to categorize the known or suspected sources of freshwater discharges, hydromodification, sediment, and bacteria within the Los Peñasquitos WMA. However, additional potential sources have been identified during the source identification that cannot be directly linked to freshwater discharges, hydromodification, sediment, and bacteria MS4 contributions on the basis of the data available. The contributions of these potential sources to freshwater discharges, sediment, and bacteria concentrations in the MS4 are unknown. Table 3-4 presents potential sources that require additional data to determine whether they are likely contributors to impairments within the Los Peñasquitos WMA.

Additionally, the following sources require further study to collect a larger data set to determine whether they may be contributing to the impairment of beneficial uses in the Los Peñasquitos WMA:

- Phase II MS4 contribution of freshwater discharge, hydromodification, sediment, and bacteria, detailed in Section 3.1.2
- Non-point source contribution of freshwater discharge, hydromodification, sediment, and bacteria, detailed in Section 3.1.2
- Locations and discharge characteristics of private outfalls
- Persistent outfalls identified from the Responsible Agencies' transitional monitoring program (in progress)

Table 3-4
Potential Freshwater Discharge, Hydromodification, Sediment, and Bacteria Sources with Data Gaps

Pollutant or Stressor	Potential Source Where Magnitude of Impact Is Unknown	Potential Origin of the Source	Source of Data[1]
Freshwater Discharge	Groundwater infiltration into the MS4	Human activity and natural	County of Los Angeles, 2010
	Rising groundwater	Natural	Regional Board, 2010
Hydromodification	No sources with data gaps were identified.		
Sediment	Chemical and Allied Products	Human activity	WURMP
	Fabricated Metal	Human activity	WURMP
	General Industrial	Human activity	WURMP
	Institutional	Human activity	WURMP
	Aerial Deposition	Human activity and natural	CLRP[2]

Table 3-4 (continued)
Potential Freshwater Discharge, Hydromodification, Sediment, and Bacteria Sources with Data Gaps

Pollutant or Stressor	Potential Source Where Magnitude of Impact Is Unknown	Potential Origin of the Source	Source of Data[1]
Bacteria	Mobile Power Washing	Human activity	WURMP
	Motor Freight	Human activity	WURMP
	Offices	Human activity	WURMP
	Primary Metal	Human activity	WURMP
	Auto Parking Lots and Storage	Human activity	WURMP
	General Industrial	Human activity	WURMP
	Mobile Power Washing	Human activity	WURMP
	Motor Freight	Human activity	WURMP
	Offices	Human activity	WURMP
	Parks and Recreation (Including Golf Courses and Cemeteries)	Human activity, human body, and natural	WURMP
	Pest Control Services	Human activity	WURMP
	Reclaimed Water Use	Human activity	CLRP[2]
	Municipal	Human activity, human body, and natural	WURMP

1. Potential sources found in the WURMP are those classified as "unknown" by the LTEA; WURMP terminology for source names is used.
2. CLRP = Tecolote Watershed Comprehensive Load Reduction Plan (City of San Diego, 2012b).

3.2 Step 2: Prioritization of Freshwater Discharge, Hydromodification, Sediment, and Bacteria Sources

Based on the findings of Section 3.1, sources were prioritized according to two factors: (1) the ability of the Responsible Agencies to control the source, and (2) the level of human influence. To determine whether a potential source is controllable, three factors were considered: (1) the locations of the MS4s and potential contributing land uses during wet weather, (2) known outlets with persistent dry weather flow, and (3) jurisdictional authority.

The relative level of human influence was evaluated on the basis of the origin of the bacteria and the relationship to urban development and human activity. The levels of fecal indicator bacteria (FIB) in a waterbody can be related to recreational health risks; a non-human-impacted waterbody with high FIB densities can pose less risk for water

recreation than a human-impacted waterbody with low FIB densities (Soller et al., 2010; Schoen and Ashbolt, 2010). The three categories of source origin are the human body, human activity, and natural sources. For example, sewage spills and transient encampments contribute discharges of bacteria from human sources; pets and secondary wildlife (i.e., wildlife associated with human presence and habitation) contribute other forms of bacteria as a result of human activity; and wildlife contributes bacteria in open spaces independently of human activity. The prioritization of the known and suspected sources is described in the following subsections.

3.2.1 Source Controllability

Sources were ranked on the basis of the ability of the Responsible Agency to control the associated discharges. Controllable sources are controllable activities by humans, although in some instances (i.e., agricultural activities) Responsible Agencies have limited jurisdictional authority to regulate them. Most point sources were considered controllable, whereas many non-point sources were not. Controllable sources are those sources that are anthropogenic (i.e., influenced by humans) in origin (Regional Board, 2010). According to the Bacteria TMDL, controllable sources of stressors include:

- Discharges from municipal land uses
- Discharges from Caltrans
- Discharges from agricultural land uses that flow into the Responsible Agencies' MS4

Sources of stressors that are not controllable include:

- Discharges from open space and undeveloped land
- Wildlife (with the exception of secondary wildlife)
- Bacteria bound in soil and humic material
- Other natural sources not influenced by human activity

The Sediment TMDL (Regional Board, 2012) distinguishes controllable sources of sediment from non-controllable sources of sediment. Controllable sources of sediment include:

- Discharges from municipal land uses
- Discharges from Phase II land uses
- Discharges from Caltrans
- Discharges from the General Industrial and General Construction Storm Water permittees

Sources of sediment that are not controllable include:

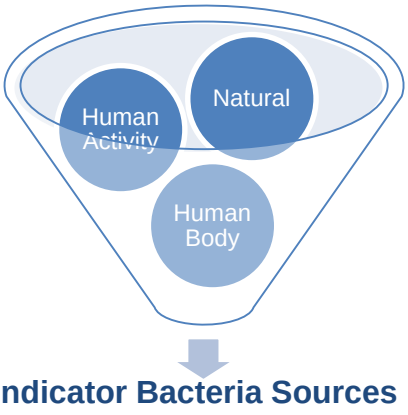
- Ocean sediment contributions

Sources that are outside the Responsible Agencies' jurisdictional boundaries, non-point sources that are not considered controllable, and sources over which the Responsible Agencies have no regulatory authority were considered to be non-controllable.

Based on this definition, sources in the Los Peñasquitos WMA were categorized as follows:

- Controllable:
  - Discharge is from a municipal land use, Caltrans, or an agricultural land use.
  - Identified land uses associated with the facility, area, or activity fall within the jurisdiction of the Responsible Agencies.
- Not controllable:
  - Discharge is not from a municipal land use, Caltrans, or an agricultural land use.
  - No identified land uses associated with the facility, area, or activity fall within the jurisdiction of the Responsible Agencies.

3.2.2 Level of Human Influence and Source Prioritization



Sources of freshwater discharge, hydromodification, sediment, and bacteria were prioritized on the basis of the level of human influence on the source. The Bacteria Conceptual Model that was developed for the San Diego County Municipal Copermittees' 2011–2012 Urban Runoff Monitoring Final Report (City of San Diego, 2012b) provides a methodology to characterize the sources of indicator bacteria (*Enterococcus*, fecal coliform, and total coliform) by the level of human influence. Freshwater discharge, hydromodification, and sediment source prioritization used the same methodology as that for bacteria, excluding sources from the human body that are not applicable.

The three categories of source origin are the human body, human activity, and natural sources, as follows:

- Human Body: Bacteria carried or shed by humans (e.g., bather shedding and sewage)

- Human Activity: Sources from non-human anthropogenic origins (the source is not from the human body, but may be increased by human influence or activities such as pet waste and secondary wildlife generation for bacteria, land-disturbing activities from construction for hydromodification and sediment, and irrigation of lawns for freshwater discharge)
- Natural: Sources from non-human non-anthropogenic origins (not increased by human influence), such as natural sources, including wildlife and natural plant decay for bacteria, naturally occurring erosion for sediment, and rising groundwater for freshwater discharge

Sources were ranked on the basis of the category of the stressor origin. Indicator bacteria sources from the human body were given the highest priority; sources associated with human activity, the second priority; and sources known or suspected to be natural in origin, the last priority. For sediment and freshwater discharges, sources associated with human activity were assigned high priority and sources identified with a potential natural origin were determined as low priority. For the Los Peñasquitos WMA, the final stressor prioritization was determined as follows:

- High:
  - Bacteria:
    - Source is controllable, and
    - Human body is identified as a potential origin.
  - Sediment, hydromodification, and freshwater discharge:
    - Source is controllable, and
    - Human activity is identified as a potential origin.
- Medium (bacteria only):
  - Source is controllable, and
  - Human activity is identified as a potential origin.
- Low (freshwater discharge, hydromodification, sediment, and bacteria):
  - Source is not controllable, or
  - Source is controllable and natural is identified as a potential origin.

Table 3-5 prioritizes the identified known and suspected sources of freshwater discharge, hydromodification, sediment, and indicator bacteria in the Los Peñasquitos WMA.

Table 3-5
Prioritized Sources

Known or Suspected Source	Controllability	Potential Origin of the Source
FRESHWATER DISCHARGE		
Facility–High		
Outfalls with Persistent Dry Weather Flow	Controllable	Human activity
Parks and Recreation (Including Golf Courses and Cemeteries)	Controllable	Human activity
Area–High		
Roads, Streets, Highways, and Parking	Controllable	Human activity
Residential Areas	Controllable	Human activity
Activity–High		
Irrigation runoff	Controllable	Human activity
Sanitary Sewer Overflows	Controllable	Human activity
HYDROMODIFICATION		
Facility–High		
Outfalls Discharging to Canyons/Bluffs	Controllable	Human activity
Flood Control Basins	Controllable	Human activity
Channel Drop Structures	Controllable	Human activity
Area–High		
Impervious Surfaces	Controllable	Human activity
Area–Low		
Open Space Areas	Not controllable	Natural
Activity–High		
Land Development	Controllable	Human activity
SEDIMENT		
Facility—High		
Aggregates/Mining	Controllable	Human activity
Animal Facilities	Controllable	Human activity
Building Materials Retail	Controllable	Human activity
Nurseries and Greenhouses	Controllable	Human activity
Health Services	Controllable	Human activity

Table 3-5 (continued)
Prioritized Sources

Known or Suspected Source	Controllability	Potential Origin of the Source
Recycling and Junk Yards	Controllable	Human activity
Stone/Glass Manufacturing	Controllable	Human activity
Storage/Warehousing	Controllable	Human activity
Area–High		
Agriculture	Controllable	Human activity
Auto Parking Lots or Storage	Controllable	Human activity
General Retail	Controllable	Human activity
Municipal	Controllable	Human activity
Residential Areas	Controllable	Human activity
Hydromodification	Controllable	Human activity
Area–Low		
Open Space Areas	Not controllable	Natural
Activity–High		
Concrete Manufacturing	Controllable	Human activity
Construction	Controllable	Human activity
General Contractors	Controllable	Human activity
Mobile Landscaping	Controllable	Human activity
Activity–Low		
Ocean Sediment Contribution	Not controllable	Natural
INDICATOR BACTERIA		
Facility–Medium		
Animal Facilities	Controllable	Human activity
Eating and Drinking Establishments	Controllable	Human activity
Nurseries and Greenhouses	Controllable	Human activity
Area–High		
Residential Areas	Controllable	Human activity
Area–Medium		
Agriculture	Controllable[1]	Human activity

Table 3-5 (continued)
Prioritized Sources

Known or Suspected Source	Controllability	Potential Origin of the Source
Area–Low		
Open Space Areas	Not controllable	Natural
Transient Encampments	Not controllable[2]	Human body and human activity
Activity–High		
Sanitary Sewer Overflows	Controllable	Human body
Activity–Medium		
Mobile landscaping	Controllable	Human activity
Wildlife (Secondary)[3]	Controllable	Human activity
Activity–Low		
Bacteria Regrowth and Biofilms	Controllable[4]	Natural
Wildlife	Not controllable	Natural

1. Per the Bacteria TMDL, discharges from agricultural lands are controllable; however, they are not in the Responsible Agencies' jurisdiction.
2. Transient encampments are temporarily located in both municipal and open space land uses. The issues raised by transient encampments are socio-economic by nature. To address the sources of homelessness requires coordination with law enforcement, social services, and the legal community. Therefore, it has been designated as an uncontrollable source.
3. Secondary wildlife comprises vermin and other wildlife species associated with human presence and habitation.
4. Bacteria regrowth is a natural phenomenon that is hard to track or predict. The regrowth of bacteria in pipes is influenced by multiple factors, some that are under the direct control of the MS4s and some that are not.

3.3 Summary of Priority Sources by Responsible Agency

JURMP Annual Reports were reviewed to identify whether priority sources could be found in the jurisdictions within the Los Peñasquitos WMA. These reports are unique to each jurisdiction, and did not consistently categorize the source information in the same manner as that presented below. Consequently, land use information provided in the JURMP Annual Reports was used to determine whether the following sources were found in the jurisdiction: agriculture; roads, streets, and parking; and residential. Because Caltrans is not subject to the MS4 Permit, it has not developed a JURMP Annual Report that presents the priority sources. Therefore, only sources for the jurisdictions are provided in this section.

Priority sources are summarized by Responsible Agency in Tables 3-6 through 3-9.

Table 3-6
Summary of Priority Freshwater Discharge Sources by Responsible Agency

Source Type	City of Del Mar	City of Poway	City of San Diego	County of San Diego
High Priority				
Irrigation Runoff[1]	✓	✓	✓	✓
Outfalls with Persistent Dry Weather Flow	—	—	✓	—
Parks and Recreation (Including Golf Courses and Cemeteries)	—	✓	✓	✓
Residential Areas	✓	✓	✓	✓
Roads, Streets, Highways, and Parking	✓	✓	✓	✓
Sanitary Sewer Overflows	—	✓	✓	—

1. Assumed to be present in all jurisdictions with MS4s.

Table 3-7
Summary of Priority Hydromodification Sources by Responsible Agency

Source Type	City of Del Mar	City of Poway	City of San Diego	County of San Diego
High Priority				
Outfalls Discharging to Canyons/Bluffs[1]	✓	✓	✓	✓
Flood Control Basins[1]	✓	✓	✓	✓
Channel Drop Structures[1]	✓	✓	✓	✓
Impervious Surfaces[2]	✓	✓	✓	✓
Land Development[2]	✓	✓	✓	✓
Low Priority				
Open Space Areas	✓	✓	✓	✓

1. Assumed to be present in all Copermittee jurisdictions; locations are subject to spatial verification.
2. Assumed to be present in all Copermittee jurisdictions.

Table 3-8
Summary of Priority Sediment Sources by Responsible Agency

Source Type	City of Del Mar	City of Poway	City of San Diego	County of San Diego
High Priority				
Aggregates/Mining	—	✓	✓	—
Agriculture	—	✓	✓	✓
Animal Facilities	—	✓	✓	✓
Auto Parking Lots and Storage	✓	✓	✓	—
Building Materials Retail	—	✓	✓	—
Concrete Manufacturing	—	✓	✓	—
Construction	✓	✓	✓	—
General Contractors	—	✓	✓	—
General Retail	—	✓	✓	—
Health Services	—	✓	✓	—
Hydromodification[1]	✓	✓	✓	✓
Mobile Landscaping	—	✓	✓	—
Municipal	✓	✓	✓	✓
Nurseries/Greenhouses	—	✓	✓	—
Recycling and Junk Yards	—	✓	✓	—
Residential Areas	✓	✓	✓	✓
Stone/Glass Manufacturing	—	✓	✓	—
Storage/Warehousing	—	✓	✓	—
Low Priority				
Ocean Sediment Contribution[2]	✓	—	✓	—
Open Space Areas	✓	✓	✓	✓

1. Assumed to be present in all Copermittee jurisdictions.
2. Assumed to be present in all Copermittee jurisdictions with a coastal boundary.

Table 3-9
Summary of Priority Indicator Bacteria Sources by Responsible Agency

Source Type	City of Del Mar	City of Poway	City of San Diego	County of San Diego
High Priority				
Residential Areas	✓	✓	✓	✓
Sanitary Sewer Overflows	—	✓	✓	—
Medium Priority				
Agriculture	—	✓	✓	✓
Animal Facilities	—	✓	✓	✓
Eating or Drinking Establishments	—	✓	✓	—
Mobile Landscaping	—	✓	✓	—
Nurseries/Greenhouses	—	✓	✓	—
Wildlife (Secondary)[1,2]	✓	✓	✓	✓
Low Priority				
Bacteria Regrowth and Biofilms[3]	✓	✓	✓	✓
Open Space Areas	✓	✓	✓	✓
Transient Encampments	NA[4]	NA[4]	NA[4]	NA[4]
Wildlife[2]	✓	✓	✓	✓

1. Assumed to be present in all Copermittee jurisdictions.
2. Secondary wildlife comprises vermin and other wildlife species associated with human presence and habitation.
3. Assumed to be present in all jurisdictions with MS4s.
4. NA = Not available; the number of transient encampments is not currently assessed by jurisdiction because of the challenges in obtaining an accurate count of encampments, which, by definition, are temporary. A point-in-time count is prepared annually by the Regional Task Force on the Homeless, and can be found on its website (http://www.rtfhsd.org/).

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4 Water Quality Goals, Strategies, and Schedules

Section 2 established two highest priority water quality conditions in the Los Peñasquitos WMA: (1) the impairment of EST and BIOL (e.g., salt marsh) beneficial uses in the Los Peñasquitos Lagoon (Lagoon), and (2) the potential impairment of REC-1 beneficial uses along the Pacific Ocean Shoreline at Torrey Pines State Beach at Del Mar. The lagoon impairments are due to hydromodification, sedimentation, and siltation during wet weather and due to freshwater discharges during dry weather. Potential impairments along the Pacific Ocean Shoreline are due to indicator bacteria (*Enterococcus*, fecal coliform, and total coliform) during both wet and dry weather.

Section 3 identified and prioritized sources and stressors potentially contributing to the hydromodification, sediment, freshwater discharge, and bacteria impairments in the Los Peñasquitos WMA by jurisdiction.

Section 4 Highlights

- Goals for the highest priority water quality conditions (Section 4.1).
- Details on the planned strategies:
  - A description of the nonstructural and structural strategies to be implemented to achieve the goals (Section 4.2). Collaborative strategies will also be highlighted (Section 4.2.5).
  - Each Responsible Agency's strategies with an implementation schedule (Appendix I).
  - The basis for strategy selection and prioritization, along with implementation assumptions used to estimate strategy effectiveness with the BMP optimization model (Appendix J).
- Specifics of the compliance analysis modeling results:
  - A percent load reduction for each BMP category to demonstrate that final goals will be met by implementing the strategies (Section 4.3.1).
  - The schedule for implementation to demonstrate that interim and final goals will be achieved by implementing the strategies (Section 4.3.2).
  - Detailed modeling results, including anticipated load reductions by each strategy type, subwatershed, jurisdiction, and pollutant (Appendix J).

As shown in the graphic below, the third step of Water Quality Improvement Plan development process is to identify the goals, strategies, and implementation schedules for the Los Peñasquitos WMA to address sources and stressors that are potentially contributing to the hydromodification, sediment, freshwater discharge, and bacteria impairment (Provision B.3).

This section presents the goals (Section 4.1) and strategies (Section 4.2) selected by the Responsible Agencies to address the highest priority water quality conditions in the Los Peñasquitos WMA. A compliance analysis using a watershed model was completed to demonstrate the anticipated progress toward achieving these goals through the proposed strategies and their implementation schedules (Section 4.3). The modeling results are summarized in Section 4.3

4.1 Goals

Numeric goals have been developed to support Water Quality Improvement Plan implementation and are used to measure progress toward addressing the highest priority water quality conditions. Numeric goals may take a variety of forms, but must be quantifiable so that progress toward and achievement of the goals is measurable. Each highest priority water quality condition may include multiple criteria or indicators. In accordance with the MS4 Permit and applicable regulatory drivers, final goals and reasonable interim goals have been developed. An interim goal is required for each five-year period from Water Quality Improvement Plan approval to the anticipated final goal compliance date (including an interim goal for this permit term).

Within the Los Peñasquitos WMA, the Sediment TMDL dictates the sediment goals that are applicable during wet weather. The Bacteria TMDL is the driver for bacteria goals, which are applicable during both dry and wet weather. Reduction of freshwater discharges during dry weather will assist in compliance with both TMDLs. Responsible Agencies must meet the wet weather Sediment TMDL targets within 20 years of TMDL adoption (FY35). Responsible Agencies must meet the wet weather Bacteria TMDL targets within 20 years of TMDL adoption (FY31) and dry weather targets within 10 years (FY21).

These TMDLs identify both receiving water and WMA targets. Appendix H describes the Sediment TMDL and Bacteria TMDL numeric targets, how the targets were derived, and how the targets were translated into numeric goals for the Water Quality Improvement Plan. Water Quality Improvement Plan numeric goals mirror TMDL targets and provide multiple compliance pathways that can be met within the receiving water or within the WMA. Water Quality Improvement Plan goals may be met (1) in the receiving water (restoring salt marsh habitat in the Lagoon or meeting applicable bacteria

concentrations at the shoreline), (2) in MS4s discharges by demonstrating that the MS4 is not causing or contributing to receiving water exceedances, or (3) by implementing an approved Water Quality Improvement Plan that used a watershed model or other watershed analytical tools to identify BMPs required to achieve compliance with the final receiving water or effluent goals. Within the Los Peñasquitos WMA, a compliance analysis using a watershed model was conducted to identify the strategies required to be implemented to meet interim and final goals. Modeling described in the following sections demonstrates that the jurisdictional strategies presented in Section 4.2 will meet the jurisdictional goals, expressed as a load reduction from the jurisdiction's MS4. The Bacteria TMDL also allows compliance if final receiving water limitations are due to loads from natural sources and pollutant loads from the MS4s are not causing or contributing to the exceedances. Language to incorporate the Sediment TMDL into the MS4 Permit is currently being drafted. Water Quality Improvement Plan goals will be updated once the Sediment TMDL is incorporated into the MS4 Permit.

The Sediment TMDL assigned a WMA-wide sediment load reduction to the Responsible Agencies. The proxy for assessing protection of the beneficial use of the Lagoon is salt marsh habitat. In the development of the Water Quality Improvement Plan, the TMDL model was updated and it calculated the sediment loads attributed to the Responsible Agencies (Appendix H). In addition to WMA sediment load reduction, the Sediment TMDL suggested two alternative measures that would contribute to an increase in salt marsh habitat: reduction of freshwater discharges and Lagoon restoration. The strategies selected in the Water Quality Improvement Plan will target both sediment and freshwater discharge reduction within their jurisdictions. However, as stated in the TMDL, current sediment loading is not the only cause of the Lagoon impairment. Historical loading, including activities within the Lagoon, contributed to the impairment. Therefore, the Responsible Agencies are also investigating partnerships and opportunities for future restoration activities as described in Section 4.2.5.1. Lagoon restoration would involve a collaborative effort among the Responsible Agencies and other stakeholders in the WMA.

Responsible Agencies developed goals both collaboratively and individually to best address the sources and stressors within the WMA and individual jurisdictions. An individualized approach provides flexibility in selecting interim goals on the basis of jurisdiction-specific strategies and schedules, and provides the framework for a more accurate assessment of progress toward achieving goals within each jurisdiction. The final and interim numeric goals for the Los Peñasquitos WMA were derived from WQBELs identified in the Bacteria TMDL and incorporated into the MS4 Permit (currently being considered for adoption). Appendix H presents the Sediment TMDL and Bacteria TMDL numeric targets and provides the basis for the Water Quality Improvement Plan numeric goals.

Performance-based goals are also included to measure the short-term individual progress toward achieving goals given that sustained water quality improvement is typically demonstrated over a longer timeframe. Performance measures are intended to measure an outcome from a strategy or suite of strategies that provide an interim link to reasonable incremental progress in the quality of MS4 discharges and receiving waters by FY18. The strategies or suite of strategies presented have been selected as goals because they are measurable and provide a direct benefit in the short-term. Section 4.2 and the associated appendices present the full suite of strategies. Section 4.3 presents the anticipated schedule for implementation of all strategies and the associated load reduction benefit estimated by strategy category. The following sections present final and interim numeric goals by jurisdiction. Appendix H presents the Sediment TMDL and Bacteria TMDL numeric targets and provides the basis for the Water Quality Improvement Plan numeric goals. Appendix I presents the strategies selected by Responsible Agencies that will be implemented to meet the goals. Appendix J presents the details of the compliance analysis and modeling results.

4.1.1 City of Del Mar Goals

The City of Del Mar Water Quality Improvement Plan interim and final goals for wet and dry weather are presented in Table 4-1 and Table 4-2, respectively. Water Quality Improvement Plan interim goals identified for each five-year assessment period not required by the TMDLs have been estimated considering the planning and assessment efforts described in the strategies and schedules discussion (Sections 4.2 and 4.3). In addition to goals based on TMDL targets, which demonstrate sustained water quality improvement over longer periods of time, performance-based goals were selected to measure short-term individual progress toward achieving goals during the current permit cycle.

Strategies that the City of Del Mar will use to achieve the numeric goals are presented in Section 4.2 and include the programs specifically identified in the performance-based goals and associated metrics.

Table 4-1
Wet Weather Numeric Goals for the City of Del Mar

Compliance Pathways		Baseline	Goals by Assessment Period and Fiscal Year					
			Current Permit Term (FY14 – FY18)	FY 16–20	FY 21–25	FY 26–30		FY 31–36
SEDIMENT								
			FY18	FY20[1]	FY24[1]	FY28[1]	FY30[1]	FY35[1]
MS4 Discharges % Load Reduction	Los Peñasquitos Lagoon	0% Load Reduction Year 2000 (Sediment TMDL Model)	3.0%	7.0%	13.9%	20.9%	27.8%	34.8%
OR								
MS4 Discharges Sediment Load Within Allowable Limits as Determined by Sediment Loading Model[2]	Los Peñasquitos Lagoon (tons/wet period)	1.6 tons/wet period 2010 (Sediment Water Quality Improvement Plan Model)	--	1.5	1.4	1.2	1.1	1.0
OR								
Receiving Water Restoration of Salt Marsh Habitat	Acres of Salt Marsh Habitat	262 acres in 2010 (Sediment TMDL)	Increasing trend toward 346 acres					346 acres[2]
OR								
# of Direct or Indirect Discharges to Receiving Water	Discharges	Number of flowing major MS4 outfalls during wet weather monitoring (Section 5 of this Water Quality Improvement Plan).	0	0	0	0	0	0

Table 4-1 (continued)
Wet Weather Numeric Goals for the City of Del Mar

Compliance Pathways		Baseline	Goals by Assessment Period and Fiscal Year				
			Current Permit Term (FY14 – FY18)	FY 16–20	FY 21–25	FY 26–30	FY 31–36
OR							
MS4 Discharges Implemented Accepted Water Quality Improvement Plan		Metric for compliance analysis is MS4 discharge percent load reduction (above). Interim compliance is implementation of strategies and schedule based on analysis results (Appendix I). Final compliance is implementation of BMPs based on analysis results and demonstration of compliance with any of the compliance pathways through monitoring and assessment. See Section 4.3.2 and Appendix J for modeling results.					
INDICATOR BACTERIA							
Compliance Pathways		**Baseline**	**FY18**	**FY19**	**FY24[1]**	**FY29**	**FY31[1]**
Receiving Water % Days Exceeding WQO	Fecal coliform	30% Days Exceeding WQO (2002 TMDL Model)	See performance measures	30%[3]	26%	25%	22%
	Enterococcus	30% Days Exceeding WQO (2002 TMDL Model)		30%[3]	26%	25%	22%
	Total coliform	30% Days Exceeding WQO (2002 TMDL Model)		30%[3]	26%	25%	22%
OR							
MS4 Discharges % Load Reduction	Fecal coliform	0% Load Reduction (2002 TMDL Model)	See performance measures	0.3%	1.0%	1.4%	2.0%
	Enterococcus			0.3%	1.0%	1.3%	1.9%
	Total coliform			0.2%	0.8%	1.1%	1.6%
OR							

Table 4-1 (continued)
Wet Weather Numeric Goals for the City of Del Mar

Compliance Pathways		Baseline	Goals by Assessment Period and Fiscal Year				
			Current Permit Term (FY14 – FY18)	FY 16–20	FY 21–25	FY 26–30	FY 31–36
MS4 Discharges % Days Exceeding WQO	Fecal coliform	Historical MS4 wet weather data will be used to identify the baseline in the first Water Quality Improvement Plan Annual Report.	See performance measures	22%	22%	22%	22%
	Enterococcus			22%	22%	22%	22%
	Total coliform			22%	22%	22%	22%
OR							
# of Direct or Indirect MS4 Discharges to Receiving Water	Discharges	Number of flowing major MS4 outfalls during wet weather monitoring (Section 5 of this Water Quality Improvement Plan).	0	0	0	0	0
OR							
% of Exceedances of Final Receiving Water WQOs Due to Natural Sources[4]	Fecal coliform	Unknown at this time. A detailed source study that differentiates between human and non-human sources would be needed to establish the baseline.	100%	100%	100%	100%	100%
	Enterococcus		100%	100%	100%	100%	100%
	Total coliform		100%	100%	100%	100%	100%
OR							
MS4 Discharges Implement Accepted Water Quality Improvement Plan		Metric for compliance analysis is MS4 discharge percent load reduction (above). Interim compliance is implementation of strategies and schedule based on analysis results (Appendix I). Final compliance is implementation of BMPs based on analysis results and demonstration of compliance with any of the compliance pathways through monitoring and assessment. See Section 4.3.2 and Appendix J for modeling results.					

Table 4-1 (continued)
Wet Weather Numeric Goals for the City of Del Mar

Compliance Pathways	Baseline	Goals by Assessment Period and Fiscal Year
		Current Permit Term
PERFORMANCE MEASURES		
Suite of Strategies to Measure Performance During First Permit Term	**Baseline**	**FY18**
Reduce anthropogenic surface dry weather flows[5] to address bacteria regrowth contributing during wet weather	Historical anthropogenic surface dry weather flow[5] data will be used to identify the baseline in the first Water Quality Improvement Plan Annual Report	10% reduction in anthropogenic surface dry weather flows[5]

Note:

1. Denotes TMDL interim and final WQBEL.
2. This can mean either: (1) successful restoration of 80% of the 1973 acreage of lagoon salt marsh habitat (346 acres); or (2) demonstration that implementation actions are active on and/or affecting 346 acres with continued monitoring to ensure 80% target achievement.
3. Denotes existing wet weather frequency as modeled in the Bacteria TMDL. With limited baseline monitoring data available, this goal reflects a reasonable estimate considering the difficulty in demonstrating progress within the receiving water during wet weather in a short amount of time. Furthermore, development and redevelopment of the urban environment has occurred since the Bacteria TMDL baseline loads were calculated in 2001. As such, this goal demonstrates that progress has been made by the Responsible Agencies by maintaining the existing wet weather exceeding frequency.
4. Demonstration of exceedances due to natural sources includes demonstration that pollutant loads from MS4s are not causing or contributing to exceedances.
5. The term “dry weather flows” excludes groundwater, other exempt or permitted non-storm water flows, and sanitary sewer overflows.

All numeric goals are cumulative from the baseline assessment for each fiscal year.
% = percent; FY = fiscal year; Water Quality Improvement Plan = Water Quality Improvement Plan; WQO = Water Quality Objective

Table 4-2
Dry Weather Numeric Goals for the City of Del Mar

Compliance Pathways		Baseline	Goals by Assessment Period and Fiscal Year		
			Current Permit Term (FY14 - FY18)	FY 16-20	FY 21-25
INDICATOR BACTERIA					
			FY18	**FY19[1]**	**FY21[1]**
Receiving Water % Days Exceeding WQO	Fecal coliform	4% Days Exceeding WQO (2002[2])	See performance measures	2.0%[2]	0%
	Enterococcus	19% Days Exceeding WQO (2002[2])		9.5%[2]	0%
	Total coliform	1% Days Exceeding WQO (2002[2])		0.5%[2]	0%
OR					
MS4 Discharges % Days Exceeding WQO	Fecal coliform	Historical MS4 dry weather data will be used to identify the baseline in the first annual report.	See performance measures	0%	0%
	Enterococcus			0%	0%
	Total coliform			0%	0%
OR					
MS4 Discharges % Load Reduction	Fecal coliform	0% Load Reduction (2002 TMDL Model)	See performance measures	48.3%	96.6%
	Enterococcus			49.7%	99.4%
	Total coliform			48.3%	96.5%
OR					
# of Direct or Indirect MS4 Discharges to Receiving Water	Discharges	Number of persistently flowing major MS4 outfalls provided in Section 5.1 of the Monitoring and Assessment Program Section of this Water Quality Improvement Plan.	0		0

Table 4-2 (continued)
Dry Weather Numeric Goals for the City of Del Mar

Compliance Pathways		Baseline	Goals by Assessment Period and Fiscal Year		
			Current Permit Term (FY14 - FY18)	FY 16-20	FY 21-25
OR					
% of Exceedances of Final Receiving Water WQOs Due to Natural Sources[3]	Fecal coliform	Unknown at this time. A detailed source study that differentiates between human and non-human sources would be needed to establish the baseline.	100%		100%
	Enterococcus		100%		100%
	Total coliform		100%		100%
OR					
MS4 Discharges Implement Accepted Water Quality Improvement Plan		Metric for compliance analysis is MS4 discharge percent load reduction (above). Interim compliance is implementation of strategies and schedule based on analysis results (Appendix I). Final compliance is implementation of BMPs based on analysis results and demonstration of compliance with any of the compliance pathways through monitoring and assessment. See Section 4.3.2 and Appendix J for modeling results.			
FRESHWATER DISCHARGE					
			FY18	**FY19[1]**	**FY21[1]**
MS4 Discharges % Irrigation or Other Dry Weather Flow Reduction	Flow	Baseline to be evaluated and provided in first Water Quality Improvement Plan Annual Report.	See performance measures	18%	25%
OR					
MS4 Discharges Implement Accepted Water Quality Improvement Plan		Metric for compliance analysis is MS4 discharge percent load reduction (above). Interim compliance is implementation of strategies and schedule based on analysis results (Appendix I). Final compliance is implementation of BMPs based on analysis results and demonstration of compliance with any of the compliance pathways through monitoring and assessment. See Section 4.3.2 and Appendix J for modeling results.			

Table 4-2 (continued)
Dry Weather Numeric Goals for the City of Del Mar

Compliance Pathways	Baseline	Goals by Assessment Period and Fiscal Year
		Current Permit Term
PERFORMANCE MEASURES		
Suite of Strategies to Measure Performance During First Permit Term	**Baseline**	**FY18**
Reduce anthropogenic surface dry weather water flows[4]	Historical anthropogenic surface dry weather flow[4] data will be used to identify the baseline in the final Water Quality Improvement Plan Annual Report.	Reduce anthropogenic surface dry weather flows[4] by 10%

Note:
1. Denotes TMDL interim and final WQBEL.
2. Calculated as a 50% reduction in the existing exceedance frequency presented in Appendix H.
3. Demonstration of exceedances due to natural sources includes demonstration that pollutant loads from MS4s are not causing or contributing to exceedances.
4. The term “dry weather flow” excludes groundwater, other exempt or permitted non-storm water flows and sanitary sewer overflows.

All numeric goals are cumulative from the baseline assessment for each fiscal year.

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4.1.2 City of Poway Wet and Dry Weather Goals

The City of Poway Water Quality Improvement Plan interim and final goals for wet and dry weather are presented in Table 4-3 and Table 4-4, respectively. Water Quality Improvement Plan interim goals identified for each five-year assessment period not required by the TMDLs have been estimated considering the planning and assessment efforts described in the strategies and schedules discussion (Sections 4.2 and 4.3). In addition to goals based on TMDL targets, which demonstrate sustained water quality improvement over longer periods of time, performance-based goals were selected to measure short-term individual progress toward achieving goals during the current permit cycle.

Strategies that the City of Poway will use to achieve the numeric goals are presented in Section 4.2 and include the programs specifically identified in the performance-based goals and associated metrics.

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Table 4-3
Wet Weather Numeric Goals for the City of Poway

Compliance Pathway		Baseline	Goals by Assessment Period and Fiscal Year					
			Current Permit Term (FY14 – FY18)	FY 16-20	FY 21-25	FY 26-30		FY 31-36
SEDIMENT								
			FY18	FY20[1]	FY24[1]	FY28[1]	FY30[1]	FY35[1]
MS4 Discharges % Load Reduction	Los Peñasquitos Creek	0% Load Reduction Year 2000 (Sediment TMDL Model)	See performance measures	9.4%	18.9%	28.3%	37.8%	47.2 %
OR								
Receiving Water Restoration of Salt Marsh Habitat	Acres of Salt Marsh Habitat	262 acres in 2010 (Sediment TMDL)	Increasing trend toward 346 acres					346 acres[2]
OR								
# of Direct or Indirect Discharges to Receiving Water	Discharges	Number of flowing major MS4 outfalls during wet weather monitoring (Section 5 of this Water Quality Improvement Plan).	0	0	0	0	0	0
OR								
MS4 Discharges Implemented Accepted Water Quality Improvement Plan		Metric for compliance analysis is MS4 discharge percent load reduction (above). Interim compliance is implementation of strategies and schedule based on analysis results (Appendix I). Final compliance is implementation of BMPs based on analysis results and demonstration of compliance with any of the compliance pathways through monitoring and assessment. See Section 4.3.2 and Appendix J for modeling results.						

Table 4-3 (continued)
Wet Weather Numeric Goals for the City of Poway

Compliance Pathway		Baseline	Goals by Assessment Period and Fiscal Year				
			Current Permit Term (FY14 – FY18)	FY 16-20	FY 21-25	FY 26-30	FY 31-36
INDICATOR BACTERIA							
Performance Measure			FY18	FY19	FY24[1]	FY29	FY31[1]
Receiving Water % Days Exceeding WQO	Fecal coliform	30% Days Exceeding WQO (2002 TMDL Model)	See performance measures	30%[3]	26%	25%	22%
	Enterococcus	30% Days Exceeding WQO (2002 TMDL Model)		30%[3]	26%	25%	22%
	Total coliform	30% Days Exceeding WQO (2002 TMDL Model)		30%[3]	26%	25%	22%
OR							
MS4 Discharges % Load Reduction	Fecal coliform	0% Load Reduction (2002 TMDL Model)	See performance measures	0.3%	1.0%	1.4%	2.0%
	Enterococcus			0.3%	1.0%	1.3%	1.9%
	Total coliform			0.2%	0.8%	1.1%	1.6%
OR							
MS4 Discharges % Days Exceeding WQO	Fecal coliform	Historical MS4 wet weather data will be used to identify the baseline in the first Water Quality Improvement Plan Annual Report.	See performance measures	22%	22%	22%	22%
	Enterococcus			22%	22%	22%	22%
	Total coliform			22%	22%	22%	22%

Table 4-3 (continued)
Wet Weather Numeric Goals for the City of Poway

Compliance Pathway		Baseline	Goals by Assessment Period and Fiscal Year				
			Current Permit Term (FY14 – FY18)	FY 16-20	FY 21-25	FY 26-30	FY 31-36
OR							
# of Direct or Indirect MS4 Discharges to Receiving Water	Discharges	Number of flowing major MS4 outfalls during wet weather monitoring (Section 5 of this Water Quality Improvement Plan).	See performance measures	0	0	0	0
OR							
% of Exceedances of Final Receiving Water WQOs Due to Natural Sources[4]	Fecal coliform	Unknown at this time. A detailed source study that differentiates between human and non-human sources would be needed to establish the baseline.	100%	100%	100%	100%	100%
	Enterococcus		100%	100%	100%	100%	100%
	Total coliform		100%	100%	100%	100%	100%
OR							
MS4 Discharges Implemented Accepted Water Quality Improvement Plan		Metric for compliance analysis is MS4 discharge percent load reduction (above). Interim compliance is implementation of strategies and schedule based on analysis results (Appendix I). Final compliance is implementation of BMPs based on analysis results and demonstration of compliance with any of the compliance pathways through monitoring and assessment. See Section 4.3.2 and Appendix J for modeling results.					

Table 4-3 (continued)
Wet Weather Numeric Goals for the City of Poway

Compliance Pathway	Compliance Pathway	Goals by Assessment Period and Fiscal Year
		Current Permit Term (FY14 – FY18)
PERFORMANCE MEASURES		
Suite of Strategies to Measure Performance During First Permit Term	**Baseline**	**FY18**
Turf conversion	The baseline of the square footage of turf converted will be identified in the first Water Quality Improvement Plan Annual Report.	5% increase from the baseline through turf conversion

Note:

1. Denotes TMDL interim and final WQBEL.
2. This can mean either:
   - Successful restoration of 80% of the 1973 acreage of lagoon salt marsh habitat (346 acres); or
   - Demonstration that implementation actions are active on and/or affecting 346 acres with continued monitoring to ensure 80% target achievement.
3. Denotes existing wet weather frequency as modeled in the Bacteria TMDL. With limited baseline monitoring data available, this goal reflects a reasonable estimate considering the difficulty in demonstrating progress within the receiving water during wet weather in a short amount of time. Furthermore, development and redevelopment of the urban environment has occurred since the Bacteria TMDL baseline loads were calculated in 2001. As such, this goal demonstrates that progress has been made by the Responsible Agencies by maintaining the existing wet weather exceeding frequency.
4. Demonstration of exceedances due to natural sources includes demonstration that pollutant loads from MS4s are not causing or contributing to exceedances.

All numeric goals are cumulative from the baseline assessment for each fiscal year.

Table 4-4
Dry Weather Numeric Goals for the City of Poway

Compliance Pathways		Baseline	Goals by Assessment Period and Fiscal Year		
			Current Permit Term (FY14 – FY18)	FY 16-20	FY 21-25
INDICATOR BACTERIA					
			FY18	**FY19[1]**	**FY21[1]**
Receiving Water % Days Exceeding WQO	Fecal coliform	4% Days Exceeding WQO (2002[2])	See performance measures	2.0%[2]	0%
	Enterococcus	19% Days Exceeding WQO (2002[2])		9.5%[2]	0%
	Total coliform	1% Days Exceeding WQO (2002[2])		0.5%[2]	0%
OR					
MS4 Discharges % Days Exceeding WQO	Fecal coliform	Historical MS4 dry weather data will be used to identify the baseline in the first Water Quality Improvement Plan Annual Report.	See performance measures	0%	0%
	Enterococcus			0%	0%
	Total coliform			0%	0%
OR					
MS4 Discharges % Load Reduction	Fecal coliform	0% Load Reduction (2002 TMDL Model)	See performance measures	48.3%	96.6%
	Enterococcus			49.7%	99.4%
	Total coliform			48.3%	96.5%
OR					
# of Direct or Indirect MS4 Discharges to Receiving Water	Discharges	Number of persistently flowing major MS4 outfalls provided in Section 5.1 of the Monitoring and Assessment Program Section of this Water Quality Improvement Plan.	0	0	0

Table 4-4 (continued)
Dry Weather Numeric Goals for the City of Poway

Compliance Pathways		Baseline	Goals by Assessment Period and Fiscal Year		
			Current Permit Term (FY14 – FY18)	FY 16-20	FY 21-25
OR					
% of Exceedances of Final Receiving Water WQOs Due to Natural Sources[3]	Fecal coliform	Unknown at this time. A detailed source study that differentiates between human and non-human sources would be needed to establish the baseline.	100%	100%	100%
	Enterococcus		100%	100%	100%
	Total coliform		100%	100%	100%
FRESHWATER DISCHARGE					
			FY18	**FY19[1]**	**FY21[1]**
MS4 Discharges % Irrigation or other Dry Weather Flow Reduction	Flow	Baseline to be evaluated and provided in first Water Quality Improvement Plan Annual Report.	See performance measures	18%	25%

Table 4-4 (continued)
Dry Weather Numeric Goals for the City of Poway

Compliance Pathways	Baseline	Goals by Assessment Period and Fiscal Year
		Current Permit Term (FY14 – FY18)
PERFORMANCE MEASURES		
Suite of Strategies to Measure Performance During First Permit Term	**Baseline**	**FY18**
Turf conversion	The baseline of the square footage of turf converted will be identified in the first Water Quality Improvement Plan Annual Report.	5% increase from the baseline through turf conversion

Note:
1. Denotes TMDL interim and final WQBEL.
2. Calculated as a 50% reduction in the existing exceedance frequency presented in Appendix H
3. Demonstration of exceedances due to natural sources includes demonstration that pollutant loads from MS4s are not causing or contributing to exceedances.

All numeric goals are cumulative from the baseline assessment for each fiscal year.

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4.1.3 City of San Diego Wet and Dry Weather Goals

The City of San Diego Water Quality Improvement Plan interim and final goals for wet and dry weather are presented in Table 4-5 and Table 4-6, respectively. Water Quality Improvement Plan interim goals identified for each five-year assessment period not required by the TMDLs have been estimated considering the planning and assessment efforts described in the strategies and schedules discussion (Sections 4.2 and 4.3). In addition to goals based on TMDL targets, which demonstrate sustained water quality improvement over longer periods of time, performance-based goals were selected to measure short-term individual progress toward achieving goals during the current permit cycle.

Strategies that the City of San Diego will use to achieve the numeric goals are presented in Section 4.2 and include the programs specifically identified in the performance-based goals and associated metrics.

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Table 4-5
Wet Weather Numeric Goals for the City of San Diego

Compliance Pathways		Baseline	Goals by Assessment Period and Fiscal Year					
			Current Permit Term (FY14 – FY18)	FY 16-20	FY 21-25	FY 26-30		FY 31-36
SEDIMENT								
			FY18	FY20[1]	FY24[1]	FY28[1]	FY30[1]	FY35[1]
MS4 Discharges % Load Reduction	Los Peñasquitos WMA	0% Load Reduction Year 2000 (Sediment TMDL Model)	See performance measures	10.6%	21.2%	31.9%	42.5%	53.1%
OR								
Receiving Water Restoration of Salt Marsh Habitat	Acres of Salt Marsh Habitat	262 acres in 2010 (Sediment TMDL)	Increasing trend toward 346 acres					346 acres[2]
OR								
# of Direct or Indirect Discharges to Receiving Water	Discharges	Number of flowing major MS4 outfalls during wet weather monitoring (Section 5 of this Water Quality Improvement Plan).	0	0	0	0	0	0

Table 4-5 (continued)
Wet Weather Numeric Goals for the City of San Diego

Compliance Pathways		Baseline	Goals by Assessment Period and Fiscal Year				
			Current Permit Term (FY14 – FY18)	FY 16-20	FY 21-25	FY 26-30	FY 31-36
OR							
MS4 Discharges Implemented Accepted Water Quality Improvement Plan		Metric for compliance analysis is MS4 discharge percent load reduction (above). Interim compliance is implementation of strategies and schedule (presented in Appendix I) based on analysis results. Final compliance is implementation of BMPs based on analysis results and demonstration of compliance with any of the compliance pathways through monitoring and assessment. See Section 4.3.2 and Appendix J for compliance analysis results.					
INDICATOR BACTERIA							
Performance Measure			**FY18**	**FY19**	**FY24[1]**	**FY29**	**FY31[1]**
Receiving Water % Days Exceeding WQO	Fecal coliform	30% Days Exceeding WQO (2002 TMDL Model)	See performance measures	30%[3]	26%	25%	22%
	Enterococcus	30% Days Exceeding WQO (2002 TMDL Model)		30%[3]	26%	25%	22%
	Total coliform	30% Days Exceeding WQO (2002 TMDL Model)		30%[3]	26%	25%	22%
OR							
MS4 Discharges % Load Reduction	Fecal coliform	0% Load Reduction (2002 TMDL Model)	See performance measures	0.3%	1.0%	1.4%	2.0%
	Enterococcus			0.3%	1.0%	1.3%	1.9%
	Total coliform			0.2%	0.8%	1.1%	1.6%
OR							

Table 4-5 (continued)
Wet Weather Numeric Goals for the City of San Diego

Compliance Pathways		Baseline	Goals by Assessment Period and Fiscal Year				
			Current Permit Term (FY14 – FY18)	FY 16-20	FY 21-25	FY 26-30	FY 31-36
MS4 Discharges % Days Exceeding WQO	Fecal coliform	Historical MS4 wet weather data will be used to identify the baseline in the first Water Quality Improvement Plan Annual Report.	See performance measures	22%	22%	22%	22%
	Enterococcus			22%	22%	22%	22%
	Total coliform			22%	22%	22%	22%
OR							
# of Direct or Indirect MS4 Discharges to Receiving Water	Discharges	Number of flowing major MS4 outfalls during wet weather monitoring (Section 5 of this Water Quality Improvement Plan).	See performance measures	0	0	0	0
OR							
% of Exceedances of Final Receiving Water WQOs Due to Natural Sources[4]	Fecal coliform	Unknown at this time. A detailed source study that differentiates between human and non-human sources would be needed to establish the baseline.	100%	100%	100%	100%	100%
	Enterococcus		100%	100%	100%	100%	100%
	Total coliform		100%	100%	100%	100%	100%
OR							
MS4 Discharges Implemented Accepted Water Quality Improvement Plan	Metric for compliance analysis is MS4 discharge percent load reduction (above). Interim compliance is implementation of strategies and schedule (presented in Appendix I) based on analysis results. Final compliance is implementation of BMPs based on analysis results and demonstration of compliance with any of the compliance pathways through monitoring and assessment. See Section 4.3.2 and Appendix J for compliance analysis results.						

Table 4-5 (continued)
Wet Weather Numeric Goals for the City of San Diego

Compliance Pathways	Baseline	Goals by Assessment Period and Fiscal Year
		Current Permit Term (FY14 – FY18)
PERFORMANCE MEASURES		
Suite of Strategies to Measure Performance During First Permit Term	**Baseline**	**FY18**
Develop a green infrastructure policy, attain City Council approval, and construct green infrastructure BMPs to improve water quality during wet and dry weather	0 acres treated in 2002, the year used as baseline in the Bacteria TMDL	37 acres of drainage area treated through construction of 10 green infrastructure BMPs[5]

1. Denotes TMDL interim and final WQBEL.
2. This can mean either: (1) successful restoration of 80% of the 1973 acreage of lagoon salt marsh habitat (346 acres); or (2) demonstration that implementation actions are active on and/or affecting 346 acres with continued monitoring to ensure 80% target achievement.
3. Denotes existing wet weather frequency as modeled in the Bacteria TMDL. With limited baseline monitoring data available, this goal reflects a reasonable estimate considering the difficulty in demonstrating progress within the receiving water during wet weather in a short amount of time. Furthermore, development and redevelopment of the urban environment has occurred since the Bacteria TMDL baseline loads were calculated in 2001. As such, this goal demonstrates that progress has been made by the Responsible Agencies by maintaining the existing wet weather exceeding frequency.
4. Demonstration of exceedances due to natural sources includes demonstration that pollutant loads from MS4s are not causing or contributing to exceedances.
5. The 37 acres of drainage area treated is associated with 10 GI projects that will be completed by FY18.

All numeric goals are cumulative from the baseline assessment for each fiscal year.

Table 4-6
Dry Weather Numeric Goals for the City of San Diego

Compliance Pathways		Baseline	Goals by Assessment Period and Fiscal Year		
			Current Permit Term (FY14 – FY18)	FY 16-20	FY 21-25
INDICATOR BACTERIA					
			FY18	**FY19[1]**	**FY21[1]**
Receiving Water % Days Exceeding WQO	Fecal coliform	4% Days Exceeding WQO (2002[2])	See performance measures	2.0%	0%
	Enterococcus	19% Days Exceeding WQO (2002[2])		9.5%	0%
	Total coliform	1% Days Exceeding WQO (2002[2])		0.5%	0%
OR					
MS4 Discharges % Days Exceeding WQO	Fecal coliform	Historical MS4 dry weather data will be used to identify the baseline in the first Water Quality Improvement Plan Annual Report.	See performance measures	0%	0%
	Enterococcus			0%	0%
	Total coliform			0%	0%
OR					
MS4 Discharges % Load Reduction	Fecal coliform	0% Load Reduction (2002 TMDL Model)	See performance measures	48.3%	96.6%
	Enterococcus			49.7%	99.4%
	Total coliform			48.3%	96.5%
OR					
# Direct or Indirect MS4 Discharges to Receiving Water	Discharges	Number of persistently flowing major MS4 outfalls provided in Section 5.1 of the Monitoring and Assessment Program of this Water Quality Improvement Plan.	0	0	0

Table 4-6 (continued)
Dry Weather Numeric Goals for the City of San Diego

Compliance Pathways		Baseline	Goals by Assessment Period and Fiscal Year		
			Current Permit Term (FY14 – FY18)	FY 16-20	FY 21-25
OR					
% of Exceedances of Final Receiving Water WQOs Due to Natural Sources[3]	Fecal coliform	Unknown at this time. A detailed source study that differentiates between human and non-human sources would be needed to establish the baseline.	100%	100%	100%
	Enterococcus		100%	100%	100%
	Total coliform		100%	100%	100%
OR					
MS4 Discharges Implement Accepted Water Quality Improvement Plan		Metric for compliance analysis is MS4 discharge percent load reduction (above). Interim compliance is implementation of strategies and schedule (presented in Appendix I) based on analysis results. Final compliance is implementation of BMPs based on analysis results and demonstration of compliance with any of the compliance pathways through monitoring and assessment. See Section 4.3.2 and Appendix J for compliance analysis results.			
FRESHWATER DISCHARGE					
			FY18	**FY19[1]**	**FY21[1]**
MS4 Discharges % Irrigation or other Wet and Dry Weather Flow Reduction	Flow	Baseline will be evaluated and provided in the first Water Quality Improvement Plan Annual Report.	See performance measures	18%	25%
OR					
MS4 Discharges Implement Accepted Water Quality Improvement Plan		Metric for compliance analysis is MS4 discharge % load reduction (above). Interim compliance is implementation of strategies and schedule (presented in Appendix I) based on analysis results. Final compliance is implementation of BMPs based on analysis results and demonstration of compliance with any of the compliance pathways through monitoring and assessment. See Section 4.3.2 and Appendix J for compliance analysis results.			

Table 4-6 (continued)
Dry Weather Numeric Goals for the City of San Diego

Compliance Pathways	Baseline	Goals by Assessment Period and Fiscal Year
		Current Permit Term (FY14 – FY18)
PERFORMANCE MEASURES		
Suite of Strategies to Measure Performance During First Permit Term	**Baseline**	**FY18**
Implement runoff reduction programs, including targeted education and outreach, enhanced inspections, rebates[4], and increased enforcement	Historical dry weather monitoring data will be used to establish a baseline in the first Water Quality Improvement Plan annual report.	10% reduction in prohibited[5] dry weather flow from baseline measured at persistently flowing outfalls in the WMA
Develop a green infrastructure policy, attain City Council approval, and construct green infrastructure BMPs to improve water quality during wet and dry[6] weather	0 acres treated in 2002, the year used as baseline in the Bacteria TMDL.	37 acres of drainage area treated through construction of 10 green infrastructure BMPs[7]

Note:
1. Denotes TMDL interim and final WQBEL.
2. Calculated as a 50% reduction in the existing exceedance frequency presented in Appendix H.
3. Demonstration of exceedances due to natural sources includes demonstration that pollutant loads from MS4s are not causing or contributing to exceedances.
4. City of San Diego rebates include grass replacement, rainwater harvesting, downspout disconnect, and micro-irrigation.
5. Does not include allowable discharges as defined in Provision A and Provision E.2.a of the MS4 Permit.
6. Irrigation runoff reduction programs are the primary strategies for addressing dry weather, freshwater flows, and bacteria loading. However, green infrastructure will treat small storm events, in addition to unabated urban runoff in the short term. Green infrastructure also provides other benefits related to providing natural areas throughout urban development. See Section 4.2.3.1 for additional discussion.
7. The 37 acres of drainage area treated are associated with 10 GI projects that will be completed by FY18.

All numeric goals are cumulative from the baseline assessment for each fiscal year.

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4.1.4 County of San Diego Wet and Dry Weather Goals

The County of San Diego Water Quality Improvement Plan interim and final goals for wet and dry weather are presented in Table 4-7 and Table 4-8, respectively. The County has established wet weather goals to address the highest priority water quality conditions, including bacteria and sediment. Currently the County has identified one goal to address bacteria. One of the compliance options for the Bacteria TMDL requires a 2 percent reduction of the bacteria load from storm drain outfalls by 2031. Half of the load reduction, 1 percent, is required by the interim TMDL target date.

The implementation of the programmatic approaches of the storm water program is estimated to result in a 10 percent reduction of the bacteria loads and will be used to meet compliance. Baseline loads will be determined during FY15-16. The load reduction is anticipated to take place incrementally by permit term, with a 0.5 percent reduction during the second permit term, a 0.5 percent reduction during the third permit term, and a 1 percent reduction during the fourth permit term. If the anticipated reductions are not confirmed by monitoring, then program adjustments will be made according to the adaptive management process. This may require the incorporation of more effective strategies, changes in program design, or incorporation of additional structural BMPs if funding is available.

The County has also developed two wet weather goals to address sediment to address the two compliance pathways that are anticipated to be required to meet the Sediment TMDL. The first compliance pathway requires a sediment load reduction of 47.7 percent from the current modeled baseline load of 76 tons per year for the Los Peñasquitos Creek subwatershed and 48.2 percent current modeled baseline load of 7.6 tons per year within the Carroll Canyon subwatershed. Programmatic approaches are estimated to reduce sediment loads by 10 percent. Because of the limited available area for structural BMPs or for significant redevelopment to occur within the County of San Diego, structural strategies are not currently being considered within the County jurisdiction. However, the County will consider collaborations with watershed partners as necessary and as funding becomes available to address watershed sediment issues on a regional basis.

The County may also consider alternate approaches for compliance with the Sediment TMDL. For example, the current land uses are almost unchanged from the 1973 land uses in the unincorporated area. Quantitative modeling was conducted during development of the Sediment TMDL to reduce current sediment loads to the 1973 predicted levels. As outlined in Table 4-7, the County may choose to meet compliance in one or more subwatersheds by demonstrating that the sediment load is in compliance with the TMDL allowable loads modeled using 1973 land uses.

The second compliance pathway requires that the Los Peñasquitos Lagoon be restored to include an increasing trend toward 80 percent of the historical salt marsh habitat or 346 acres of tidal/non-tidal salt marsh habitat. The TMDL establishes monitoring protocols to evaluate trends in habitat within the lagoon and will be utilized to determine the necessity to develop a restoration plan. If yearly monitoring warrants, the County will collaborate with the appropriate watershed parties to develop and implement this plan.

The County of San Diego has established dry weather numeric goals for the highest priority water quality conditions for bacteria in the Los Peñasquitos WMA, to comply with one of the compliance pathways for the Bacteria TMDL, to effectively eliminate anthropogenic dry weather discharges from storm drain outfalls to the receiving waters. This pathway will also address freshwater flows that were identified in this Water Quality Improvement Plan as a highest priority water quality condition.

The County of San Diego dry weather goal was established to reduce dry weather flow in storm drains to effectively eliminate anthropogenic discharges to zero, to reduce pollutant loading to waterbodies during dry weather. This goal will be accomplished through the implementation of numerous JRMP strategies to reduce dry weather runoff, as described in the County of San Diego JRMP. Throughout the implementation of the Water Quality Improvement Plan, adaptive management will be used to evaluate reasonable progress toward the numeric goals and to consider changes to program design and project implementation, as needed to meet goals and as funding becomes available. This adaptive management process will be further described in the final Water Quality Improvement Plan. Efforts will be adaptively managed to mitigate dry weather flows and consider only small-scale structural controls if needed. Compliance with the TMDL goal, scheduled for April 2021, will be demonstrated through the storm drain outfall monitoring program.

Table 4-7
Wet Weather Numeric Goals for the County of San Diego

Wet Weather Numeric Goals for Highest Priority Water Quality Condition - Bacteria							
Title	**Metric**	**Baseline**	**Outcome**	**1st Permit Term 2013 - 2018**	**2nd Permit Term 2018 - 2023**	**3rd Permit Term 2023 - 2028**	**4th Permit Term 2028 - 2033**
						Meet TMDL Interim Compliance Date April 4, 2028 [1,2)]	**Meet TMDL Final Compliance Date April 4, 2031**
Implement Water Quality Improvement Plan with focus on programmatic BMPs and use adaptive management to increase effectiveness	% bacterial load reduction	TBD in FY15-16 using TMDL model	Reduce baseline bacteria loads by 2% from storm drain outfalls to meet TMDL required load reductions	Implement programmatic (non-structural) BMPs to achieve source reduction of bacteria loads from the storm drain outfalls	Reduce bacteria loads by 0.5% from the storm drain outfalls through continued implementation of programmatic BMPs and, based on adaptive management, focus and enhance efforts where needed	Reduce bacteria loads by an additional 0.5% (total 1%) from the storm drain outfalls by continued implementation of programmatic BMPs	Reduce bacteria loads by an additional 1% (total 2%) from the storm drain outfalls by continues implementation of programmatic BMPs

1. Request moving Interim TMDL Compliance Date from April 4, 2021, (per MS4 Permit Attachment E, 6.c(1)) to April 4, 2028, to allow adequate time to monitor progress through the adaptive management process of the Water Quality Improvement Plan.
2. Progress toward final goals will be monitored and, if implemented programmatic BMPs are not enough to meet compliance, then through the adaptive management process of the Water Quality Improvement Plan, more effective and or additional BMPs, including structural controls, will be considered for implementation. The County of San Diego is concerned that a funding source to construct, operate, and maintain structural controls is not identified, if structural controls are needed to meet compliance.

Table 4-7 (continued)
Wet Weather Numeric Goals for the County of San Diego

Wet Weather Numeric Goals for Highest Priority Water Quality Condition – Sediment									
Title	**Metric**	**Baseline**	**Outcome**	**1st Permit Term 2013 - 2018**	**2nd Permit Term 2018 - 2023**	**3rd Permit Term 2023 - 2028**		**4th Permit Term 2028 - 2033**	**5th Permit Term 2033 - 2038**
					Meet 20% Interim Compliance: December 2019	**Meet 40% Interim Compliance: December 2023**	**Meet 60% Interim Compliance: December 2027**	**Meet 80% Interim Compliance: December 2031**	**Meet Final Compliance Date: December 2034**
Implement Water Quality Improvement Plan with focus on programmatic BMPs and use adaptive management to increase effectiveness	% Sediment load reduction or verify allowable tons of sediment per year is met for Los Peñasquitos Creek	76 tons/year using 2003 water year	40 tons/year 47.2% reduction of baseline loads or verify allowed loads of 36 tons/year is met in 2034	Implement programmatic (non-structural) BMPs to achieve reduction of sediment loads from the storm drain outfalls	Reduce sediment loads by 9.4% from the storm drain outfalls through implementation of programmatic BMPs and, based on adaptive management, focus and enhance efforts where needed	Reduce sediment loads by an additional 9.5% (cumulative total of 18.9%) from the storm drain outfalls by continued implementation of programmatic BMPs	Reduce sediment loads by an additional 9.4% (cumulative total 28.3%) from the storm drain outfalls by continued implementation of programmatic BMPs	Reduce sediment loads by an additional 9.5% (cumulative total 37.8%) from the storm drain outfalls by continued implementation of programmatic BMPs	Reduce sediment loads by an additional 9.4% (cumulative total 47.2%) from the storm drain outfalls by continued implementation of programmatic BMPs
Implement Water Quality Improvement Plan with focus on programmatic BMPs and use adaptive management to increase effectiveness	% Sediment load reduction or verify allowable tons of sediment per year is met for Carroll Canyon	7.6 tons/year using 2003 water year	3.3 tons/year or 48.2% reduction of baseline loads or verify allowed loads of 3.7 tons/year is met in 2034	Implement programmatic (non-structural) BMPs to achieve reduction of sediment loads from the storm drain outfalls to receiving water	Reduce sediment loads by 9.6% from the storm drain outfalls through implementation of programmatic BMPs and, based on adaptive management, focus and enhance efforts where needed	Reduce sediment loads by an additional 9.7% (cumulative total 19.3%) from the storm drain outfalls by continued implementation of programmatic BMPs	Reduce sediment loads by an additional 9.6% (cumulative total 28.9%) from the storm drain outfalls by continues implementation of programmatic BMPs	Reduce sediment loads by an additional 9.7% (cumulative total 38.6%) from the storm drain outfalls by continues implementation of programmatic BMPs	Reduce sediment loads by an additional 9.6% (cumulative total 48.2%) from the storm drain outfalls by continues implementation of programmatic BMPs
AND									
Restoration of Lagoon (as needed and as funding is available)	Restoration of 346 acres of salt marsh	262 acres of tidal/non-tidal salt marsh	Restoration of 346 acres of tidal/non-tidal salt marsh	Coordinate with watershed partners to determine restoration goals and establish monitoring protocols, as applicable	Increasing trend toward 346 acres (Note: Compliance targets listed above are for sediment reduction only)				Successful restoration of 346 acres of tidal/non-tidal salt marsh

Table 4-8
Dry Weather Numeric Goals for the County of San Diego

Dry Weather Numeric Goals for Highest Priority Water Quality Condition – Bacteria and Freshwater Flow						
					2nd Permit Term Numeric Goals 2018 - 2023	
Title	Metric	Baseline	Outcome	1st Permit Term Numeric Goals 2013 - 2018	TMDL Interim Compliance Date April 4, 2020 [2)]	TMDL Final Compliance Date April 4, 2021
Effectively eliminate anthropogenic dry weather flows [1] from storm drain outfalls	Make routine observations of storm drain outfalls to verify the absence of discharge to receiving water	Verify the absence of flow from storm drain outfalls in 2014 & 2015	Effectively eliminate anthropogenic dry weather flow from storm drain outfalls to receiving water	Verify the effective elimination of anthropogenic dry weather flow from storm drain outfalls and use programmatic approaches to maintain compliance	Verify the effective elimination of anthropogenic dry weather flow from storm drain outfalls and use programmatic approaches to maintain compliance	Verify the effective elimination of anthropogenic dry weather flow from storm drain outfalls and use programmatic approaches to maintain compliance

1. Here and throughout this table, the term “dry weather flows” excludes groundwater, other exempt or permitted non-storm water flows, and sanitary sewer overflows.
2. Request moving Interim TMDL Compliance Date from April 4, 2017, (per MS4 Permit Attachment E, 6.c(1)) to April 4, 2020, to allow adequate time to investigate and mitigate dry weather flows, if present through the adaptive management process of the Water Quality Improvement Plan.

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4.1.5 Caltrans Wet and Dry Weather Goals

Caltrans storm water flows are not included in the MS4 Permit; however, Caltrans is subject to similar requirements through its own MS4 Permit (State Board, 2012b). Caltrans has voluntarily contributed to the Water Quality Improvement Plan effort to provide a consistent and subwatershed-wide approach to meeting applicable TMDL requirements. The baseline strategies are continuously implemented and augmented as resources become available.

Attachment IV to the Caltrans MS4 Permit outlines a methodology for prioritizing stream segments included in TMDLs to which Caltrans is subject. The permit establishes BMP implementation requirements, evaluated in terms of compliance units. Caltrans is expected to achieve 1,650 compliance units per year through the implementation of retrofit BMPs, cooperative implementation, and post-construction treatment beyond permit requirements.

Impaired reaches throughout the state will be prioritized on the basis of several factors, including, but not limited to, percent reduction needed, Caltrans drainage area contributing to the reach, and proximity to receiving waters. Reaches with metals TMDLs will likely be prioritized. This prioritization list is currently under negotiation between Caltrans Head Quarter and State Water Resources Control Board.

Caltrans' jurisdiction areas include roadways, land adjacent to roadways, and facilities. Caltrans' jurisdictional strategies specifically focus on BMP implementation to reduce known pollutants within these areas. Caltrans' strategies vary from those of other Responsible Agencies (in both type and name) to best address freeway characterization discharges from its right-of-way. Strategies include programs developed by Caltrans Headquarters for statewide execution and District 11 implementation. Caltrans' implementation of strategies with the WMA is dependent on legislative approval.

For Bacteria TMDLs, Caltrans is expected to eliminate dry weather flows by implementing control measures to ensure effective prohibition (Provision B.2 of the MS4 Permit). For wet weather flows, Caltrans is expected to implement control measures or BMPs to prevent discharge of bacteria from the right-of-way; this can be source control and preemptive activities such as street sweeping, cleanup of illegal dumping, and public education on littering. Implementation of these controls is per the TMDL prioritization list currently under development.

Caltrans Water Quality Improvement Plan interim and final goals for wet weather are presented in Table 4-9. Caltrans Water Quality Improvement Plan interim and final goals for dry weather are presented in Table 4-10.

Table 4-9
Wet Weather Goals for Caltrans

Goals	Unit of Measure	Assessment Metric
MS4 Discharges	Cooperative Implementation Agreement	Achieve compliance units by contributing funds to a cooperative implementation
OR		
MS4 Discharges	Implement Nonstructural BMPs	Continue to implement wet weather nonstructural BMP activities within the watershed
OR		
MS4 Discharges	Implement Structural BMPs	Continue to implement wet weather structural BMP activities for proposed projects within the watershed

Table 4-10
Dry Weather Goals for Caltrans

Goals	Unit of Measure	Assessment Metric
MS4 Discharges	Reduction in Dry Weather Flow	Eliminate dry weather flows by implementing control measures to ensure effective prohibition
OR		
MS4 Discharges	Implement Dry Weather BMPs	Implement drought-tolerant landscaping and conversion to smart irrigation controllers within the watershed

4.2 Strategies

The Responsible Agencies were tasked with identifying water quality improvement strategies to address the highest priority water quality conditions. The strategies were selected on the basis of their ability to effectively and efficiently eliminate non-storm water discharges to the MS4, reduce pollutants in storm water discharges from the MS4 to the MEP, and achieve the interim and final numeric goals identified in Section 4.1. A compliance analysis was completed using a watershed simulation and BMP optimization model developed for the Los Peñasquitos WMA to quantify load reductions to support evaluation of TMDL compliance and select the most cost-effective BMP strategy for implementation. The compliance analysis modeled the outcome of applying a set of strategies to the watershed in the most cost-effective order, and demonstrated

that implementation of the strategies would result in achievement of interim and final goals.

A brief description of the strategy selection process is provided in Section 4.2.1. A general discussion of nonstructural strategies, such as MS4 maintenance and street sweeping, administrative policies, enforcement of municipal ordinances, education and outreach programs, rebate and incentive programs, and collaboration with WMA partners, is presented in Section 4.2.2. Structural strategies, those strategies that can improve water quality by removing pollutants through filtration and infiltration, are introduced in Section 4.2.3. A description of nonstructural and structural strategies selected by each Responsible Agency to target the highest priority water quality conditions by jurisdiction is presented in Section 4.2.4. A comprehensive list of strategies, including the method for implementing each strategy, the cost, and WMA partners included in the effort, is presented in Appendix I. Strategies implemented on a WMA scale or through collaboration with WMA partners are discussed in more detail in Section 4.2.5. The modeling results, or outcome of the implementation of the strategies selected in terms of percent load reduction, is presented in Appendix J. Section 4.3 presents a summary of the compliance analysis results to demonstrate the anticipated progress towards achieving the interim and final goals.

4.2.1 Strategy Selection

A list of potential strategies (nonstructural and structural) was developed by the Responsible Agencies and includes JRMP activities and enhancements to JRMP activities, and augmented by public input and discussions with the Los Peñasquitos WMA Consultation Committee (Los Peñasquitos WMA Responsible Agencies, 2014). This list was used as a guide by Responsible Agencies to identify strategies appropriate for their jurisdictions.

Strategy selection considered the following:

- Emphasis was given to strategies that target highest priority water quality condition and provide multiple benefits.
- The Responsible Agencies considered the triple bottom line, evaluating the environmental, economic, and social components of the strategies.
- Strategies that improve and promote cooperation and collaboration between the Responsible Agencies and other governmental agencies (WMA groups, Caltrans, water districts, school districts) and other entities, such as private or non-profit organizations, were also given priority. Responsible Agencies also continually collaborate with internal jurisdictional departments, which are also presented in the jurisdictional strategies table.

The Responsible Agencies evaluated their existing JRMP programs, the potential for incorporating enhancements and new administrative programs, and, if warranted, the appropriate types of structural BMPs that may be needed to meet Water Quality Improvement Plan goals. The JRMP provided the necessary background for existing nonstructural solutions and informed potential enhancements in activities and programs.

Efficiency in pollutant reduction is based partly on identifying the known and suspected areas or sources likely contributing to the highest priority water quality conditions and targeting those sources. To assist in the geographical identification of sources, watershed modeling and GIS tools were used to estimate the relative sediment and bacteria loading within the Los Peñasquitos WMA, land ownership and availability of public land for implementation, and physical watershed characteristics such as slope and soil types for BMP selection. Appendix J provides additional details on strategy selection, including a description of the prioritization of drainage areas within the Los Peñasquitos WMA by sediment and bacteria loading, implementation assumptions used to estimate strategy effectiveness within the simulation models, and results of the modeling efforts, including anticipated load reductions by strategy, subwatershed, jurisdiction, and pollutant. The Water Quality Implementation Plan assessments and BMP optimization were based on results from watershed models (simulations) updated for TMDL development from the Bacteria TMDL to the Sediment TMDL. The Los Peñasquitos WMA baseline model calibration is presented in Appendix K.

4.2.2 Nonstructural Strategy Descriptions

Nonstructural reduction strategies are defined as those actions and activities that are intended to reduce storm water pollution that do not involve construction or implementation of a physical structure to filter and treat storm water. These strategies are also considered nonstructural by the nature of their programmatic implementation. Examples include MS4 maintenance and street sweeping, administrative policies, creation and enforcement of municipal ordinances, education and outreach programs, rebate and other incentive programs, and cooperation and collaboration with other WMA or regional partners. Jurisdictions across the region have implemented these types of programs for many years, either in response to MS4 Permit requirements or in response to jurisdiction- or WMA-specific needs (Regional Board, 2013).

The combination of existing efforts and new or enhanced efforts determines the final, expected load reduction (Figure 4-1). Fundamentally, strategies were chosen on the basis of their expected effectiveness in reducing pollutant sources and targeting pollutant-generating activities (PGAs) of concern in the Los Peñasquitos WMA and their suitability and potential for implementation by the Responsible Agencies.

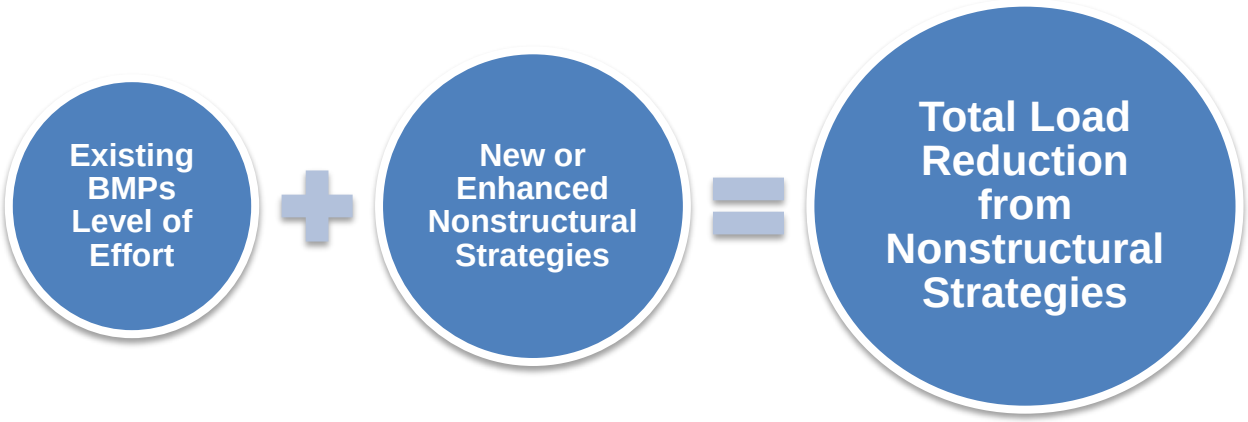

Figure 4-1
Determining Total Load Reduction from Nonstructural Strategies

The list of nonstructural strategies for each Responsible Agency is based on the following:

- Existing programs or actions that the Responsible Agencies are already implementing or must implement on the basis of MS4 Permit requirements
- Opportunities for enhancing and refining existing programs or actions
- Identification of new actions or initiatives that are effective or potentially effective in other areas or programs

It is challenging to accurately quantify most nonstructural strategy benefits in terms of pollutant load reductions because it generally requires extensive survey and monitoring information. In addition, nonstructural strategies may target pollutants, land uses, or populations, resulting in different load reductions depending on the implementation technique. Nevertheless, the modeling completed and discussed further in Appendix J estimated the effectiveness of current and future levels of implementation of selected nonstructural strategies, building on the previous modeling efforts in the region, such as Mission Bay CLRP I and II, and using best available information. The framework developed for other watersheds served as a foundation for modeling assumptions. Nonstructural strategies that cannot be effectively modeled to determine their quantifiable benefits are referred to as non-modeled nonstructural strategies (Section 4.2.2.1). The nonstructural strategies with sufficient supporting data to estimate associated load reductions through modeling are discussed in Section 4.2.2.2.

4.2.2.1 Non-modeled Nonstructural Strategies

The MS4 Permit requires Responsible Agencies to control the contribution of pollutants to the MS4 and the discharges from the MS4 within their jurisdictions through JRMPs (MS4 Permit Provision E). Most nonstructural strategies implemented by the Responsible Agencies are part of their JRMPs. The MS4 Permit requires the jurisdictions to identify the strategies being implemented by JRMP Provisions E.2 through E.7 as part of the Water Quality Improvement Plan for the highest priority water quality conditions. Caltrans is not subject to the requirements of the MS4 Permit; however, Caltrans is subject to similar requirements through its MS4 Permit (State Board, 2012b).

For those nonstructural strategies where sufficient data existed to support modeling of effectiveness, load reductions were quantified. Those strategies are covered in Section 4.2.2.2. The effectiveness of most nonstructural strategies, e.g., those non-modeled nonstructural strategies covered in this section, are difficult to quantify through modeling. However, the relative benefit associated with water chemistry, physical, and biological improvements for each of these non-modeled nonstructural strategies is shown in Table 4-12.

Nonstructural strategies may be broad, overarching administrative programs or activities targeting specific sources. The MS4 Permit provides guidelines for Responsible Agency implementation of each program; however, they are implemented differently depending on the unique characteristics of each jurisdiction. Because the MS4 Permit provides leeway in implementing strategies, not all jurisdictions may be implementing the same strategies within their JRMPs. Strategies identified by some jurisdictions may not be the most appropriate or efficient strategies to achieve pollutant reductions in others

A description of the JRMP strategy categories is presented in Table 4-11. The relative benefit associated with water chemistry, physical, and biological improvements achieved by strategy implementation is presented in Table 4-12. The assumptions represent best professional judgment based on literature reviews, practical experience, and stakeholder input. The BMP benefits outlined in Table 4-12 are dependent on site characteristics, implementation, and the target pollutant of the program or strategy. Although the benefits are variable, estimates of the relative pollutant reduction benefits are provided for comparative evaluation. A compilation of references used to estimate the overall, relative benefit is included in Appendix L. Pollutant reductions identify the primary pollutants (●), the secondary pollutants (◗), and the pollutants that the strategy does not address (O). Estimated pollutant reductions assume typical design, land use, and geography, but can be modified to target pollutants or site-specific needs. For additional information on JRMP implementation, see each Responsible Agency's JRMP document (to be submitted in June 2015).

Table 4-11
Categories of JRMP Strategies

Strategy Category	Strategy Description
Development Planning	Uses Responsible Agencies' land use and planning authority to require implementation of BMPs to address effects from new development and redevelopment.
Construction Management	Addresses pollutant generation from construction activities associated with new development or redevelopment.
Existing Development	Addresses pollutant generation from existing development, including commercial, industrial, municipal, and residential land uses. Includes stream, channel, and habitat restoration and retrofitting in areas of existing development.
Illicit Discharge, Detection, and Elimination (IDDE) Program	Actively detects and eliminates illicit discharges and improper disposal of wastes into the MS4.
Public Education and Participation	Promotes and encourages behaviors to reduce pollutant discharges. Describes opportunities for public participation in water quality improvement planning.
Enforcement Response Plan	Describes escalating enforcement measures for each JRMP component.

Table 4-12
JRMP Strategy Benefits

JRMP STRATEGY	Average Water Chemistry Benefit[1]									Physical and Biological Benefit			
	Sediment[2]	Bacteria[2]	Metals	Organics	Pesticides	Nutrients	Oil and Grease	Dissolved Solids	Trash	Flow Rate	Volume Reduction[3]	Habitat/ Wildlife	Aquatic Life
Development Planning													
All Development Projects	*Benefit varies by source control or low-impact development (LID) BMP type: Refer to Table 4-14 for a discussion of structural benefits.*												
Priority Development Projects (PDPs)	◗	◗	◗	◗	◗	◗	◗	◗	◗	◗	◗	◗	◗
Construction Management	●	○	○	○	○	○	◗	○	◗	●	●	○	●
Existing Development													
Commercial, Industrial, Municipal, and Residential Minimum BMP Requirements and Facility and Area Inspections	◗	◗	◗	◗	◗	◗	◗	◗	◗	◗	◗	◗	◗
MS4 Infrastructure Maintenance (including Catch Basin Cleaning)	●	◗	●	○	◗	◗	○	○	●	○	○	○	◗

Table 4-12 (continued)
JRMP Strategy Benefits

JRMP STRATEGY	Average Water Chemistry Benefit[1]									Physical and Biological Benefit			
	Sediment[2]	Bacteria[2]	Metals	Organics	Pesticides	Nutrients	Oil and Grease	Dissolved Solids	Trash	Flow Rate	Volume Reduction[3]	Habitat/ Wildlife	Aquatic Life
Roads, Streets, and Parking Lots Maintenance (including Street Sweeping)	●	◗	●	◗	○	●	○	◗	●	○	○	○	◗
Pesticide, Herbicides, and Fertilizer Program	○	○	○	●	●	●	○	○	○	○	○	◗	●
Retrofit and Rehabilitation in Areas of Existing Development	*Varies by development area; potential benefit for all conditions.*												
IDDE Program	***Benefit varies; potential benefit for all conditions.***												
Public Education and Participation	◗	◗	◗	◗	◗	◗	◗	◗	◗	◗	◗	◗	◗
Enforcement Response Plan	◗	◗	◗	◗	◗	◗	◗	◗	◗	◗	◗	◗	◗

1. For references for the water chemistry benefits for each strategy, refer to Appendix L.
2. Orange-shaded cells indicate highest priority water quality condition for the WMA.
3. Volume reductions address the freshwater discharge goals.

Responsible Agencies have also identified additional strategies that fall outside a JRMP category. These additional strategies are not required by MS4 Permit Provision E, but some Responsible Agencies have identified them as potentially effective in addressing priority water quality conditions within their jurisdictions. They may not be appropriate or effective within all jurisdictions.

The effectiveness of non-modeled, nonstructural strategies is difficult to quantify. Therefore, assigning a load reduction to each strategy or a suite of strategies is difficult. For the BMPs that are not represented in the model, a conservative load reduction of 10 percent is allocated. A 10 percent load reduction for nonstructural activities was estimated by averaging the range of measured and anticipated pollutant removal from the list of City of San Diego nonstructural strategies. Strategies were categorized as "high" percent removal, those with greater City control (operation and maintenance of MS4 infrastructure), or "low" percent removal, those requiring public behavior changes. The range of pollutant load reduction was as low as approximately 2 percent and as high as 72 percent. The overall average percent removal for all constituents and all activities is 10.1 percent. The average bacteria removal from the list of strategies was 11.7 percent (HDR, 2014).

4.2.2.2 Modeled Nonstructural Strategies

While the effectiveness of most nonstructural strategies is difficult to quantify, the pollutant and flow reduction benefits from rain barrels, downspout disconnections, and irrigation runoff reduction practices were estimated using quantitative methods, as described in Table 4-13 and Appendix J. The general effectiveness of each strategy was identified. The implementation assumptions, such as the number of rain barrels implemented per year, were then modeled independently from other nonstructural strategies because of their quantifiable properties. Appendix J describes the modeling process for the nonstructural strategies for each Responsible Agency. Because Caltrans' jurisdiction primarily consists of roadways, rain barrels and other incentive programs are not applicable.

Table 4-13
Modeled Nonstructural Strategies

Modeled Nonstructural Strategy[1]	Strategy Description	Example Photograph
Catch Basin Cleaning	Enhanced catch basin cleaning activities will contribute to watershed-scale pollutant load reductions. The City of San Diego Catch Basin Cleaning Pilot Study findings suggested that catch basins tend to fill up with debris quickly during storm events and remain at their capacity for debris storage until they are cleaned. Because current catch basin cleaning activities are typically performed only once annually, there is ample opportunity to substantially increase pollutant load removal by increasing the number of cleanings per basin in areas targeting sediment high priority water quality conditions, as appropriate. Note that while enhanced catch basin cleaning can significantly reduce pollutant loads, this BMP is not associated with runoff volume reduction.	
Downspout Disconnection Incentive Program	Implementing a downspout disconnection incentive program can promote load reductions by routing rooftop runoff over pervious surfaces, such as landscaped or grassed areas, rather than directly to hardscaped areas or storm drains. Downspout disconnections provide a similar watershed impact as rain barrels and are modeled similarly.	
Irrigation Runoff Reduction and Grass Replacement	This nonstructural strategy is a suite of measures that target water conservation and landscaping practices to reduce and eliminate irrigation runoff. Measures that contribute to this modeled strategy include the implementation of grass replacement projects, micro-irrigation system installations, downspout disconnections, education and outreach, and enforcement of regulations that prohibit runoff.	

Table 4-13 (continued)
Modeled Nonstructural Strategies

Modeled Nonstructural Strategy[1]	Strategy Description	Example Photograph
Rain Barrels Incentive Program	Capturing storm water from rooftops in residential rain barrels is a simple method to reduce demand on the potable water system and help prevent pollution by reducing the amount of runoff entering municipal storm drain systems. Retained runoff can be reused for irrigation, or when reuse is not possible, the retained flows can be slowly released after a period of storage. Any released flows can be routed through landscaped areas, where runoff load reduction can be attained through the processes of infiltration and evapotranspiration, or to bioretention BMPs as part of a treatment train. Through its residential BMP rebate program, the City of San Diego offers residential customers a cash-back rebate of $1.00 for every gallon of rain barrel storage capacity up to 400 gallons. Other rebate programs offered by regional water agencies and promoted by Responsible Agencies are also available.	
Street Sweeping	Improved street and median sweeping technology enhances the potential for wet weather pollutant load reductions for bacteria, metals, non-metal toxics, and nutrients. Increasing the sweeping frequency, increasing the area of impervious cover swept, or upgrading the sweeping equipment can result in an increase in pollutant load removal. Recommendations for program enhancement could affect the selection of mechanical (broom) and enhanced (vacuum) sweeping of commercial and residential roads and medians at frequencies ranging from bimonthly to twice per week. Note that while street sweeping can significantly reduce pollutant loads, the practice is not associated with runoff volume reduction.	

1. Assumptions about the modeling process and the extent of implementation are presented in Appendix K.

4.2.3 Structural Strategy Descriptions

Structural strategies can be used strategically throughout the contributing watershed to improve water quality by removing pollutants through a variety of chemical, physical, and biological processes, including filtration and infiltration. The effectiveness and feasibility of implementing different types of BMPs should be carefully considered in regard to the BMP impact and cost to implement and maintain. Long-term structural BMP effectiveness is often dependent on the successful construction and routine maintenance of each BMP. Note that there are many areas in the Los Peñasquitos WMA that contain low-infiltrating soil types. In addition, the impacts of infiltration BMPs on the highest priority water quality condition of freshwater discharges to the Lagoon is a concern. The Responsible Agencies acknowledged these factors by considering non-infiltrating BMPs in these areas, such as detention ponds, wetlands, and bioretention and permeable pavement with underdrains. The Responsible Agencies also considered channel restoration projects and source control strategies. Before implementing structural strategies, Responsible Agencies will consult with appropriate resource agencies (e.g., California Coastal Commission, California Department of Fish and Wildlife, Fish and Wildlife Service, National Marine Fisheries Service, etc.) and will obtain required permits as necessary. Further, Responsible Agencies will identify and apply “lessons learned” during project development and post-development monitoring. Feasibility of maintenance and inspection will be incorporated in the design and site selection stages to ensure that structural BMPs meet engineered specifications and can be maintained for the life of the BMP without difficulty.

Similar to nonstructural strategies, structural BMPs were carefully evaluated and chosen. Factors include their expected effectiveness in reducing pollutant sources, targeting PGAs of concern in the Los Peñasquitos WMA, and their suitability and potential for implementation by the Responsible Agencies.

Potential structural BMPs were broken into three categories on the basis of scale and overall function: (1) green infrastructure, (2) multiuse treatment areas, and (3) water quality improvement BMPs (Figure 4-2). These categories and their respective levels of implementation in the Los Peñasquitos WMA are discussed in detail in the following sections.

Modeling was used to estimate the effectiveness of already-implemented structural BMPs and future levels of implementation of select structural BMPs, using best available information. Modeling assumptions and results are further detailed in Appendix K.

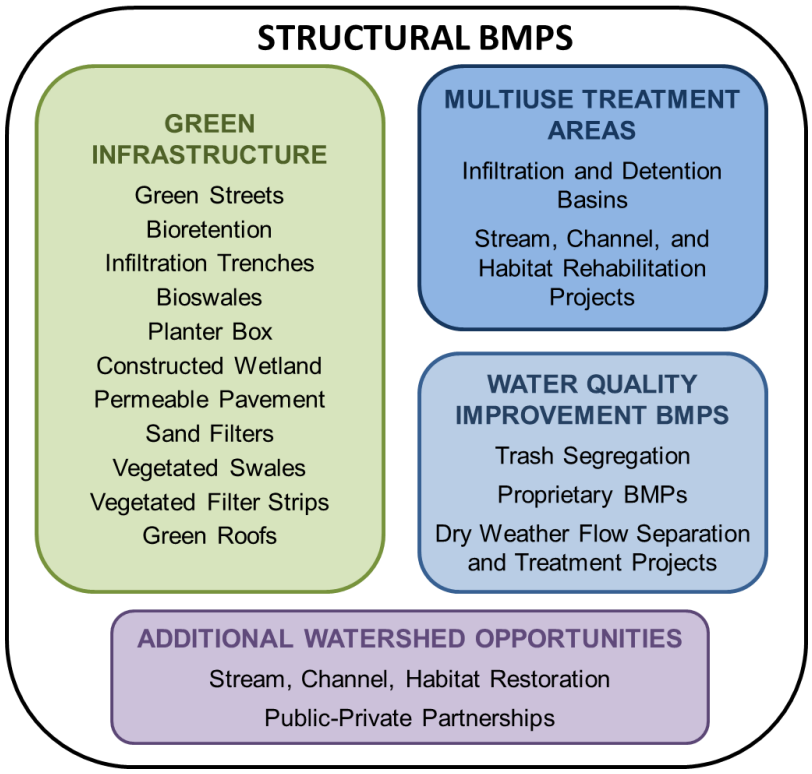

Figure 4-2
Summary of Structural Strategy Categories

Table 4-14 provides the relative benefit to water quality improvement by structural BMP type. Although variable, estimates of the relative pollutant reduction benefits are provided for comparative reference. These estimates are based on best professional judgment from literature reviews, practical experience, and stakeholder input. The site characteristics, BMP implementation, and pollutant of concern all influence the potential benefits. Routine maintenance of these structural strategies also significantly impacts the benefits of the BMPs. References used to estimate the overall, relative benefit are included in Appendix L. Pollutant reductions identify the primary pollutants (●),secondary pollutants (◗), and pollutants that the strategy does not address (O). Estimated pollutant reductions assume typical design, land use, and geography, but can be modified to target pollutants or site-specific needs.

Table 4-14
Structural Strategy Benefits

STRUCTURAL BMP	Water Chemistry Benefit[1]									Physical and Biological Benefit			
	Sediment[2]	Bacteria[2]	Metals	Organics	Pesticides	Nutrients	Oil and Grease	Dissolved Solids	Trash	Flow Rate	Volume Reduction[3]	Habitat/ Wildlife	Aquatic Life
Green Infrastructure													
Green Infrastructure Outside the Right-of-Way													
Bioretention	●	●	●	●	●	◗	●	◗	●	●	●	○	◗
Infiltration Trenches	●	●	●	●	●	●	●	●	●	●	●	○	●
Bioswales	●	●	●	●	●	◗	●	◗	●	●	●	○	◗
Planter Boxes	●	●	●	●	●	◗	●	◗	●	◗	◗	○	◗
Permeable Pavement	●	◗	●	◗	●	◗	◗	◗	◗	●	●	○	◗
Constructed Wetlands	●	●	●	◗	●	●	◗	◗	●	●	◗	●	◗
Sand Filters	●	●	●	●	●	◗	●	○	●	◗	◗	○	◗
Vegetated Swales	●	◗	◗	◗	◗	◗	◗	○	●	◗	◗	○	◗
Vegetated Filter Strips	●	◗	◗	◗	◗	◗	◗	○	●	◗	◗	○	◗
Green Roofs	●	◗	◗	○	○	○	○	○	○	●	◗	○	◗
Green Streets													
Green Streets	●	●	●	●	●	◗	●	◗	●	●	●	○	◗

Table 4-14 (continued)
Structural Strategy Benefits

STRUCTURAL BMP	Water Chemistry Benefit[1]									Physical and Biological Benefit			
	Sediment[2]	Bacteria[2]	Metals	Organics	Pesticides	Nutrients	Oil and Grease	Dissolved Solids	Trash	Flow Rate	Volume Reduction[3]	Habitat/ Wildlife	Aquatic Life
Multiuse Treatment Areas													
Infiltration and Detention Basins	●	◗	●	◗	●	◗	◗	◗	◗	●	●	○	◗
Stream, Channel, and Habitat Rehabilitation Projects	Varies by project												
Water Quality Improvement BMPs													
Trash Segregation, Proprietary BMPs, and Dry Weather Flow Separation and Treatment Projects	Varies by project												

1. For references for the water chemistry benefits for each strategy, refer to Appendix L.
2. Orange-shaded cells indicate the highest priority water quality condition for the WMA.
3. Volume reductions address the freshwater discharge goals.

4.2.3.1 Green Infrastructure

A critical consideration in selecting and evaluating structural BMPs is scale. Structural BMPs that are built within the landscape at the site scale, which often require retrofit of site designs to accommodate the rerouting and positioning of BMPs onsite, are called green infrastructure. Green infrastructure uses vegetation, soils, and natural processes to manage water and create healthier urban environments. At the scale of a city or county, green infrastructure refers to the patchwork of natural areas that provide habitat, flood protection, cleaner water, and potentially through cleaner air. At the scale of a neighborhood or individual site, green infrastructure includes storm water management systems such as bioretention areas, permeable pavements, and green roofs that use natural processes to soak up, store, and treat water.

Green infrastructure typically incorporates multiple BMPs using the natural features of the site in conjunction with the goal of the site development. Multiple BMPs can be incorporated into the site development to complement and enhance the proposed layout, while also providing water quality treatment and volume reduction. Green infrastructure practices provide control and treatment of storm water runoff on or near locations where the runoff originates, which improves water quality and reduces volume. The most common and effective green infrastructure BMPs implemented by the Responsible Agencies are listed in Table 4-15. Rain barrels are covered programmatically as a nonstructural strategy, but are also commonly incorporated as multi-benefit components of green infrastructure systems.

Table 4-15
Common Green Infrastructure BMPs

Green Infrastructure BMP	BMP Description	Example Photograph
Bioretention	Shallow vegetated features constructed in green spaces alongside roads, sidewalks, and other paved surfaces. Bioretention includes an engineered soil media designed to encourage pollutant treatment and water storage.	
Infiltration Trenches	Narrow, linear BMPs that have functions similar to those of bioretention areas with variable surface materials, including rock or decorative stone, designed to allow storm water to infiltrate into subsurface soils.	

Table 4-15 (continued)
Common Green Infrastructure BMPs

Green Infrastructure BMP	BMP Description	Example Photograph
Bioswales	Shallow, open channels designed to reduce runoff volume through infiltration and pollutant removal by filtering water through vegetation within the channel and infiltration into bioretention soil media. Bioswales can serve as a storm water conveyance, but the primary objective is water quality enhancement (often referred to as linear bioretention).	
Planter Box	Fully contained system containing soil media and vegetation that functions similarly to a small biofiltration BMP, but including an impermeable liner and underdrain.	
Constructed Wetland	Engineered, shallow marsh system designed to control and treat storm water runoff. Particle-bound pollutants are removed through settling and other pollutants are removed through biogeochemical activity.	
Permeable Pavement	Material that allows streets, parking lots, sidewalks, and other impervious covers to increase or enhance their infiltration capacity while maintaining the structural and functional features of the materials they replace. Roads such as highways can include permeable friction course (PFC) overlays that provide water quality benefits when traditional permeable pavement is not suitable. This BMP can also include underdrains in areas with low-infiltration soil types.	
Sand Filters	Treatment systems that remove particulates and solids from storm water runoff by facilitating physical filtration.	

Table 4-15 (continued)
Common Green Infrastructure BMPs

Green Infrastructure BMP	BMP Description	Example Photograph
Vegetated Swales	Shallow, open channels that are designed primarily for storm water conveyance. Pollutants such as trash and debris are removed by physically straining/filtering water through vegetation in the channel.	
Vegetated Filter Strips	Bands of dense, permanent vegetation with a uniform slope, designed to provide pretreatment of runoff generated from impervious areas before it flows into another BMP as part of a treatment train.	
Green Roofs	Roofing systems that layer a soil/vegetative cover over a waterproofing membrane and can reduce runoff through interception and evapotranspiration.	

Green infrastructure can provide water quality and community benefits at the site scale outside of the right-of-way or within the public street right-of-way (green streets). The following subsections discuss implementation of green infrastructure in these two settings.

Green Infrastructure Outside the Right-of-Way

Any single BMP or a combination of the BMPs listed in Table 4-15 can be applied at the site scale to capture and treat storm water runoff at the source. These potential small-scale projects are important to the WMA as a whole when incorporated near the top of the watershed. Collectively they can provide an effective means toward pollutant load reduction, while also attenuating peak flow, reducing discharge volume, and providing aesthetic value and improved habitat quality. These potential small-scale BMPs can be implemented on public parcels by municipalities or incorporated into Priority Development Projects (PDPs) and redevelopment activities on private parcels. Examples of potential existing development retrofits for green infrastructure BMPs outside the right-of-way include converting parking lot medians into planter boxes and asphalt into permeable pavements.

Much of the impervious area on most parcels, regardless of land use type, consists of a combination of parking lots and roof tops. Those areas can often be treated using a system of green infrastructure implemented in landscape areas and replacing hardscape with comparable permeable materials (see examples in Figure 4-3 and Figure 4-4). Other options for treatment to be considered for areas outside the right-of-way are green roofs, infiltration trenches, sand filters, vegetated filter strips, and vegetated swales.

Figure 4-3
Bioretention Areas in Parking Lots and Adjacent to Buildings Provide Multiple Benefits by Treating Runoff While Also Serving as Landscape Features and Habitat

Figure 4-4
Permeable Pavement Functions as a Parking and Driving Surface While Capturing and Treating Storm Water

Example Green Infrastructure Project Outside the Right-of-Way

The parking lot of the Mira Mesa Library, which is located in the Los Peñasquitos Creek subwatershed, has been identified as a suitable site for green infrastructure. The green lot proposed for the parking lot will implement several surface and subsurface low-impact development (LID) BMP components to manage flows from the parking lot. Figure 4-5 is a rendering that shows how green infrastructure could enhance the parking lot. Installing treatment planters in the landscaped areas and pervious pavement in the parking areas can reduce runoff volumes, bacteria, heavy metals, nutrients, pesticides, and sediment loadings in the Los Peñasquitos WMA. Additionally, green infrastructure at Mira Mesa Library could enhance community enjoyment and environmental awareness by calming traffic, reducing heat island effects, improving aesthetics, providing bird and butterfly habitat, and offering public outreach opportunities.

Figure 4-5
Rendering of Proposed Green Parking Lot at Mira Mesa Library

Green Infrastructure in the Right-of-Way (Green Streets)

Green streets can consist of multiple BMP types implemented in a linear manner within the road right-of-way. Placing BMPs within the right-of-way provides an additional opportunity to treat urban storm water runoff, attenuate peak flow, and reduce discharge volume while improving community pride, land value, and habitat quality. Given that green streets are in the right-of-way, they have no land acquisition costs and are more conveniently accessed for maintenance activities. Green streets also provide the added benefit of treating runoff from both the roadway and contributing parcel.

The most common approaches for green streets include bioretention areas located between the edge of the pavement and the edge of the right-of-way and permeable pavement installed in the parking lanes. The configuration of the street, particularly the presence of curb and gutter, locations of underground utilities, road classifications, and sidewalk, parking, and right-of-way widths, often dictates the configuration of green streets. Options are presented below for streets with and without curb and gutter.

Streets with Curb and Gutter

Curb and gutter is often used to provide a clear delineation between the travel lanes and the parkway area of the right-of-way. With this configuration, storm water is often treated through permeable pavement in the parking lanes and bioretention areas in the space between the back of the curb and the sidewalk. Figure 4-6 provides examples of green infrastructure in the parking area and parkway within the right-of-way.

Figure 4-6
Examples of Bioretention and Permeable Pavement in the Right-of-Way with Curb and Gutter

Streets Without Curb and Gutter

Streets without curb and gutter provide direct connection for diffused runoff to be treated within the right-of-way. Often, without the delineation provided by curb and gutter, the right-of-way at the edge of the travel lane can become compacted and eventually cause erosion concerns. Implementing green street concepts could provide an opportunity to stabilize those areas using permeable pavers, as shown in Figure 4-7, or bioretention areas.

Figure 4-7
Permeable Pavers in the Right-of-Way Without Curb and Gutter

Implementation in Los Peñasquitos WMA

The pollutant and flow reduction benefits attributed to the implementation of potential green infrastructure BMPs in the Los Peñasquitos WMA were estimated using quantitative methods and are summarized in Appendix K. These benefits were then applied to the areas that were identified for potential green infrastructure opportunities (some of which have already been constructed) throughout the Los Peñasquitos WMA to meet numeric targets. The resulting total level of implementation of potential green infrastructure BMPs is outlined in Section 4.2.4 and further discussed in Section 4.3.

4.2.3.2 Multiuse Treatment Areas

Large structural treatment control BMPs, referred to as multiuse treatment areas, are regional facilities that receive flows from neighborhoods or larger areas and often serve dual purposes for flood control and groundwater recharge. These BMPs are often located in public spaces and can be co-located within parks or green spaces to provide excellent ecosystem services and aesthetic value. Bioretention areas can enhance biodiversity and beautify the urban environment with native vegetation. Large-scale

facilities, such as infiltration basins or dry extended detention basis, can provide dual use as athletic fields or open spaces.

The following components can be incorporated into multiuse treatment areas to promote multiuse benefits:

- Simple signage or information kiosks can be used to raise public awareness of storm water issues, educate the public, and provide a guide for native plant and wildlife identification.
- Volunteer groups can be organized to perform basic maintenance such as trash removal as an opportunity to raise public awareness.
- Public-private partnerships can be pursued where property owners are supportive of water quality improvement measures and parcels are identified for ideal multiuse treatment area locations.
- Larger BMPs can be equipped with pedestrian cross-paths or benches for wildlife viewing.
- Sculptures and other art can be installed within the BMP and outlet structures or cisterns can incorporate aesthetically pleasing colors, murals, or facades.
- Vegetation with canopy cover can provide shade, localized cooling, and noise dissipation.
- Bird and butterfly feeders can be used to attract wildlife to the BMPs.
- Ornamental plants can be cultivated along the perimeter and in the bed of vegetated BMPs (invasive plants should be avoided).

Infiltration and Detention Basins

Large multiuse BMPs considered in this Water Quality Improvement Plan focus on surface BMPs (on public parcels) that provide treatment through the detention and infiltration of runoff. Examples include infiltration and dry extended detention basins, an example of which is shown in Figure 4-8. These BMPs are designed to hold runoff for an extended period of time to allow water to evaporate into the atmosphere, infiltrate into native soils, or be transpired by vegetation, while accommodating for overflow and bypass during large storm events. These BMPs are well suited to public spaces such as active (soccer fields) and passive (parks) recreation areas and they raise public

Figure 4-8
Example of an Athletic Field Designed to Function as an Infiltration Basin

awareness of storm water management. The example in Figure 4-8 is a park designed to function as a multiuse treatment area.

Example Potential Multiuse Treatment Area Project

Figure 4-9
Ashley Falls Catchment Open Space with Potential for Conversion to Infiltration or Detention Basins

The Ashley Falls catchment is located in the northwestern portion of the Los Peñasquitos WMA, north of the intersection of Carmel Knolls Drive and Pearlman Way. The drainage area spans approximately 30 acres and includes a large school site, approximately 4 acres of medium-density residential area, and a large area of park and open space preserve. Pending a geotechnical investigation by a licensed geotechnical engineer, an infiltration or detention basin would be appropriate to treat the large drainage area. Figure 4-9 shows the open space along Carmel Knolls Drive that could be converted to infiltration or detention basins in the Ashley Falls catchment area.

Based on regional monitoring in residential areas and the drainage area characteristics, nutrients, TSS, and bacteria are expected to be prevalent in the storm water runoff. Relative to similarly sized drainage areas, the site is anticipated to have higher levels of bacteria, due to the dense housing configuration and potential for pet waste from the area.

The infiltration or detention basin could treat storm water by diverting flow from the drainage pipe flowing along Carmel Knolls Drive just north of the intersection of Carmel Knolls Drive and Seagrove Street into the open space along Carmel Knolls Drive. Locating the basin in the open space would provide an educational opportunity for children and adults through educational signage.

Stream, Channel, and Habitat Rehabilitation Projects

Natural streams, channels, and habitats serve hydrologic and ecological functions that can be compromised when these natural systems are degraded or altered. Natural systems can be degraded or altered by increased runoff volumes and velocities which can cause bank erosion of streams and channels. Erosion can result in large quantities of sediment and sediment-binding pollutants entering the water column and traveling downstream, where potentially critical coastal habitats such as salt marshes, lagoons, and wetlands can be affected.

In the Los Peñasquitos WMA, erosion of creek banks has led to sediment loading. According to the Preliminary Assessment of Sediment Reduction Measures (ESA,

2011), increased peak flows and changes in creek morphology from hydromodification, quarry activities, and other creek modifications have led to the erosion of creek banks along Carroll Canyon Creek and subsequent sediment loading. Sediment transport due to erosion of unlined canyon walls, drainages, channels, and/or stream banks can be reduced through stream stabilization methods as well as habitat rehabilitation projects. Stabilization projects can include grading; construction of check dam structures, drop structures, and channel bed and bank protection measures; vegetation planting to protect channel areas; and modified channel cross-sections to promote hydrologic connectivity. Alternatively, habitat rehabilitation projects can improve a biological and ecological system that has been degraded as a result of sediment loading, erosion, or other causes. To ensure adaptive management, methods and metrics to measure the effectiveness of these stabilization and rehabilitation measures should also be developed to provide feedback on the level of sediment reduction achieved. These rehabilitation projects can results in sediment load reduction and restoration of aquatic life and vegetation, which can lead to greater public understanding of water quality while serving as recreational opportunities.

Implementation in Los Peñasquitos WMA

The pollutant and flow reduction benefits attributed to the implementation of potential multiuse treatment areas (specifically infiltration and detention basins) in the Los Peñasquitos WMA were estimated using quantitative methods and are summarized in Appendix K. These benefits were then applied to the areas that were identified for potential multiuse treatment area opportunities throughout the Los Peñasquitos WMA to meet numeric targets. The resulting total level of implementation of multiuse treatment areas is outlined in Sections 4.2.4 and 4.3 for the Responsible Agencies. The load reduction benefits of stream and habitat rehabilitation projects have not been explicitly modeled, but are further discussed in Section 4.2.3.4.

4.2.3.3 Water Quality Improvement BMPs

The Responsible Agencies will implement green infrastructure as permitted and when feasible, but site constraints preclude use of green infrastructure in some areas. In such cases, water quality improvement BMPs may be required to protect water resources. Water quality improvement BMPs include trash segregation, proprietary BMPs, and dry weather flow separation and treatment projects. Maintenance of these BMPs is covered separately under nonstructural strategies as part of each Responsible Agency's MS4 infrastructure maintenance programs, where applicable.

Trash segregation includes inlet devices, such as trash guards or trash racks, which are installed to capture trash and debris before conveyance into receiving waters. Proprietary BMPs are prefabricated commercial products such as hydrodynamic separators or catch basin filter inserts that typically provide storm water treatment in space-limited areas, often using patented and innovative technologies.

Proprietary BMPs typically use settling, filtration, absorptive/adsorptive materials, vortex separation, and sometimes vegetative components to remove pollutants from runoff.

Dry weather flow separation and treatment projects are those identified and planned by each respective Responsible Agency to target non-storm water dry season flows and to divert these flows for treatment either onsite or to sanitary sewer systems and ultimately wastewater treatment plants.

Implementation in Los Peñasquitos WMA

Because of the relative scale of their pollutant-reduction benefits, as well as the lack of published supporting data, trash segregation and proprietary BMPs were not modeled for the Los Peñasquitos WMA. However, the level of implementation of these BMPs is outlined in Sections 4.2.4 and 4.3.

4.2.3.4 Additional Opportunities

Additional opportunities are strategies that will promote an increase in salt marsh habitat that are not included in the aforementioned nonstructural and structural strategies. They will require Responsible Agencies to engage in collaborative efforts collectively and, as needed, with other institutional entities. Additional opportunities may include creation of additional sediment detention basins and stream and canyon restoration, in addition to Lagoon restoration. Activities particularly relevant within the Los Peñasquitos WMA that target water quality improvement include upgrades to existing MS4 outfalls to reduce scouring, low-impact development measures in the developed mesas, restoration or enhanced sediment management of reaches affected by mining operations, and stabilization of various sections of Carroll Canyon Creek. Restoration of the Los Peñasquitos Lagoon, further discussed in Sections 4.2.5.1 and 4.2.5.2, is a significant regional effort and potential additional watershed opportunity that will rely on key WMA partnerships and funding. The success of this restoration effort can result in significant sediment load reduction while restoring the Lagoon's beneficial uses (see Section 4.2.5.1), and therefore, the Los Peñasquitos Lagoon Restoration Project is recognized as a priority additional opportunity.

Implementation in Los Peñasquitos WMA

Because of limited restoration component details currently available, load reductions for additional opportunities were estimated because of the implementation of two additional sediment detention basins, similar to the existing basin in the Los Peñasquitos Creek subwatershed, restoration of five creek segments, including repair or replacement of MS4 outfalls, and restoration of the Lagoon as discussed further in Section 4.2.5.1. Detailed modeling or technical analyses will need to be performed to quantitatively assess the water quality benefits as a result of the restoration and to identify other regional structural BMPs, if needed, to meet the Water Quality Improvement Plan numeric goals.

4.2.4 Jurisdictional Strategy Selection by Responsible Agency

Strategy selection within the Los Peñasquitos WMA is discussed in Section 4.2.1 and Appendix J. Sections 4.2.4.1 through 4.2.4.5 provide examples of recommended strategies for each Responsible Agency and jurisdiction-specific selection

methodologies, if different from watershed-wide selection methodologies. The recommended strategies are those that are intended to specifically target the highest priority water quality conditions to achieve the numeric goals identified in Section 4.1. These strategies are a subset of each Responsible Agency's JRMP. A complete list of strategies by Responsible Agency, including the implementation approach, implementation year, and level of effort required, is presented in Appendix I.

As discussed in Sections 4.2.2 and 4.2.3, typically most nonstructural and structural strategies address multiple pollutants. For example, maintenance activities for catch basins and roads primarily target sediment, metals, and trash. In addition, bacteria and organics can be removed. Green infrastructure strategies such as bioretention and bioswales primarily target bacteria, sediment, and metals; however, they can provide dissolved solids and organics reductions as well. Permeable pavement primarily targets sediment, oil and grease, and metals, but can provide secondary benefits toward bacteria and organics reductions as well.

4.2.4.1 Caltrans Strategies

Caltrans' jurisdiction areas include roadways, land adjacent to roadways, and facilities; Caltrans' jurisdictional strategies specifically focus on BMP implementation to reduce known pollutants within these areas. Caltrans is not subject to the requirements of the MS4 Permit; however, Caltrans is subject to TMDL requirements through its MS4 Permit (State Board, 2012b). Caltrans' strategies vary from those of other Responsible Agencies (in both type and name) to best address typical discharges from its jurisdictions. Strategies include programs being implemented by Caltrans Headquarters for statewide execution and by District 11 for local implementation. Caltrans' implementation of strategies within the WMA is dependent on state funding. A complete list of strategies and their anticipated implementation schedule are provided in Appendix I. The strategies and schedules are subject to change and are contingent upon annual budget approvals and funding availability. They will be modified through the adaptive management process as needed.

4.2.4.2 City of Del Mar Example Strategies

The City of Del Mar (Del Mar) has selected jurisdictional strategies that best suit the topography and characteristics of its jurisdiction to comply with MS4 Permit requirements. Del Mar's land use primarily consists of low-density residential and commercial areas, so the strategies address problematic areas associated with these characteristics. The following example strategies have been identified to address the highest priority water quality conditions in Del Mar's jurisdiction within the Los Peñasquitos WMA. A complete list of strategies and their anticipated implementation schedule are provided in Appendix I. The strategies and schedules are subject to change and are contingent upon annual budget approvals and funding availability. They will be modified through the adaptive management process as needed. Any applicable projects which incorporate or implement this Plan will require its own environmental review, as required by the California Environmental Quality Act by the City of Del Mar as appropriate.

Development Planning – Greater Pervious Area Requirement

Del Mar has a stringent planning requirement that requires a conservative ratio of impervious area footprint to lot size, which assists in reducing the amount of directly connected impervious areas within its jurisdiction. Despite stringent planning requirements, the jurisdiction is highly developed, and many roads have not only limited right-of-way, but also limited physical space for green street implementation. While green streets will be considered, options may be limited due to right-of-way constraints and bluff stabilization concerns in many parts of the City of Del Mar.

Existing Development – Enhanced Patrol Program

A key strategy to address dry and wet weather bacteria loads from existing development, which includes commercial, industrial, municipal, and residential land uses, is a patrol-based program throughout the jurisdiction. Del Mar's size facilitates a hands-on approach to inspections, including mobile businesses. Frequent patrols, a minimum of six per year, allow for increased opportunities to identify potential illicit discharges and outreach to business owners and residents. Del Mar also has an irrigation control program in place to specifically address runoff associated with residential and commercial properties.

In addition to the patrol-based program, Del Mar performs street sweeping, catch basin cleaning, and other JRMP activities detailed further in Appendix I.

Public Education and Participation

Implementation of a public education and participation program is a key strategy to promote and encourage development programs, management practices, and behaviors that reduce the discharge of pollutants in storm water. Del Mar plans to continue and to expand several of its current outreach programs. Outreach program efforts include distributing informational material on irrigation runoff through the patrol program, conducting trash cleanup events through community-based organizations, and collaborating with other regional education and outreach efforts. Del Mar also plans to review the City storm water website and to identify and implement appropriate updates to reflect Water Quality Improvement Plan and JRMP revisions.

4.2.4.3 City of Poway Example Strategies

The City of Poway (Poway), located in the middle of the Los Peñasquitos WMA tends to have larger lot sizes and more pervious surfaces. In addition to administrative JRMP strategies, strategies focus on source control, such as open trash enclosures, and monitoring and reducing of the pollutant source exposure and storm water runoff at a public waste yard. The following example strategies have been identified to address the highest priority water quality conditions in Poway's jurisdiction within Los Peñasquitos WMA. A complete list of strategies and their anticipated implementation schedule are provided in Appendix I. The strategies and schedules are subject to change and are contingent upon annual budget approvals and funding availability. They will be modified through the adaptive management process as needed.

Existing Development – Promote Water Conservation Programs that Improve Water Quality

Poway plans to promote and collaborate with water agencies and other groups to encourage implementation of water conservation programs that improve water quality by reducing irrigation runoff with smart products or turf replacement and capturing rain water in residential areas. Poway plans to promote and encourage implementation of designated BMPs in residential areas through collaboration with the Metropolitan Water District (MWD) and San Diego County Water Authority (SDCWA) to promote SoCal Water$mart rebates and products. Products intended to conserve water include Water$mart irrigation systems, weather-based irrigation controllers, rotating sprinkler nozzles, soil moisture sensor systems, rain barrels, and turf removal.

Existing Development – Program to Address Illegal Grading on Private Property

Poway plans to address illegal grading on private property through a program dedicated to investigating reports and maintaining records of reported illegal grading. Through this program, violations of grading or storm water regulations would be issued “Stop Work” notices so that permits can be obtained and violations can be corrected.

Existing Development – MS4 Infrastructure Maintenance

Poway plans to continue to improve the MS4 infrastructure as well as roads, streets, and parking lots. Strategies to improve the MS4 infrastructure include optimizing catch basin cleaning to maximize pollutant removal, proactively repairing and replacing MS4 components to provide source control, increasing the frequency of open-channel cleaning and scour pond repair to reduce pollutant loads, and implementing controls to prevent sewage infiltration into the MS4. Strategies to enhance the street sweeping program include equipment upgrades and route optimization, sweeping of medians, and outreach of sweeping enhancement in targeted areas.

Structural BMPs – Green Infrastructure

Poway currently maintains five infiltration basins within the Los Peñasquitos WMA. In addition, a creek stabilization project in Rattlesnake Creek is scheduled to begin in FY16. This project is intended to stabilize a segment of the ephemeral tributary to Los Peñasquitos Creek. As required to meet numeric goals, green infrastructure and additional multiuse treatment area projects have been identified and are being investigated for potential future implementation.

4.2.4.4 City of San Diego Example Strategies

The City of San Diego (City) has identified administrative policies, urban development management programs, and innovative pilot projects as strategies to achieve its goals, and is investing in research for site locations for green infrastructure and other treatment BMPs throughout its jurisdiction in multiple WMAs. Furthermore, the City is currently developing a framework to evaluate other[1] potential benefits that the recommended strategies may provide beyond those associated with water quality. These other benefits may be financial, environmental, or societal. Other benefits refer to additional outcomes of a strategy beyond water quality improvements. Other benefits can include reduced air pollution, increased water conservation, aesthetics-induced property value increases, and increased business investments. The recommended strategies will be scored on the basis of the number of other benefits they provide, and may guide future updates to the Water Quality Improvement Plan (Appendix M).

The following strategies are examples of those selected by the City and planned for implementation. A complete list of strategies planned for implementation and a description of the strategy selection process is provided in Appendix I. These strategies will be implemented by the City of San Diego; they are not intended to be implemented by private entities (e.g., development, business, industry, etc.); however, some of the City's strategies, such as development planning, may have implications for private entities. In the Los Peñasquitos WMA, an analysis using a watershed model was conducted to identify the strategies required to be implemented to meet interim and final goals. The strategies and implementation schedules identified in Appendix I demonstrate that numeric goals will be met on the basis of that analysis. The adaptive management process provides the framework to evaluate progress toward meeting the goals and allows for modification of strategies, if necessary. If strategies are modified, the analysis will be updated as needed to provide assurance that numeric goals will be met. The strategies and schedules are subject to change and are contingent upon annual budget approvals and funding availability. They will be modified through the adaptive management process as needed.

The City of San Diego will address discharges of bacteria, sediment, and other pollutants through activities on public land across its jurisdiction in the Los Peñasquitos WMA. The following example strategies provide multiple benefits by addressing bacteria and sediment, as well as other water quality pollutants such as trash. They are targeted at reducing wet weather discharges, but may also assist the City in meeting dry weather numeric goals.

[1] Other benefits refer to outcomes of a strategy beyond water quality improvements. Other benefits can include reduced air pollution, increased water conservation, aesthetics-induced property value increases, and increased business investments.

Development Planning – Development and Implementation of a Green Infrastructure Policy and Program

In FY16, the City will develop a policy that will require the inclusion of green infrastructure features on all suitable City projects, including non-SUSMP (Standard Urban Storm Water Mitigation Plan) projects. This policy will be coordinated with ongoing efforts to update City design manuals and LID design standards for public LID BMPs. To guide implementation of the new policy, a green infrastructure program will be initiated in parallel. The program will begin with research and recommendation of ideal methods for green infrastructure project siting and prioritization within the City. By FY18, the City will initiate design of proposed green infrastructure and green streets projects to capture and treat approximately 265.5 acres of drainage area pending environmental permitting as necessary in the Los Peñasquitos WMA.

Construction Management – Explore Enhanced Inspections for Construction Sites

In FY16, the City plans to establish storm water standards and guidelines for construction sites. These standards and guidelines will include inspections at appropriate frequencies and will identify enforcements that can take place.

Existing Development – Enhanced Property-Based Inspection Program

In FY16, the City plans to administer a program that will require implementation of minimum BMPs for existing development (commercial, industrial, municipal, and residential) that are specific to the facility, area types, and PGAs. This program would increase the number of discharges identified compared to standard inspections. This program will also include the inspection of existing development at appropriate frequencies and methods, such as property-based inspections in lieu of traditional individual business inspections. The City conducted an extensive multi-year pilot study of its business inspection program and found that additional discharges could be found and abated by inspecting large properties rather than individual businesses.

Existing Development – Increased Enforcement

The City intends to enhance enforcement responses by increasing the number of Code Compliance staff. Between FY16 and FY19, the City is planning to gradually hire additional Code Compliance Officers and support staff to increase compliance with statutes, ordinances, permits, contracts, orders, and other requirements for IDDE, development planning, construction management, and existing development as detailed in the City's Enforcement Response Plan. This effort will target increased enforcement of irrigation runoff regulations and water-using mobile businesses.

Existing Development – Residential and Commercial Rebate Programs Targeting Water Quality

The City plans to continue and expand its landscape-based rebate program to target water quality impacts from residential and commercial areas in FY16 and beyond. Expansion of this program can occur through distribution of promotional and information material and brochures to community groups, libraries, and recreation centers.

Educational material would emphasize watershed stewardship and encourage the implementation of designated BMPs through rebates for rain barrels, grass replacement, downspout disconnections, and micro-irrigation.

Existing Development – MS4 Infrastructure Improvements and Flood Risk Management

In FY16, the City plans to continue to improve the MS4 infrastructure as well as the City's roads, streets, and parking lots. The City strives for water quality improvement and flood control risk management through proper and effective operation and maintenance activities (inspections and cleanings) for MS4 and related structures (catch basins, storm drain inlets, detention basins, channels etc.). Strategies to improve the MS4 infrastructure include optimizing catch basin cleaning to maximize pollutant removal, proactively repairing and replacing MS4 components to provide source control from MS4 infrastructure, and implementing controls to prevent sewage infiltration into the MS4. Strategies to enhance the street sweeping program include equipment upgrades and route optimization, sweeping of medians, and outreach of sweeping enhancement in targeted areas.

The City has adopted a Master Storm Water System Maintenance Program (MSWSMP) for flood control facilities. Each fiscal year, the City identifies channels requiring maintenance to restore flood control capacity. The list of identified channels is available at the City of San Diego's Storm Water Division website.

The City has identified a need to assess canyon areas where MS4 asset structural or configuration issues have the potential to cause or contribute to downstream water quality problems, such as sediment loads. Accordingly, the City has developed and implemented a prioritized assessment strategy for canyon outfall assets to identify areas where assets may need to be rehabilitated, replaced, or relocated to prevent structural damage, reduce or eliminate potential erosion issues, and/or improve water quality in downstream receiving waters. The City is currently implementing the fourth phase of this work which will exclusively focus in the Los Peñasquitos WMA and will identify priority locations and sediment load reductions associated with outfall repair/relocation.

In FY16, the City plans to request resources to increase identification and enforcement of actionable erosion and slope stabilization issues on private and municipal property and require stabilization and repair. This strategy would be performed through an inventory and assessment of eroding areas and their risk to surface waters, followed by development of a schedule for ongoing inspection and stabilization.

The City continues to collaborate with watershed stakeholders to plan and implement projects that will further Los Peñasquitos Lagoon restoration efforts and reduce flooding in the lower watershed. Efforts may include (1) dredging of tidal channels and inlet area to restore and maintain tidal circulation and facilitate draw down times of floodwater in the Lagoon, and (2) modeling and/or studies to analyze sediment transport and flood control options.

Increased Public Education and Participation

The City of San Diego conducts an extensive public education and outreach program through its Think Blue program. Examples include the following:

- The City will continue and expand several of its current outreach programs. Outreach programs would be widely implemented but targeted to home owners associations (HOAs), business owners associations (BOAs), maintenance districts, various community groups through organized community trash cleanup events, and water-used mobile businesses.
- Workshops will be held, community events will be organized, and informational material and brochures will be disbursed to reach community members and advise them of incentives, regulations, and training, and provide general information they need for implementation of good watershed stewardship practices or BMPs.

Structural Strategies – Green Infrastructure

Green infrastructure projects in Los Peñasquitos WMA will be implemented in a phased approach. Ten projects on public parcels are currently planned with a total of roughly 20 acres of green infrastructure in the form of bioretention and/or permeable pavement. Approximately 238 acres of potential green streets are anticipated for implementation throughout Los Peñasquitos WMA.

4.2.4.5 County of San Diego Example Strategies

The County of San Diego comprises only 3 percent (1,875 acres) of the Los Peñasquitos WMA. This area includes 73 percent undeveloped vacant land/natural open space, 20 percent rural residential space, and 7 percent agricultural and roadway areas. Therefore, during the interim permit cycles, the County will focus on implementing its programmatic programs to meet its goals. However, if it is determined through assessments that the County is unable to meet its interim goals, the County will work toward a solution through adaptations of the programmatic program and through collaboration with watershed partners. Specific dry and wet weather goals are further discussed below.

Dry Weather Strategies

The County's dry weather goal to effectively eliminate anthropogenic discharges will be accomplished through the implementation of numerous JRMP strategies to reduce dry weather runoff, as described in the County of San Diego JRMP. In particular, the County has shifted to a more active field program to better locate and abate dry weather flows. County storm water staff members spend a greater frequency of time present in unincorporated communities identifying nuisance anthropogenic flows and addressing them through appropriate education and enforcement strategies. All County staff members have been trained to identify and report illicit discharges and illicit connections during required annual storm water training; this training has been updated to reflect recent MS4 Permit changes.

In addition to the increase in County staff field surveillance, the County is also implementing a focused program to reduce flow at targeted MS4 outfalls that have demonstrated persistent dry weather flow. The County understands that there are no reported persistent dry weather flows in the unincorporated area, but will confirm whether this is the case through field surveys. Regular monitoring will be conducted to determine the conditions of all outfalls. If dry weather flows are detected, staff will initiate a field investigation to seek out and abate the source of flow.

Using the strategy above, the County will strive to effectively eliminate dry weather flow from outfalls in the Los Peñasquitos WMA. Throughout the implementation of the Water Quality Improvement Plan, adaptive management will be used to evaluate reasonable progress toward the numeric goals and to consider changes to program design and project implementation, as needed to meet goals and as funding becomes available. This adaptive management process will be further described in the final Water Quality Improvement Plan. Efforts will be adaptively managed to mitigate dry weather flows and consider only small-scale structural controls if needed. Compliance with the TMDL goal, scheduled for April 2021, will be demonstrated through the storm drain outfall monitoring program.

Wet Weather Strategies

The County will address wet weather bacteria and sediment load reductions primarily through a programmatic approach. The implementation of the programmatic approaches of the storm water program is estimated to result in a 10 percent reduction of the bacteria loads and will be used to meet compliance. Baseline loads will be determined during FY15-16. The load reduction is anticipated to take place incrementally by permit term, with a 0.5 percent reduction during the second permit term, a 0.5 percent reduction during the third permit term, and a 1 percent reduction during the fourth permit term. If the anticipated reductions are not confirmed by monitoring, then program adjustments will be made according to the adaptive management process. This may require the incorporation of more effective strategies, changes in program design, or incorporation of additional structural BMPs if funding is available.

Additionally, the County of San Diego will assess during the second permit term whether or not predicted bacteria reductions are being met through the programmatic approaches. If this assessment indicates that a final load reduction of 2 percent cannot be reached through changes to the programmatic program, then structural BMPs may be considered. A county-wide program may be implemented, if determined to be feasible, that encourages small-scale structural BMPs through a public-private partnership. The BMPs may include roof downspout disconnects to landscaped areas, rainwater use through rain barrel capture, rain gardens, and bioswales. This is in addition to the anticipated BMPs required to be constructed during redevelopment. If determined to be feasible, the public-private partnership small-scale BMP program is an optional strategy to be implemented only as needed and as funding becomes available.

The County has also developed two wet weather goals to address sediment to address the two compliance pathways that are anticipated to be required to meet the Sediment TMDL. The first compliance pathway requires a sediment load reduction of 47.7 percent from the current modeled baseline load of 76 tons per year for the Los Peñasquitos Creek subwatershed and 48.2 percent current modeled baseline load of 7.6 tons per year within the Carroll Canyon subwatershed. Programmatic approaches are estimated to reduce sediment loads by 10 percent. Because of the limited available area for structural BMPs or for significant redevelopment to occur within the County of San Diego, structural strategies are not currently being considered within the County's jurisdiction. However, the County will consider collaborations with watershed partners as necessary and as funding becomes available to address watershed sediment issues on a regional basis.

The County may also consider alternate approaches for compliance with the Sediment TMDL. For example, the current land uses are almost unchanged from the 1973 land uses in the unincorporated area. Quantitative modeling was conducted during development of the Sediment TMDL to reduce current sediment loads to the 1973 predicted levels. As outlined in the Table 4-7, the County may choose to meet compliance in one or more subwatersheds by demonstrating that the sediment load is in compliance with the TMDL allowable loads modeled using 1973 land uses.

The second compliance pathway requires that the Los Peñasquitos Lagoon be restored, to include an increasing trend toward 80 percent of the historical salt marsh habitat or 346 acres of tidal/non-tidal salt marsh habitat. The TMDL establishes monitoring protocols to evaluate trends in habitat within the lagoon and will be utilized to determine the necessity to develop a restoration plan. If yearly monitoring warrants, the County will collaborate with the appropriate watershed parties to develop and implement this plan.

4.2.5 Collaborative WMA Strategies

In addition to implementing strategies on a jurisdictional basis, Responsible Agencies may collaboratively implement projects within the WMA that improve water quality. Two restoration opportunities are being explored. The first is in response to the Sediment TMDL (Section 4.2.5.1) and the second is an existing effort through the North Coast Corridor (NCC) Program (Section 4.2.5.2). Other watershed-wide efforts include encouraging water conservation efforts to meet dry weather goals, collaborating on the potential for alternative compliance and the WMAA, and collaborating with the Regional Board.

4.2.5.1 Watershed Collaboration for Los Peñasquitos Lagoon Restoration

This strategy will identify opportunities for stakeholder collaboration to promote the restoration of salt marsh areas and overall improvements in estuarine and other beneficial uses within the Los Peñasquitos Lagoon. Benefits of this strategy include more efficient targeting and prioritization of lagoon restoration activities, increased cost-effectiveness of selected BMP strategies in the watershed, and development of partnerships across the MS4 jurisdictions and other TMDL responsible parties. These efforts will be coordinated with the Lagoon Enhancement Program currently being updated by the Los Peñasquitos Lagoon Foundation and will require that (1) funding to address MS4 discharges and dry weather input of freshwater is identified and secured, (2) staff resources are identified and secured, (3) partners are identified and formal memoranda of understanding (MOUs) are developed and executed, (4) permits required by regulatory agencies are secured, and (5) consensus and community support are achieved. In addition, the need for collaboration will depend on progress toward achieving interim and final numeric goals on the basis of the MS4 jurisdiction-specific strategies.

Planning will include evaluation of potential short- and long-term restoration activities using a phased approach and will assess their effectiveness in restoring salt marsh habitat in critical areas, their ability to maintain restored areas over time, and their capacity to mitigate current and future impacts on Lagoon beneficial uses. Of particular interest will be identifying restoration activities designed to increase the resiliency of the lagoon to sedimentation (from watershed and ocean inputs), freshwater flows, and other impacts during initial years until the necessary sediment load reduction and other actions can be achieved that will to support the lagoon's long-term viability (especially salt marsh areas). Such an approach may facilitate the success of nonstructural BMPs that target direct sources of constituents of concern and result in more efficient use of funds, while minimizing impacts and costs related to implementation and maintenance of structural BMPs that may not be needed through in the long term. For example, efforts to increase the tidal prism and water circulation in the Lagoon may allow for a shift in resources toward lagoon restoration versus building structural BMPs throughout the watershed. In addition, regional BMPs, such as the Los Peñasquitos Creek sedimentation basin, have proven to be more effective at removing sediment compared with WMA BMPs. It's important to note that collaboration and participation of all key stakeholders will be crucial to successfully implement any restoration activities identified.

To achieve Water Quality Improvement Plan numeric goals, it will be necessary to incorporate elements of the Lagoon Enhancement Program along with lagoon modeling/analysis. The first step would be to identify the appropriate combination of regional BMPs and lagoon restoration efforts that are likely to provide significant increases in salt marsh habitat over time, and will help offset the need for the most costly structural BMPs that are programmed to be built throughout the watershed at the end of the compliance schedule. The second step will be to perform modeling/technical

analysis to quantitatively assess the appropriate combination of sediment reduction and lagoon restoration activities needed to help increase the Lagoon's resiliency to sedimentation and other impacts (as described above). The modeling/technical analysis performed would also be used to identify more effective regional structural BMPs in conjunction with the lagoon restoration strategy. In addition, other strategies that are particularly relevant within the Los Peñasquitos WMA will be quantified as part of this analysis. For example, stream channel restoration, relocation of storm water outfalls, and other activities can potentially reduce the need more expensive BMP implementation efforts within the WMA, as described in Section 4.3.

Based on current plans for the Lagoon Enhancement Program and future refinements to watershed BMP strategies, it is estimated that approximately 15 percent of the sediment load reduction required could be offset or accomplished through more efficient measures. This estimate conservatively assumes approximately 5 percent of the sediment load reduction may not necessarily be due to future restoration efforts and improvements in lagoon function and sediment transport characteristics. Regional BMPs, similar to the existing Los Peñasquitos Creek sedimentation basin, would be able to provide more efficient sediment trapping and removal. A preliminary modeling analysis indicates that 5 percent of the sediment load reduction could be reasonably achieved through the development of sedimentation basins in the lower portion of the watershed. Finally, other more efficient watershed strategies such as outfall repair and relocation, slope stabilization, and stream restoration could conservatively achieve 5 percent of the load reduction at a much lower cost. These potential benefits and cost savings were incorporated into the overall Water Quality Improvement Plan strategy. These estimates will be updated when the lagoon modeling/analysis (described above) and future BMP special studies are completed. It is anticipated that these two steps would occur over the next one to two years, depending on momentum in establishing watershed partnerships and funding. Key to the success of the Water Quality Improvement Plan will be an effective adaptive management program that will track progress in restoring the Lagoon's beneficial uses and adjust strategies, as needed.

4.2.5.2 Los Peñasquitos Wetland Restoration Project

The NCC Program is a region-wide effort led by Caltrans and SANDAG that is intended to improve coastal transportation (including Interstate 5 and the coastal rail and transit system) while protecting and restoring coastal habitats throughout the corridor (Figure 4-10). The 27-mile-long project stretches across the cities of Oceanside, Carlsbad, Encinitas, Solana Beach, Del Mar, and San Diego, and provides improvements for six coastal lagoons, including the Los Peñasquitos Lagoon.

Figure 4-10
Los Peñasquitos Lagoon (LPLF, 2014)

In the Los Peñasquitos WMA, SANDAG and Caltrans acquired the Pardee Carmel Valley property, known as Deer Canyon, to restore native upland habitat. The Deer Canyon habitat restoration project will provide 12.6 acres of wetlands creation, 30.9 acres of upland habitat creation, and 0.25 acre of upland habitat enhancement. The project will remove non-native vegetation and revitalize coastal sage shrub that is native to the area, preserving the habitat of the California Gnatcatcher. Bioswales are planned to be implemented along the freeway to prevent runoff from entering into the Lagoon. The NCC Program is implementing construction in phases from 2010 through 2040. The program is a $6.5-billion investment in the region that will be paid for through a combination of federal, state, and local funds. The NCC Program is part of TransNet, the voter-approved, half-cent sales tax initiative that helps fund transportation projects in the region (TransNet, 2014).

4.2.5.3 Collaborative Approach to Irrigation Reduction

Responsible Agencies of the Los Peñasquitos WMA are collaborating with water agencies to encourage implementation of water conservation efforts. In a Mediterranean climate such as that of southern California, water conservation efforts ensure a reliable water supply while keeping the region naturally beautiful. Water conservation that attempts to reduce irrigation and minimize storm water runoff can also improve water quality of receiving waterbodies, including reducing anthropogenic freshwater flows into the Los Peñasquitos Lagoon. The MWD and SDCWA are primary water providers in southern California that lead regional and multijurisdictional programs that incentivize water conservation efforts.

MWD's SoCal Water$mart Program and SDCWA's WaterSmart Program support conservation efforts by offering incentives in the form of rebates for rain barrels, rotating sprinkler nozzles, weather-based irrigation controllers, soil moisture sensor systems, and turf replacement (MWD, 2014; SDCWA, 2014). San Diego County's WaterSmart program also offers landscape training classes and plant fairs to educate and engage the community on water conservation efforts. Several Responsible Agencies and local municipal water districts promote and express interest in collaborating with MWD and SDCWA to support their water conservation incentive programs (Table 4-16). Funding and resources to support these region-wide water conservation efforts for each Responsible Agency are presented in Table 4-16. There is also potential to collaborate with retail water suppliers who have more direct contact with water users and who can more effectively monitor water consumption to identify possible sources of system leaks and over-irrigation.

Table 4-16
Responsible Agency Collaboration with Regional and WMA Water Conservation Programs

Responsible Agency	Responsible Departmental Agency	Metropolitan Water District (MWD)	San Diego County Water Authority (SDCWA)	Source of Funding
City of San Diego	Transportation and Storm Water Department (T&SW); Public Utilities Department (PUD)	✓	—	Residential BMP Rebate program is intended to promote rebates for rain barrels, irrigation controls (turf conversion), and downspout disconnections.
City of Del Mar	Clean Water Program (CWP)	✓	✓	Costs to be confirmed upon budget approval.
City of Poway	Development Services Department (DSD)	✓	✓	City to provide cost
County of San Diego	Watershed Protection Program (WPP)/Other County Department	✓	✓	General Fund

Water conservation efforts through residential and/or commercial rebates are not applicable to Caltrans.

Modeling within the San Diego region, including in the Los Peñasquitos WMA, indicates that a 25 percent reduction in irrigation (modeled as a reduction in irrigated land by 25 percent and the reduction of overspray) results in an average 99 percent reduction in fecal coliform. The 25 percent reduction in irrigation is in line with and slightly more aggressive than California's statewide 20x2020 Water Conservation Plan (20x2020 Plan), which aims to reduce the urban water demand by 20 percent per capita by 2020. In California, outdoor water consumption exceeds 40 percent of overall urban water use (DWR, 2010). The reduction of irrigation (or outdoor water) demand not only benefits receiving water conditions, including the restoration of salt marsh habitat, but also reduces costs of new water infrastructure and reduces water-related energy among other benefits discussed in the 20x2020 Plan.

The collaborative strategies implemented through the Responsible Agencies and water agencies to reduce and eliminate dry weather flows will be encouraged and implemented throughout the watershed, reducing freshwater discharges not only directly to the lagoon through MS4 outfalls, but also to tributaries upstream through MS4 discharges, surface runoff, and percolation through groundwater seeps. By targeting a reduction in irrigation, both irrigation runoff and overall anthropogenic contributions to a rising groundwater table will be addressed.

4.2.5.4 Offsite Alternative Compliance Option (WMAA)

The MS4 Permit allows for the implementation of offsite alternative compliance methods in lieu of meeting structural BMP design standards and/or hydromodification management criteria on the project site. To implement an alternative compliance program, a jurisdiction must first complete an optional WMAA as detailed in MS4 Permit Provision B.3.b(4). The San Diego County Copermittees have collectively funded and provided guidance for development of a regional WMAA. Findings of the draft regional WMAA, specific to the Los Peñasquitos WMA, are provided in Appendix N. The WMAA characterizes important processes of the watershed through creation of GIS layers that include the following information:

- A description of dominant hydrologic processes, such as areas where infiltration or overland flow likely dominates
- A description of existing streams in the watershed, including bed material and composition, and whether they are perennial or intermittent
- Current and anticipated future land uses
- Potential coarse sediment yield areas
- Locations of existing flood control structures and channel structures, such as stream armoring, constrictions, grade control structures, and hydromodification or flood management basins

Information from the WMAA can be used for the following purposes:

- To identify candidate projects that could potentially be used as offsite alternative compliance options in lieu of satisfying full onsite retention, biofiltration, and hydromodification runoff requirements
- To identify and/or prioritize areas where it is appropriate to allow certain exemptions from onsite hydromodification management BMPs

Alternative compliance methods can be implemented at the subwatershed scale (e.g., multiuse treatment area BMPs) or as green infrastructure BMPs (e.g., green streets). Regardless of scale, offsite alternative compliance BMPs mitigate for pollutants not reliably retained on the project site or hydromodification impacts not reliably mitigated onsite per requirements detailed in MS4 Permit Provisions E.3.c.(1) and E.3.c.(2). Note that onsite treatment control BMPs will still be required, although such BMPs would not be required to meet the onsite retention requirements. In addition to meeting site-specific structural BMP and hydromodification management requirements, alternative compliance methods can provide enhanced benefits for the WMA.

In addition to allowing for offsite alternative compliance program development, the WMAA findings can also assist in determining the feasibility of candidate projects for offsite alternative compliance implementation (MS4 Permit Provision B.3.b.(4)(b)). The Responsible Agencies are currently compiling a list of candidate projects that consider the numeric goals of the Los Peñasquitos WMA as well as projects previously identified in JRMPs and other regulatory documents. Draft candidate project lists currently available are provided in Appendix N. The Water Quality Improvement Plan will be updated to include the final candidate project list, as that list is made available.

The WMAA documents were developed as part of a regional Copermittee effort and followed criteria set forth in the MS4 Permit. The effort included a call for data for information to be included in the analysis. Data included in the documents are intended for guidance purposes. Where more site specific information is available, then the more detailed information should be used.

The WMAA also provides an assessment of applicable exemptions to hydromodification management requirements, in addition to the MS4 Permit's allowed exemptions regarding direct discharges to exempt receiving waters including the Pacific Ocean, lakes, or reservoirs (or direct discharges to underground storm drains or concrete-lined channels directly discharging to the Pacific Ocean). For the Los Peñasquitos WMA, no additional potential exemptions are recommended with regard to exempt river reaches, stabilized conveyances, highly impervious watersheds, or tidally influenced lagoons.

4.2.5.5 Collaboration with the Regional Board

The Responsible Agencies will work with the Regional Board to identify solutions and address sources of potential water quality impairments within the Los Peñasquitos WMA. Descriptions of the current priorities are provided below and will be updated as implementation, monitoring, and assessment continues.

Enforcement of the Industrial General Permit

As discussed in Section 1, the MS4 Permit holds the Responsible Agencies responsible for pollutants originating from non-MS4 or non-municipal sources if those pollutants are ultimately discharged from an MS4 under their jurisdiction, although inspection and oversight responsibility may be outside of the Responsible Agencies' purview or authority. The Responsible Agencies, therefore, recognize the need for collaboration

and improved communication with non-municipal sources and the appropriate regulatory agencies to (1) ensure that these discharges are appropriately regulated before entering the Responsible Agencies' MS4s, and (2) improve water quality throughout the WMA.

In the Los Peñasquitos WMA, a strategy to address sediment, bacteria, and freshwater discharge impairments is to ensure that industrial dischargers are fulfilling their requirements under the Industrial General Permit (IGP). The Responsible Agencies and the Regional Board have dual permitting and oversight responsibilities over land use where industrial activities occur. The Responsible Agencies conduct inspections within their jurisdictions and inform the Regional Board when industries have the potential to be regulated under the IGP, but are not permitted (non-filers), or when non-compliance with the IGP is suspected. The Responsible Agencies will continue to work with the Regional Board to identify priority areas or facilities that need additional follow-up. Follow-up may take place in the form of additional inspections by the Regional Board on facilities with exceedances of monitored constituents and verification that facilities are monitoring for all appropriate constituents.

Enforcement of Other Non-MS4 Dischargers

The Responsible Agencies will work with the Regional Board to identify and address other sources of potential water quality impairment within the WMA. These sources may include working with Phase II MS4 dischargers, transportation agencies, school districts, nurseries and agricultural dischargers, or non-compliant construction dischargers, as the need arises.

Bacteria TMDL Updates

The Pacific Ocean Shoreline segment at the Los Peñasquitos river mouth was removed from the 303(d) list for REC-1 impairment in 2010. However, calculation of the Bacteria TMDL had already begun and the segment remained in the Bacteria TMDL through Bacteria TMDL adoption in 2011. The Los Peñasquitos WMA Pacific Ocean Shoreline segment was then incorporated into the Bacteria TMDL requirements within the MS4 Permit in 2013. The Responsible Agencies will pursue removal of the beach segment from the Bacteria TMDL and Attachment E of the MS4 Permit.

In February 2010, the Regional Board adopted Resolution No. R9-2010-0001, *Resolution Amending the Water Quality Control Plan for the San Diego Basin (9) to Incorporate Revised Total Maximum Daily Loads for Indicator Bacteria, Project I – Twenty Beaches and Creeks in the San Diego Region (Including Tecolote Creek),* referred to as the Bacteria TMDL. As part of the Bacteria TMDL Implementation Plan, the Regional Board included a planned milestone to consider revisions to the Bacteria TMDL on the basis of new technical information provided by the dischargers or other entities within five years after the effective date of the TMDL (April 4, 2016). The Counties of San Diego and Orange and the City of San Diego are coordinating with the Regional Board to assess the scope of a third-party TMDL reopener process.

4.2.5.6 Refinement of Water Quality Regulations

A goal for Responsible Agencies is to protect human health and improve water quality in an effective and efficient manner. To achieve this goal the Water Quality Improvement Plan will be used as a tool to plan and cost the BMPs needed to protect human health and improve water quality for the highest priority water quality conditions in the Los Peñasquitos WMA. The MS4 Permit clearly states that the "Copermittees need only comply with permit conditions relating from discharges from the MS4s for which they are operators." This objective is reflected in the discussion presented in Section 1.1 and Figure 1-1. However, it is worth noting that the MS4 Permit assigns TMDL discharge responsibility entirely to the Copermittees. As such, the Responsible Agencies will collaborate with the Regional Board to refine the accuracy of regulations to ensure non-MS4 dischargers are regulated appropriately. The Water Quality Improvement Plan provides an opportunity to present a scenario where discharges associated with areas within the Copermittees' jurisdictions covered by other NPDES permits or regulatory procedures, or owned by federal or state agencies or Indian tribes, are removed from the Copermittees' responsibility. In short, the goal of this exercise is to begin a dialogue with the Regional Board that may lead to the following outcomes:

(1) Remove non-MS4 discharges and the associated BMPs needed to treat those discharges from the Responsible Agencies' burden.

(2) Amend current TMDLs and the MS4 Permit to correctly assign responsibilities for non-MS4 discharges to the appropriate entities.

(3) Strengthen non-MS4 NPDES permits that are directly tied to the requirements of existing and future TMDLs. For example, the City of San Diego and USEPA Region 9 are currently collaborating on a modeling study to evaluate the relative pollutant loads from various commercial, industrial, institutional, and MS4 Phase II sources and the costs to reduce loads from each source. Results of this analysis will inform the USEPA of the ability of the MS4 Permit to address these sources, potentially resulting in new specific requirements for the Industrial General Permit and General Phase II Permit to address TMDL discharges.

It is important to note that the Copermittees would continue to implement programs to inspect, enforce, and oversee some of these dischargers because the MS4 Permit requires that "each Copermittee must implement a program to actively detect and eliminate illicit discharges and improper disposal into the MS4, or otherwise require the discharge to apply for and obtain a separate NPDES permit."

Other NPDES Permits

There are several active NPDES permits for dischargers within the Los Peñasquitos WMA that are not addressed by the MS4 Permit, including:

- NPDES No. CAS000003 – Statewide Storm Water Permit, Waste Discharge Requirements for State of California Department of Transportation (Caltrans Permit)
- NPDES NO. CAS000002 – General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (General Construction Permit)
- NPDES General Permit No. CAS000001 – Waste Discharge Requirements for Dischargers of Storm Water Associated with Industrial Activities Excluding Construction Activities (Industrial General Permit)
- NPDES General Permit No. CAS000004 – Waste Discharge Requirements for Storm Water Discharges from Small MS4s (General Phase II Permit)

Caltrans is voluntarily participating in the Water Quality Improvement Plan, and is proposing BMPs within its jurisdiction to meet jurisdictional numeric goals. The General Construction Permit is difficult to assess because areas are never constant, and oversight of these areas by both the Copermittees and the Regional Board are addressed through separate processes. However, areas addressed by the Industrial General Permit and the General Phase II Permit are clear and their responsibilities can be considered in the Water Quality Improvement Plan. The Industrial General Permit states that "discharges addressed by this General Permit are considered to be point source discharges, and therefore must comply with effluent limitations that are consistent with the assumptions and requirements of any available waste load allocation for the discharge prepared by the state and approved by USEPA." Similarly, the General Phase II Permit states that "discharges from Small MS4s are point source discharges subject to TMDLs," and further states that "this Order requires Permittees to comply with all applicable TMDLs." With TMDL pollutants representing the highest priority water quality conditions, it is logical to assume that the Industrial General Permit and General Phase II Permit are independently responsible for meeting associated wasteload allocations, and therefore can be separated from the Copermittees responsibility in the Water Quality Improvement Plan.

In addition to these NPDES permits, the Regional Board allows a Conditional Waiver of Discharges from Agricultural and Nursery Operations (Ag Waiver) that applies to discharges of storm water runoff and irrigation return water. Ag Waiver enrollment is accomplished in one of three ways. Operations can (1) join an established Monitoring Group; (2) submit a Notice of Intent (NOI) and form a new Monitoring Group; or (3) enroll as an individual by submitting a NOI. However, there is little data available to identify those areas in the Los Peñasquitos WMA covered by the Ag Waiver.

Land owned by federal and state agencies or Indian tribes can also be considered in terms of removing responsibility of the Copermittees in the Water Quality Improvement Plan. Copermittees do not have authority to require BMPs to be placed within these lands, nor do they have authority to regulate discharges from these lands.

As a result of these considerations, the following land use categories will be assessed for potential removal from the responsibility of the Copermittees within the Water Quality Improvement Plan:

- Industrial Areas
- General Phase II Permittees
- Agricultural Areas
- Federal, State, and Indian Land

Alternative scenarios are currently being developed to estimate the load contribution and associated BMP implementation implications for MS4s and Non-MS4 entities in the Los Peñasquitos WMA. The results of this analysis will be summarized in Section 4.4 to be provided in the full Water Quality Improvement Plan (June 2015). The results will also provide important context for collaborative discussions with the Regional Board and non-MS4 entities in the future. The following sections describe how the land areas for the four categories listed above are being selected for the alternative scenarios.

Industrial Areas

The Industrial General Permit addresses a range of industrial facilities and operations; however, the inclusion of specific industry owners within the permit is contingent on their registration within the permit. To date, the Industrial General Permit addresses only a limited number of registrants as identified in California's Stormwater Multiple Application and Report Tracking System (SMARTS). Industrial permit locations were geocoded on the basis of address information provided in SMARTS (if available) and the associated parcels were identified on the basis of SANDAG parcel ownership GIS data.

An additional consideration for assessing the impact of industrial areas on pollutant loadings, particularly those not currently registered in the Industrial General Permit, is the use of land use GIS to establish industrial areas. Assessment of industrial land use can provide an indication of the impact that additional registrants in the Industrial General Permit can have on reducing the responsibility of the Copermittees, should those areas be fully registered in the permit. Currently, the USEPA is providing similar analyses of the impact of industrial land uses (as well as commercial and institutional areas) in watersheds in the San Diego and Los Angeles Regions to evaluate the effectiveness of the NPDES program to regulate these areas. The intent of this study is to inform future discussions regarding revisions of the Industrial General Permit, including increased registration of all applicable industrial dischargers and stricter requirements to directly address TMDL requirements and other water quality impairments. Further analysis of industrial areas in the Water Quality Improvement Plan

will provide additional assessment of the balance between responsibilities of the Copermittees, and the role of all industrial areas in the Industrial General Permit should full registration of industrial areas take place.

For the purpose of this analysis, SANDAG land use data were used to identify industrial areas in the WMA. This analysis will also provide important information in terms of cost implications of non-registered industrial dischargers on Copermittees.

General Phase II Permit

Several small MS4s that are regulated under the Phase II General Permit are located within the Los Peñasquitos WMA. As with the Industrial General Permits, further analysis is necessary to identify Phase II permit responsibilities to facilitate meeting the Water Quality Improvement Plan numeric goals. Existing Phase II Permits were spatially identified on the basis of information gathered from permit documentation on the Regional Board's website. In addition, it is understood that some school districts and other facilities that qualify will be incorporated into the General Phase II Permit program in the near future. These potential Phase II Permits were not spatially located, but could be included in future analyses.

Agriculture

Without specific information regarding agricultural areas enrolled in the Ag Waiver, SANDAG land use data were used to identify agricultural lands within the Los Peñasquitos WMA to help with estimating the contribution from these areas.

Federal, State, and Indian Land

Multiple areas in the Los Peñasquitos WMA are owned by federal or state governments, or Indian tribes. These lands were identified on the basis of SANDAG parcel ownership GIS data to help estimate the contribution from these areas.

4.3 Implementation Schedule to Meet Final Goals

Responsible Agencies must identify reasonable schedules that demonstrate progress toward achieving the interim and final numeric goals presented in Section 4.1. Compliance analysis results presented in Appendix J and summarized in Section 4.3.1 dictate the schedule for implementation, which is presented graphically in Section 4.3.2. This Water Quality Improvement Plan incorporates the 20-year Sediment TMDL and 20-year Bacteria TMDL compliance schedules to attain wet weather goals and the 10-year Bacteria TMDL compliance schedule to attain dry weather goals. Strategy development and planning include an assessment of relative cost-effectiveness of each strategy and was one of the key drivers in phasing strategy implementation. Nonstructural BMPs are effective in reducing pollutant loads before they enter the storm drain system and are generally cost-effective and require a shorter planning period. Therefore, most nonstructural strategies are planned for implementation before or upon approval of the Water Quality Improvement Plan. Structural BMPs can be cost-effective when greater load reductions are needed and treatment must occur after the pollutants

enter the storm drain system, particularly when benefits other than water quality improvements are considered. However, planning for structural BMPs requires additional time to secure resources, design BMPs, and obtain permits. Most of the potential structural BMPs are planned for later in the compliance period to allow more time to ensure that the implementation is necessary to meet numeric goals and is designed to achieve the load reductions required, and that alternatives to construction have been evaluated.

In the Los Peñasquitos WMA, a compliance analysis using a watershed model was conducted to identify the strategies required to be implemented to meet interim and final goals. BMP optimization models were used to simulate associated pollutant reductions over the entire compliance period. A summary of the level of effort anticipated for each modeled strategy, the associated load reductions predicted for the highest priority water quality conditions, and the predicted benefit to other water quality parameters for wet and dry weather conditions are presented in Section 4.3.1.

The Los Peñasquitos watershed model has been continuously updated since development of the bacteria and sediment TMDLs on the basis of recent studies that provided additional information and insight on pollutant sources in the watershed (especially within Carroll Canyon), fate and transport processes, and existing water quality conditions. This information was used to improve the accuracy of the model and provide a sound foundation for the evaluation of the various Water Quality Improvement Plan strategies. Long-term sediment transport modeling at the watershed scale is particularly complex because of changing weather patterns and instream dynamics that constantly vary temporally and spatially. Because of these challenges, the model provides the best possible representation of pollutant fate and transport and loads contributed by the watershed and stream network, based on available data. Likewise, substantial efforts were made to identify and quantify the broader BMP strategies (structural and nonstructural) that may be needed to meet the Water Quality Improvement Plan numeric goals. These strategies, including multiuse treatment areas, green infrastructure, and green streets, represent a range of BMP types proven effective at removing pollutants and reducing dry weather flows, in some cases.

The suite of nonstructural and structural strategies were selected in the order described in Section 4.3.1 based on efficient targeting of the highest priority water quality condition as well as consideration of multiple benefits, taking into account the environmental, economic, and social components of each strategy. Following nonstructural strategies, structural strategies were proposed in the model in order of efficiency. Accordingly, following nonstructural strategies, all identified potential multiuse treatment areas on public parcels and green infrastructure opportunities were proposed, with implementation phased to meet interim and final goals. Green streets were then proposed to the optimal extent of implementation (30 percent based on the modeled point of diminishing return). Green streets, when sited and designed appropriately, as described in detail in Appendix J, are highly effective at pollutant removal through filtration and sedimentation. Even in areas with higher erodibility and sediment loading, green streets can be located upstream to reduce volume and peak flow.

Significant research was conducted to quantitatively represent these BMPs in the modeling analysis to demonstrate their relative effectiveness and identify the level of implementation needed to meet the numeric goals. Although this analysis focused on these broader BMP categories, which have widespread application and sufficient data available for model representation, additional strategies exist that are particularly relevant within the Los Peñasquitos WMA. For example, scouring of canyon walls due to storm water outfalls has been a historical problem within the WMA. Also, historical and current sediment loading from mining operations (quarries) within the Carroll Canyon Creek area represent an important data gap. Stream channel restoration, in addition to the planned restoration projects, may also be beneficial and feasible in other areas of the watershed. For Carroll Canyon, the most cost-effective sediment reduction measures will likely consist of a combination of upgrades to existing MS4 outfalls along canyon slopes, low-impact development measures in the developed mesas, restoration or enhanced sediment management of the reaches passing through the two quarries, and stabilization of sections of Carroll Canyon Creek and its drainages. These strategies are discussed in Section 4.2.3.4 and will be further explored and quantified in the near future. In addition, development of a comprehensive Los Peñasquitos Lagoon Restoration strategy (as outlined in Section 4.2.5.1) will provide an opportunity to reassess the watershed sediment load reduction needs and further refine the overall direction of the Water Quality Improvement Plan. Potential permitting challenges and local data necessary to incorporate these strategies into the modeling analysis will be addressed.

In summary, the current modeling analysis incorporates the best use of available data and an effective suite of proposed structural and nonstructural strategies that were prioritized and selected as outlined in Section 4.3.1. Continued improvement of the compliance/modeling analysis is anticipated through the following steps:

- Quantification of the load reduction benefits associated with lagoon restoration, as discussed in Section 4.2.5.1
- Completion of an Outfall Assessment/Special Study quantifying benefits associated with storm water outfall repairs (in particular, those that may be causing significant canyon scouring)
- Incorporation of other Special Studies that further quantify sediment transport dynamics throughout Carroll Canyon, including a study currently underway with locations upstream and downstream of mining areas and a Flanders Canyon Study (completed by AMEC in 2013)
- Coordination with resource agencies on permitting of outfall extensions/repairs for overall benefit to the WMA
- Evaluation of other opportunities and data collection necessary for model representation and compliance analysis

Additionally, collaborative efforts with the Regional Board and potential refinement of the water quality regulations covered in Sections 4.2.5.5 and 4.2.5.6, respectively, will provide further opportunities for an improved compliance analysis.

The adaptive management process provides the framework to evaluate progress toward meeting the goals and allows for modification of strategies. As strategies are modified, the compliance analysis will be updated as needed to provide assurance that numeric goals will be met. Section 4.3.1 presents the modeling analysis that demonstrates that planned strategies will reach the required load reductions for sediment, bacteria, and freshwater discharge (flow). The modeling results also include benefits to pollutants other than the highest priority water quality conditions, demonstrating the multiple benefits of nonstructural and structural strategies. Section 4.3.2 presents the schedule for achieving interim and final goals by identifying the load reductions from nonstructural and structural strategies over the compliance time frame.

4.3.1 Jurisdictional Implementation (Compliance Analysis)

A summary of the implementation year and duration of each jurisdictional strategy is presented in Appendix I within each jurisdictional strategy table. If a jurisdictional strategy is not initiated upon approval of the Water Quality Improvement Plan, the expected implementation year is provided. The implementation description within the strategy tables for optional strategies provides the circumstances for implementation and the resources needed. Optional strategies are those strategies that may be triggered in the future to achieve the interim and final numeric goals. The schedules and resources required to implement the WMA strategies are presented in Section 4.2.5, as well as within each jurisdictional strategy for those jurisdictions participating in the WMA strategy. This section describes the schedule for implementation, the benefits expected from the strategies, and the dates that the final and interim goals will be met by the Responsible Agency.

Jurisdictional schedules demonstrate that phased implementation of the nonstructural and structural strategies by jurisdiction, listed in Section 4.2.4, achieves both Bacteria and Sediment TMDL wet weather numeric goal compliance over 20 years and dry weather numeric goal compliance over 10 years. To demonstrate this progress and select and schedule the most cost-effective strategies, the following steps were taken (graphically depicted in Figure 4-11):

(1) The combination of programmatic nonstructural strategies that could not be explicitly modeled was assumed to result in a combined pollutant load reduction of 10 percent for wet and dry weather (Section 4.2.2.1). These are the most cost-effective strategies and were, accordingly, scheduled first.

(2) Pollutant reduction benefits realized by nonstructural strategies that could be explicitly represented in the model were then quantified, as described further in Appendix K. These strategies were scheduled along with the non-modeled nonstructural strategies (item 1 above).

(3) Potential structural strategies were then individually evaluated by category for the most cost-effective solution toward TMDL numeric goal compliance. Because multiuse treatment areas on public land are the most cost-effective strategy toward pollutant load reduction (Figure 4-11) and provide additional community benefits, this category of structural strategies was maximized and scheduled first.

(4) Potential green infrastructure BMPs were the next most cost-effective option and can be implemented, monitored, and maintained on prioritized locations within the Responsible Agencies' jurisdictions. To leverage these efficiencies, potential green infrastructure followed next in the jurisdictional schedules.

(5) The public right-of-way collects storm water runoff (and associated pollutants) from roadway surfaces, and can be easily accessed for maintenance. Because of these factors, and because projects can be scheduled to coincide with other road improvement projects, potential green street BMPs were scheduled as the next strategy after green infrastructure.

(6) Any additional loads that could not be reduced by the preceding combination of strategies were assumed to be addressed by additional opportunities. To serve as a foundation for future analyses, additional opportunities were estimated as the implementation of two additional sediment detention basins, similar to the existing basin in the Los Peñasquitos Creek subwatershed, restoration of five creek segments, including repair or replacement of MS4 outfalls, and restoration of the Lagoon, as discussed further in Section 4.2.5.1. Further collaboration between Responsible Agencies will identify the preferred strategies to attain the jurisdictional goals. Responsible Agencies may consider potential stream, channel, and habitat rehabilitation projects, such as the Los Peñasquitos Lagoon Restoration Project, and other public-private partnerships, as needed, that most effectively target the final numeric goal.

The resulting jurisdictional load reductions from the strategies listed in Section 4.2.4 and Appendix J are outlined for the Responsible Agencies in Sections 4.3.1.1 through 4.3.1.5. A detailed breakdown of load reductions is provided in Appendix J.

The dry weather results present the percent bacteria load reduction through implementation of two primary strategy types: (1) non-modeled nonstructural strategies, and (2) irrigation runoff reduction strategies. Irrigation reduction strategies include the implementation of turf conversion projects, micro-irrigation system conversions, weather-based irrigation controllers, education and outreach, and enforcement of regulations that prohibit runoff. Modeling simulations of 25 percent irrigation reduction and elimination of overspray have demonstrated on average 99 percent bacteria load reduction across all Los Peñasquitos subwatersheds. Complete elimination of dry weather runoff is the goal; however, there is also an anticipated load reduction from treatment of dry weather flows through structural BMPs as they are built. Infiltration and detention basins built to treat wet weather flows can also be designed to infiltrate or detain dry weather runoff, thus providing multi-season benefits. If monitoring and

assessment demonstrate that compliance is not occurring, the Responsible Agencies will adapt their programs and assess the incorporation of optional strategies or amendments to ongoing strategies.

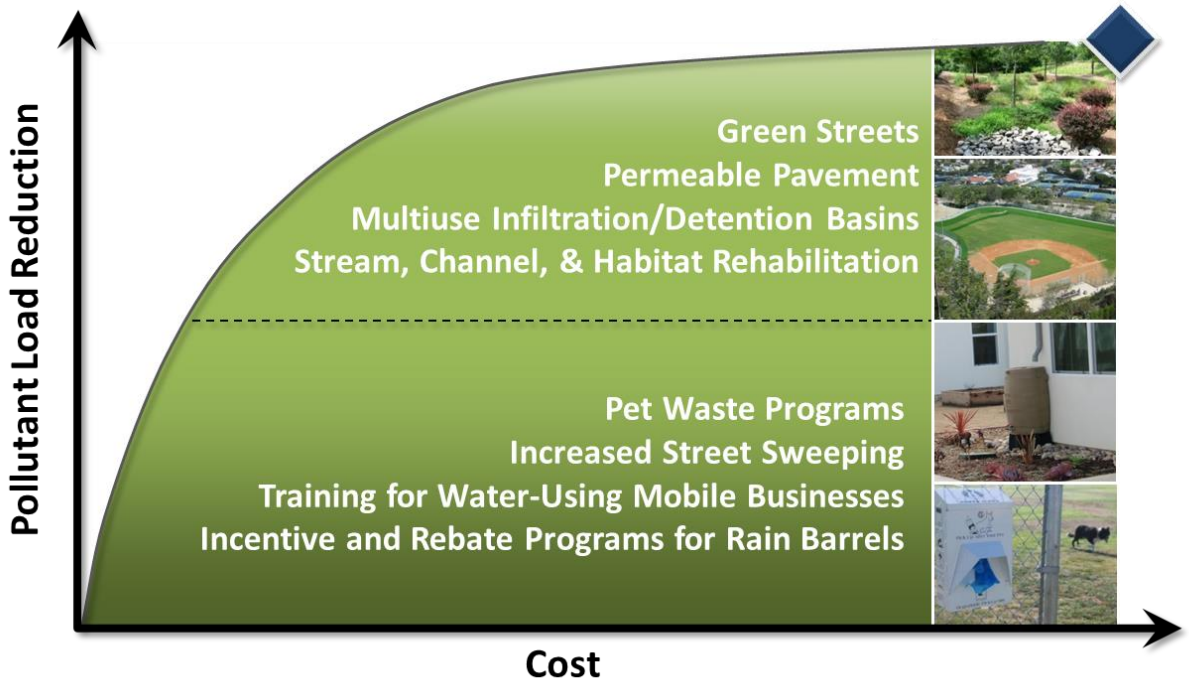

Figure 4-11
Conceptual Diagram Illustrating BMP Implementation (not to scale)

4.3.1.1 Caltrans

Caltrans will voluntarily implement the strategies outlined in Section 4.2, as resources are available, per the schedule provided in Appendix I. Attachment IV to the Caltrans MS4 Permit outlines a methodology for prioritizing stream segments included in TMDLs to which Caltrans is subject. The permit establishes BMP implementation requirements evaluated in terms of compliance units, as opposed to load reduction targets. Caltrans is expected to achieve 1,650 compliance units per year through the implementation of retrofit BMPs, cooperative implementation, and post-construction treatment beyond permit requirements.

For Bacteria TMDLs, Caltrans is expected to eliminate dry weather flows by implementing control measures to ensure effective prohibition (Provision B.2 of the MS4 Permit). For wet weather flows, Caltrans is expected to implement control measures/BMPs to prevent discharge of bacteria from the right-of-way; this can be source control and preemptive activities such as street sweeping, cleanup of illegal dumping, and public education on littering. Implementation of these controls is per the TMDL prioritization list currently under development. The Sediment TMDL has not been incorporated into the Caltrans MS4 Permit.

4.3.1.2 City of Del Mar

The City of Del Mar currently plans to implement the strategies outlined in Section 4.2 per the schedule provided in Appendix I. A combination of nonstructural strategies, potential multiuse treatment areas, and potential green infrastructure may be used to meet the interim and final numeric goals. Implementation of most of the nonstructural strategies is planned to occur prior to or upon approval of the Water Quality Improvement Plan.

To demonstrate that the final goals will be met, BMP optimization models were used to simulate associated pollutant reductions over the entire compliance period. Table 4-17 provides an overall summary for these load reductions for wet and dry weather for Del Mar. A summary of the level of effort anticipated for each modeled strategy, the associated load reductions predicted for the highest priority water quality condition, and the predicted benefit to other water quality parameters for wet and dry weather conditions is presented in Appendix K. Monitoring and adaptive management will verify implementation will need to be adjusted over time.

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Table 4-17
Water Quality Improvement Plan Load Reductions for the City of Del Mar

Strategy and Level of Implementation[2]	City of Del Mar – Percentage Load Reductions[1]									
	Total Sediment[3]	Fecal Coliform[3]	Flow	Total Cu	Total Pb	Total Zn	Total N	Total P	Entero-coccus	Total Coliform
Wet Weather										
Los Peñasquitos Lagoon Subwatershed										
Nonstructural Subtotal	13%	10%	14%	11%	11%	10%	12%	14%	10%	10%
Structural Subtotal	22%	31%	24%	29%	26%	29%	28%	23%	30%	30%
Total	**35%**	**41%**	**38%**	**40%**	**37%**	**40%**	**40%**	**37%**	**40%**	**40%**
	Goal = 34.8%	**Goal = 2%**							**Goal = 1.9%**	**Goal = 1.6%**
Dry Weather										
Los Peñasquitos Lagoon Subwatershed										
Nonstructural Subtotal[4]	42%	100%	42%	36%	47%	69%	75%	96%	100%	100%
Total	**42%**	**100%**	**42%**	**36%**	**47%**	**69%**	**75%**	**96%**	**100%**	**100%**
		Goal = 96.6%							**Goal = 99.4%**	**Goal = 96.5%**

1. Load reductions are subject to change as new information and data are collected for this specific drainage area.
2. Note that these numbers are planning-level values calculated at a subwatershed scale; structural BMPs should be designed to meet both jurisdictional standards and the numeric goals outlined above at each respective project site. Reported BMP sizes include projects that have already been implemented.
3. Orange-shaded cells indicate highest priority water quality condition for the WMA.
4. Nonstructural subtotals include non-modeled nonstructural strategies and irrigation reduction strategies such as the implementation of turf conversion projects, micro-irrigation system conversions, weather-based irrigation controllers, education and outreach, and enforcement of regulations that prohibit runoff. These are the primary dry weather strategies to eliminate dry weather flow. As structural wet weather strategies are implemented and designed to treat dry-weather flows (e.g., multiuse treatment areas), additional load reductions may be achieved.

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4.3.1.3 City of Poway

The City of Poway currently plans to implement the strategies outlined in Section 4.2 per the schedule provided in Appendix I. A combination of nonstructural strategies, potential multiuse treatment areas, and potential green infrastructure may be used to meet the interim and final numeric goals. Implementation of most of the nonstructural strategies is planned to occur prior to or upon approval of the Water Quality Improvement Plan.

To demonstrate that the final goals will be met, BMP optimization models were used to simulate associated pollutant reductions over the entire compliance period. Table 4-18 provides an overall summary for these load reductions for wet and dry weather for Poway. A summary of the level of effort anticipated for each modeled strategy, the associated load reductions predicted for the highest priority water quality condition, and the predicted benefit to other water quality parameters for wet and dry weather conditions is presented in Appendix K. Monitoring and adaptive management will verify implementation will need to be adjusted over time.

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Table 4-18
Water Quality Improvement Plan Load Reductions for City of Poway

Strategy and Level of Implementation[1]	City of Poway – Percentage Load Reductions									
	Total Sediment[2]	Fecal Coliform[2]	Flow	Total Cu	Total Pb	Total Zn	Total N	Total P	Entero-coccus	Total Coliform
Wet Weather										
Los Peñasquitos Creek Subwatershed										
Nonstructural Subtotal	17%	10%	14%	20%	17%	19%	12%	13%	10%	10%
Structural Subtotal	32%	42%	21%	46%	35%	46%	32%	28%	44%	41%
Total	**50%**	**52%**	**34%**	**66%**	**52%**	**65%**	**44%**	**41%**	**54%**	**51%**
	Goal = 47.2%	**Goal = 2%**							**Goal = 1.9%**	**Goal = 1.6%**
Dry Weather										
Los Peñasquitos Creek Subwatershed										
Nonstructural Subtotal[3]	47%	100%	43%	42%	53%	67%	74%	85%	100%	100%
Total	**47%**	**100%**	**43%**	**42%**	**53%**	**67%**	**74%**	**85%**	**100%**	**100%**
		Goal = 96.6%							**Goal = 99.4%**	**Goal = 96.5%**

1. Note that these numbers are planning-level values calculated at a subwatershed scale; structural BMPs should be designed to meet both jurisdictional standards and the numeric goals outlined above at each respective project site. Reported BMP sizes include projects that have already been implemented.
2. Orange-shaded cells indicate highest priority water quality condition for the WMA.
3. Nonstructural subtotals include non-modeled nonstructural strategies and irrigation reduction strategies such as the implementation of turf conversion projects, micro-irrigation system conversions, weather-based irrigation controllers, education and outreach, and enforcement of regulations that prohibit runoff. These are the primary dry weather strategies to eliminate dry weather flow. As structural wet weather strategies are implemented and designed to treat dry-weather flows (e.g., multiuse treatment areas), additional load reductions may be achieved.

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4.3.1.4 City of San Diego

The City of San Diego currently plans to implement the strategies outlined in Section 4.2 per the schedule provided in Appendix I. A combination of nonstructural strategies, potential multiuse treatment areas, and potential green infrastructure may be used to meet the interim and final numeric goals. Implementation of most of the nonstructural strategies is planned to occur prior to or upon approval of the Water Quality Improvement Plan.

To demonstrate that the final goals will be met, BMP optimization models were used to simulate associated pollutant reductions over the entire compliance period. Table 4-19 provides an overall summary for these load reductions for wet and dry weather for the City of San Diego. A summary of the level of effort anticipated for each modeled strategy, the associated load reductions predicted for the highest priority water quality condition, and the predicted benefit to other water quality parameters for wet and dry weather conditions is presented in Appendix K. Monitoring and adaptive management will verify implementation will need to be adjusted over time.

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Table 4-19
Water Quality Improvement Plan Load Reductions for City of San Diego

Strategy and Level of Implementation[1]	City of San Diego – Percentage Load Reductions									
	Total Sediment[2]	Fecal Coliform[2]	Flow	Total Cu	Total Pb	Total Zn	Total N	Total P	Entero-coccus	Total Coliform
Wet Weather										
Los Peñasquitos Watershed										
Nonstructural Subtotal[3]	22.5%	10.3%	13.3%	25.5%	20.0%	22.4%	12.4%	13.4%	10.3%	10.2%
Structural Subtotal	24.8%	37.3%	9.6%	31.8%	24.7%	32.8%	24.1%	23.7%	29.0%	27.5%
Other Opportunities	8.6%	Load Reductions from pollutants not assessed, but are anticipated.								
Total	**55.8%** **Goal = 53.1%**	47.6% **Goal = 2.0%**	22.9%	57.2%	44.8%	55.1%	36.6%	37.1%	39.3% **Goal = 1.9%**	37.7% **Goal = 1.6%**
Dry Weather										
Los Peñasquitos Watershed										
Nonstructural Subtotal[4]	56.9%	100%	49.4%	51.3%	64.1%	89.8%	78.3%	95.8%	100%	100%
Total	56.9%	**100%** **Goal = 96.6%**	**49.4%**	**51.3%**	**64.1%**	**89.8%**	**78.3%**	**95.8%**	**100%** **Goal = 99.4%**	**100%** **Goal = 96.5%**

Note:

1. Note that these numbers are planning-level values calculated at a watershed scale; structural BMPs should be designed to meet both jurisdictional standards and the numeric goals outlined above at each respective project site. Reported BMP sizes include projects that have already been implemented.
2. Orange-shaded cells indicate highest priority water quality condition for the WMA.
3. Nonstructural load reductions include both the modeled and non-modeled load reductions. Non-modeled load reductions are assumed to be 10% for all pollutants (HDR, 2014) and modeled load reductions vary by strategy and pollutant.
4. Nonstructural subtotals include non-modeled nonstructural strategies and irrigation reduction strategies such as the implementation of turf conversion projects, micro-irrigation system conversions, weather-based irrigation controllers, education and outreach, and enforcement of regulations that prohibit runoff. These are the primary dry weather strategies to eliminate dry weather flow. As structural wet weather strategies are implemented and designed to treat dry-weather flows (e.g., multiuse treatment areas), additional load reductions may be achieved.

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4.3.1.5 County of San Diego

The County of San Diego currently plans to implement the strategies outlined in Section 4.2 per the schedule provided in Appendix I. A combination of nonstructural strategies, potential multiuse treatment areas, and potential green infrastructure may be used to meet the interim and final numeric goals. Implementation of most of the nonstructural strategies is planned to occur prior to or upon approval of the Water Quality Improvement Plan.

To demonstrate that the final goals will be met, BMP optimization models were used to simulate associated pollutant reductions over the entire compliance period. Table 4-20 provides an overall summary for these load reductions for wet and dry weather for the County of San Diego. A summary of the level of effort anticipated for each modeled strategy, the associated load reductions predicted for the highest priority water quality condition, and the predicted benefit to other water quality parameters for wet and dry weather conditions is presented in Appendix K. Monitoring and adaptive management will verify implementation will need to be adjusted over time.

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Table 4-20
Water Quality Improvement Plan Load Reductions for the County of San Diego

Strategy and Level of Implementation[1]	County of San Diego – Percentage Load Reductions (and tonnage)									
	Total Sediment[2]	Fecal Coliform[2]	Flow	Total Cu	Total Pb	Total Zn	Total N	Total P	Entero-coccus	Total Coliform
Wet Weather										
Carroll Canyon Creek Subwatershed										
Nonstructural Subtotal	15%	10%	12%	29%	21%	33%	12%	11%	10%	11%
Structural Subtotal	34%	47%	20%	33%	31%	34%	32%	27%	50%	47%
Total	**49%**	**57%**	**32%**	**63%**	**52%**	**67%**	**44%**	**38%**	**54%**	**52%**
	Goal = 48.2%	**Goal = 2%**							**Goal = 1.9%**	**Goal = 1.6%**
Los Peñasquitos Creek Subwatershed										
Nonstructural Subtotal	15%	10%	12%	31%	21%	36%	12%	11%	10%	10%
Structural Subtotal	34%	55%	33%	47%	40%	52%	34%	28%	60%	51%
Total	**48%**	**66%**	**46%**	**78%**	**61%**	**88%**	**46%**	**39%**	**70%**	**62%**
	Goal = 47.2%	**Goal = 2%**							**Goal = 1.9%**	**Goal = 1.6%**
Dry Weather										
Carroll Canyon Creek Subwatershed										
Nonstructural Subtotal[3]	65%	100%	50%	62%	72%	98%	76%	100%	100%	100%
Total	**65%**	**100%**	**50%**	**62%**	**72%**	**98%**	**76%**	**100%**	**100%**	**100%**
		Goal = 97%							**Goal = 99.4%**	**Goal = 96.5%**

Table 4-20 (continued)
Water Quality Improvement Plan Load Reductions for the County of San Diego

Strategy and Level of Implementation[1]	County of San Diego – Percentage Load Reductions (and tonnage)									
	Total Sediment[2]	Fecal Coliform[2]	Flow	Total Cu	Total Pb	Total Zn	Total N	Total P	Entero-coccus	Total Coliform
Los Peñasquitos Creek Subwatershed										
Nonstructural Subtotal[3]	52%	100%	43%	47%	59%	88%	76%	97%	100%	100%
Total	**52%**	**100%**	**43%**	**47%**	**59%**	**88%**	**76%**	**97%**	**100%**	**100%**
		Goal = 97%							**Goal = 99.4%**	**Goal = 96.5%**

1. Note that these numbers are planning-level values calculated at a subwatershed scale; structural BMPs should be designed to meet both jurisdictional standards and the numeric goals outlined above at each respective project site. Reported BMP sizes include projects that have already been implemented.
2. Orange-shaded cells indicate highest priority water quality condition for the WMA.
3. Nonstructural subtotals include non-modeled nonstructural strategies and irrigation reduction strategies such as the implementation of turf conversion projects, micro-irrigation system conversions, weather-based irrigation controllers, education and outreach, and enforcement of regulations that prohibit runoff. These are the primary dry weather strategies to eliminate dry weather flow. As structural wet weather strategies are implemented and designed to treat dry-weather flows (e.g., multiuse treatment areas), additional load reductions may be achieved.

4.3.2 Progress Toward Achieving Numeric Goals

As resources are available, the Responsible Agencies will implement the strategies in Section 4.2 per the schedules in Appendix I to achieve the subwatershed load reductions in Section 4.3.1. Phasing of the implementation is necessary to properly plan, assess, and select strategies that will be the most efficient and effective in addressing the highest priority water quality conditions.

Compliance with Water Quality Improvement Plan goals is met by achieving one of the compliance pathways for each highest priority water quality conditions during each assessment period (Section 4.1). One of the compliance pathways is implementing a Water Quality Improvement Plan that demonstrates that the selected strategies will meet the goals. Within the Los Peñasquitos WMA, the compliance analysis described in the previous sections provides assurance that the jurisdictional strategies presented in Section 4.2 will meet the jurisdictional goals, expressed as a load reduction from the jurisdiction's MS4. The Responsible Agencies within the Los Peñasquitos WMA will implement water quality monitoring and assess programmatic results to guide the iterative process of adapting strategies and direct the level of effort needed for implementation to meet the required load reductions. The iterative adaptive management process may include coordination with WMA stakeholders as the Responsible Agencies continue to pursue the necessary sustainable, effective, and efficient strategies to address the highest priority water quality conditions.

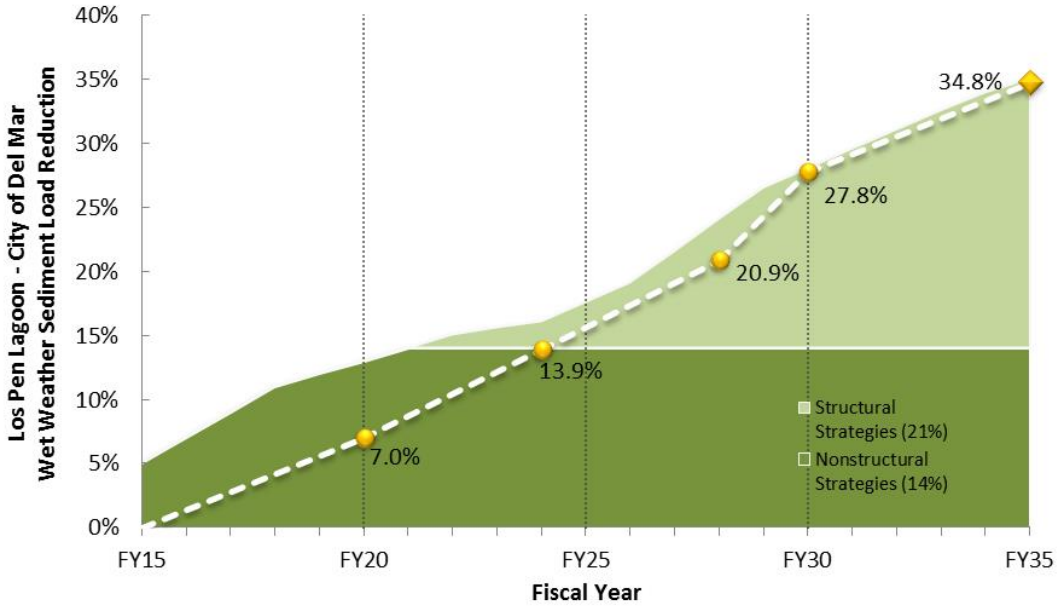
4.3.2.1 Caltrans

Although Caltrans is not permitted under this MS4 Permit, nor is it required to meet numeric goals, Caltrans has voluntarily demonstrated progress toward meeting watershed goals by planning and implementing nonstructural and green infrastructure projects within the Los Peñasquitos WMA.

Caltrans has voluntarily contributed to the Water Quality Improvement Plan effort to provide a consistent and subwatershed-wide approach to meeting applicable TMDL requirements. The strategies developed will be implemented as resources are available.

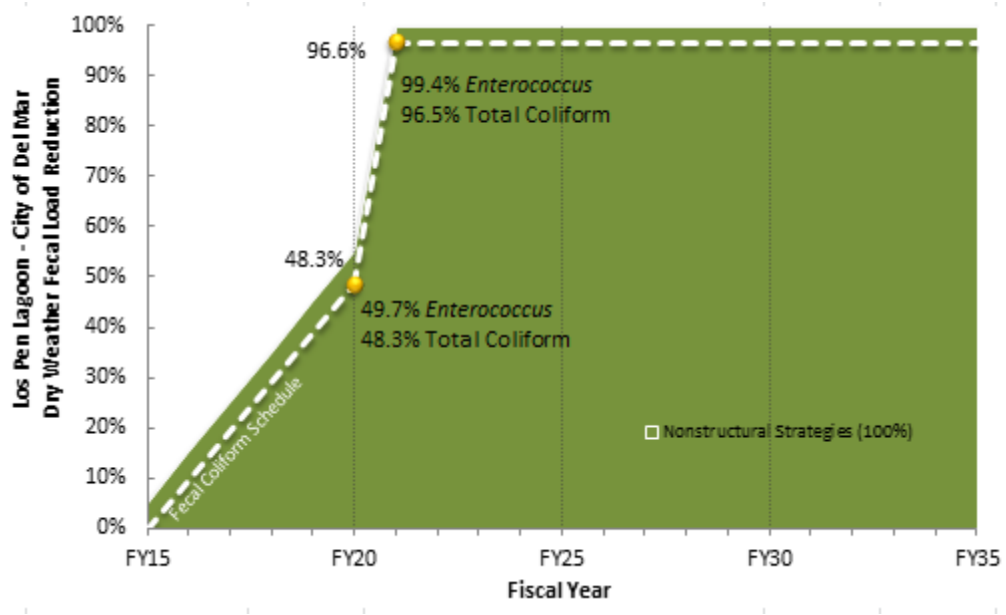
4.3.2.2 City of Del Mar

The City of Del Mar has already demonstrated progress toward meeting the numeric goals by implementing a number of nonstructural strategies within the WMA. The City of Del Mar's expected progress toward meeting interim and final numeric goals is presented for the Los Peñasquitos Lagoon subwatershed in Figure 4-12 for wet weather and in Figure 4-13 for dry weather.



Note: The load reductions are subject to change as new information and data are collected for this specific drainage area.

Figure 4-12
Wet Weather Compliance Schedule for the City of Del Mar in the Los Peñasquitos Lagoon Subwatershed



Note: The load reductions are subject to change as new information and data are collected for this specific drainage area.

Figure 4-13
Dry Weather Compliance Schedule for the City of Del Mar in the Los Peñasquitos Lagoon Subwatershed

4.3.2.3 City of Poway

The City of Poway has already demonstrated progress toward meeting the numeric goals by implementing a number of nonstructural and structural projects within the WMA, including five multiuse treatment areas that were represented explicitly in the baseline model. BMPs included in the baseline model do not represent specific load reductions reported in the Water Quality Improvement Plan, but rather they reduce the baseline loads to be addressed by other strategies. In other words, the five multiuse treatment areas that have been implemented in the City of Poway demonstrate progress toward attaining the numeric goals by reducing the baseline amount of sediment that must be captured by the strategies listed in Section 4.2.4 The City of Poway's expected progress toward meeting interim and final numeric goals in the Los Peñasquitos Creek subwatershed is presented in Figure 4-14 for wet weather and in Figure 4-15 for dry weather.

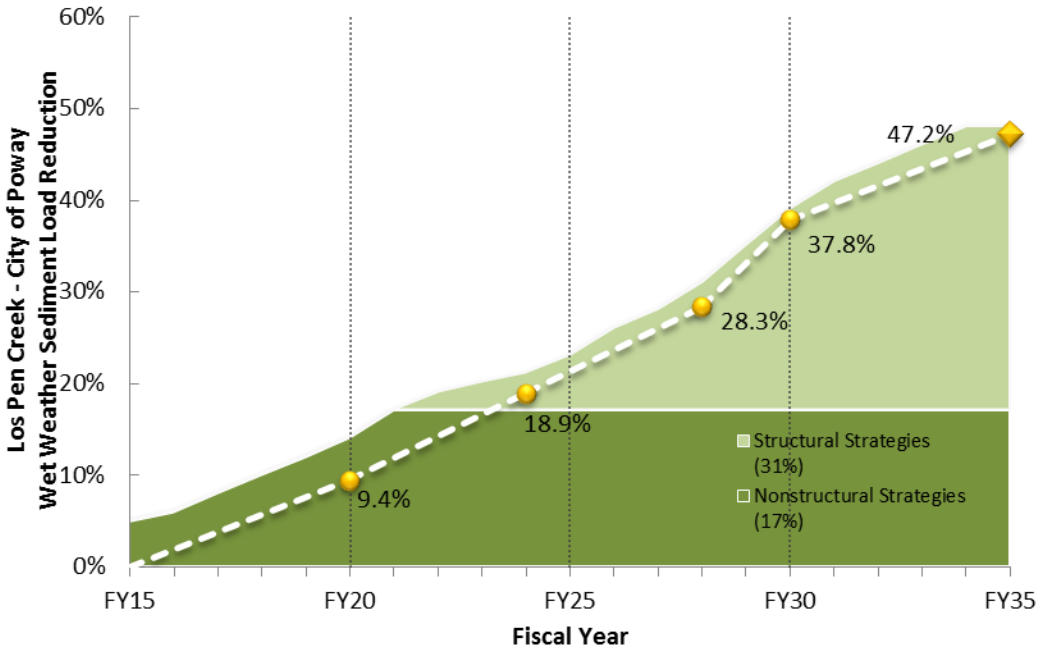


Figure 4-14
Wet Weather Compliance Schedule for the City of Poway in the Los Peñasquitos Creek Subwatershed

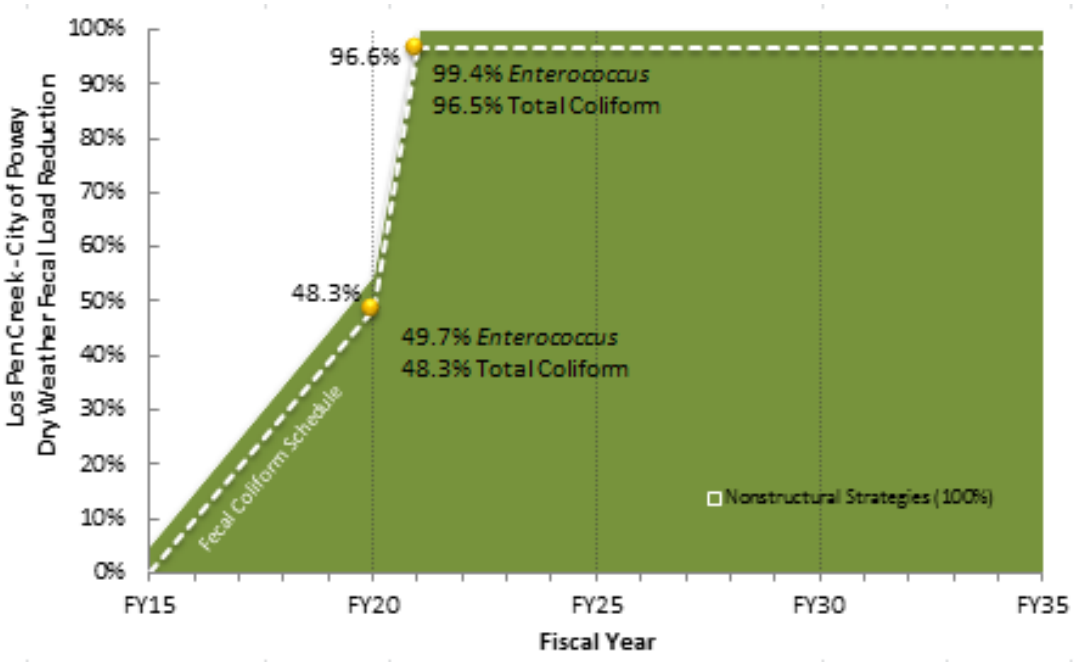


Figure 4-15
Dry Weather Compliance Schedule for the City of Poway in the Los Peñasquitos Creek Subwatershed

4.3.2.4 City of San Diego

The City of San Diego has already demonstrated progress toward meeting the numeric goals by planning and implementing a number of nonstructural and structural projects within the WMA, including at least nine green infrastructure projects and four multiuse treatment areas. The City of San Diego's expected progress toward meeting interim and final numeric goals is presented for the Carmel Valley Creek, Carroll Canyon Creek, Los Peñasquitos Creek, and Los Peñasquitos Lagoon subwatersheds in Figure 4-16 for wet weather and in Figure 4-17 for dry weather.

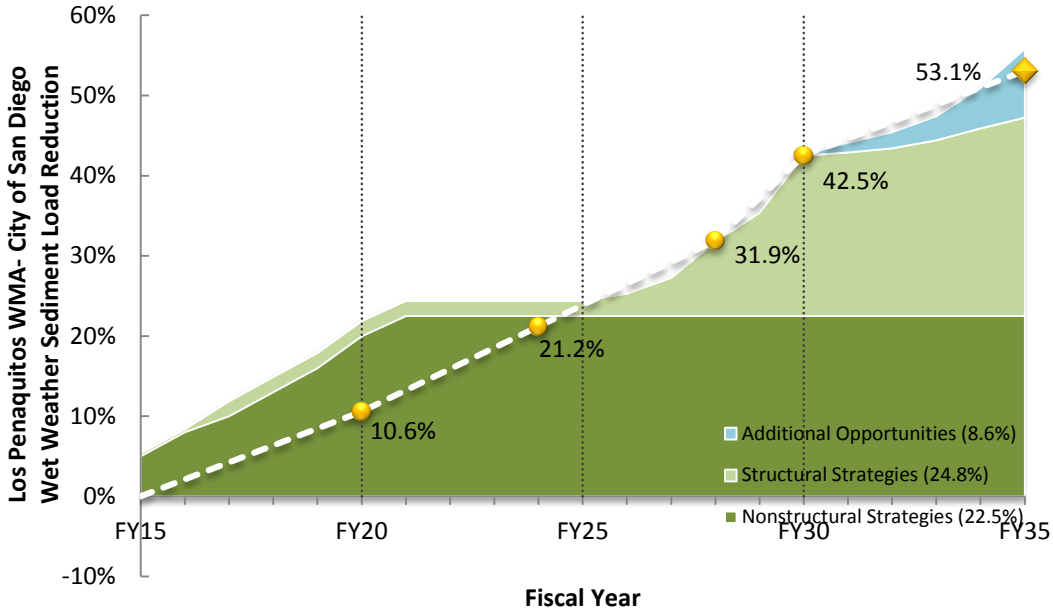


Figure 4-16
Wet Weather Compliance Schedule for Sediment for City of San Diego

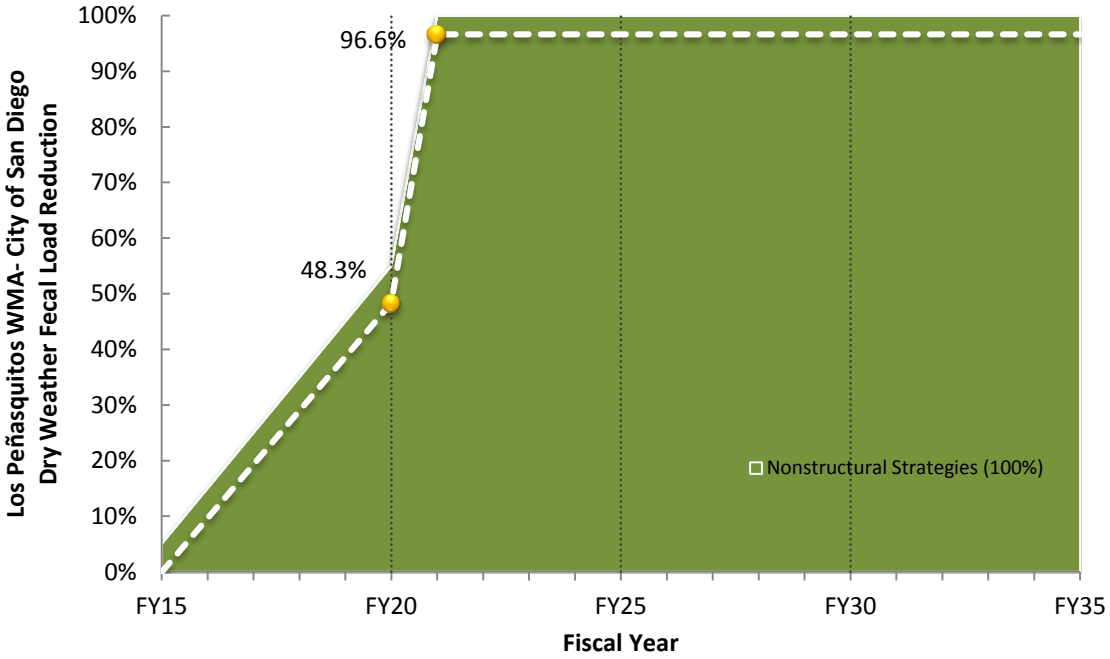
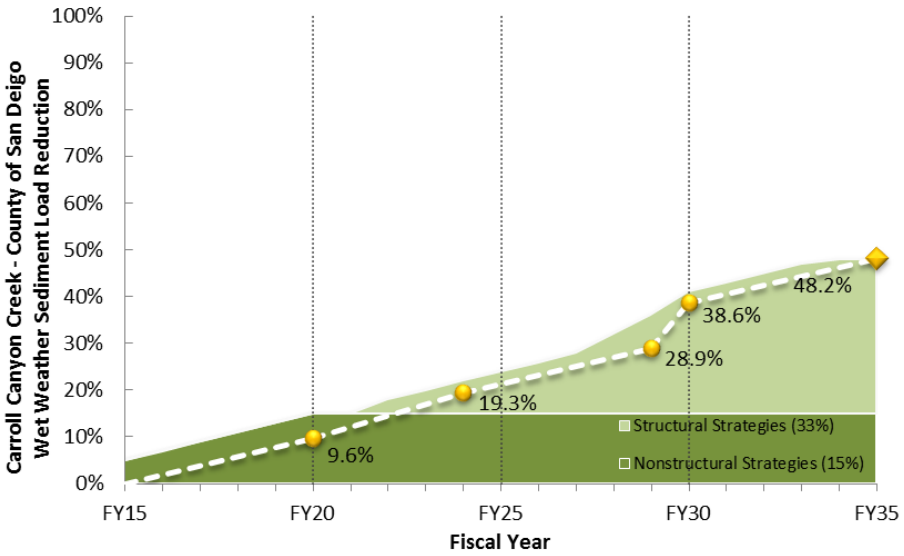


Figure 4-17
Dry Weather Compliance Schedule for City of San Diego

County of San Diego

The County of San Diego has already demonstrated progress toward meeting the numeric goals by implementing a number of nonstructural strategies within the WMA. The County of San Diego's expected progress toward meeting interim and final numeric goals in the Carroll Canyon Creek and Los Peñasquitos Creek subwatersheds is shown in Figure 4-18 for wet weather and Figure 4-19 for dry weather.

(a)



(b)

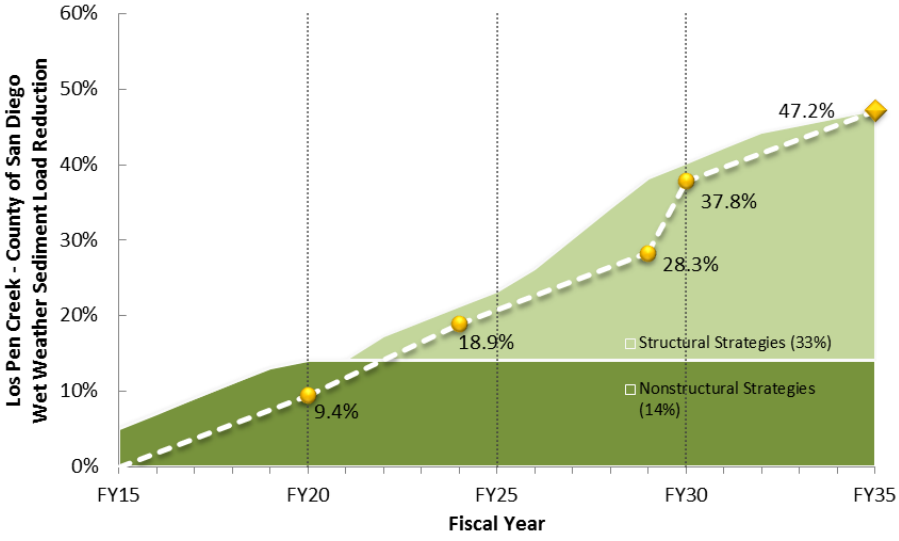
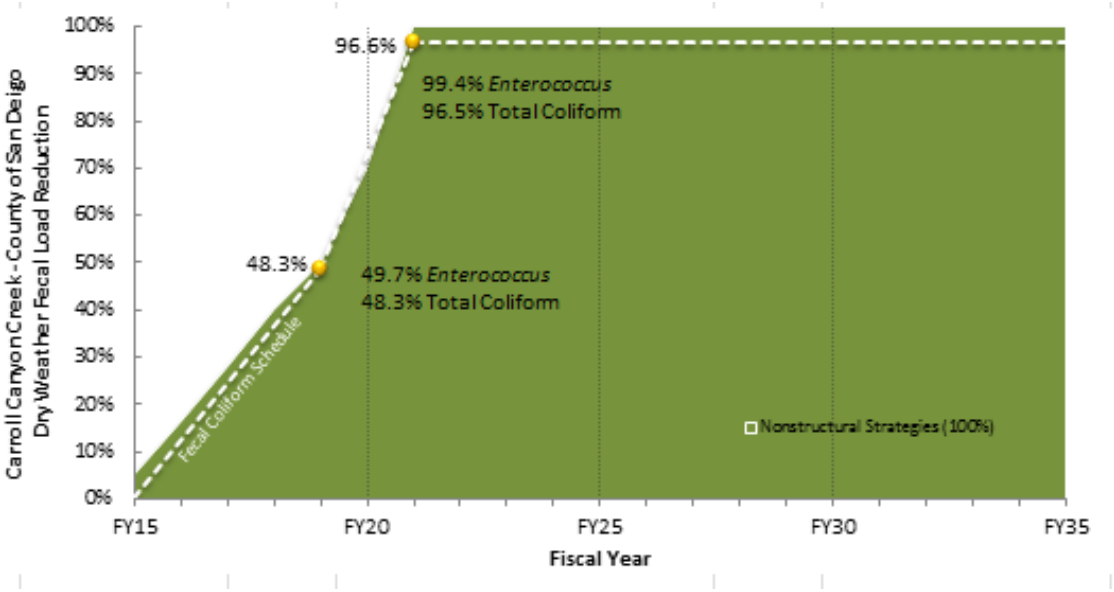


Figure 4-18
Wet Weather Compliance Schedule for County of San Diego in (a) Carroll Canyon Creek and (b) Los Peñasquitos Creek Subwatersheds

(a)



(b)

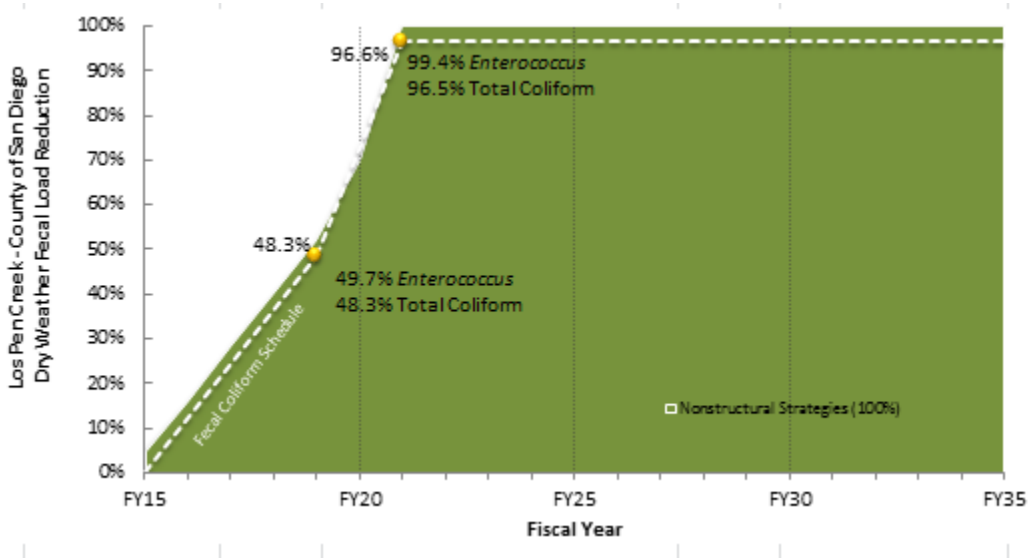


Figure 4-19
Dry Weather Compliance Schedule for County of San Diego in
(a) Carroll Canyon Creek and (b) Los Peñasquitos Creek Subwatersheds

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5 Water Quality Improvement Plan Monitoring and Assessment Program

This section of the Water Quality Improvement Plan describes the development of the Monitoring and Assessment Program for the Los Peñasquitos WMA. The Monitoring Program includes three major components: (1) the receiving water monitoring program measures the long-term health of the watershed; (2) the MS4 outfall monitoring program investigates the elimination of dry weather flows from MS4 outfalls and the improvement the quality of the flows the exit the MS4 outfalls during rain events; and (3) special studies take a further look into the highest priority water quality conditions presented in Section 2. The Assessment Program includes an annual analysis of the monitoring data and an integrated analysis that combines all previously performed analyses at the end of the MS4 permit term.

Section 5 Highlights

- Develops the Monitoring and Assessment Program for the Los Peñasquitos WMA Water Quality Improvement Plan.
- Monitoring Program includes the following components:
  - Receiving Water Monitoring
    - Includes 14 total locations for 1 to 5 years of monitoring per location
    - Measures long-term health and attainment of beneficial uses
  - MS4 Outfall Monitoring
    - Includes 16 total locations
    - Dry weather: Includes inspections and inventory development with the goal of eliminating non-storm flow
    - Wet weather: Investigates whether there is a reduction in flow volumes and an improvement in discharge quality
  - Special Studies
- Assessment Program includes:
  - Annual assessments, including a review of the receiving water, MS4 outfall, and special studies data
  - A permit term assessment, combining all previous assessments into an integrated assessment.

As shown in the graphic below, the fourth step of the Water Quality Improvement Plan (Monitoring & Assessment) is the development of an integrated Monitoring and Assessment Program for the Los Peñasquitos WMA (Provision B.4, Provision D, Provision E, Provision F and Attachment E). The Monitoring and Assessment Program moves into the second phase of the Water Quality Improvement Plan process.

The first three steps of the Water Quality Improvement Plan drive the Copermittees' program planning and budgeting processes:

(1) Determining the priority water quality conditions

(2) Identifying the sources

(3) Defining goals, strategies, and schedules in relation to the highest priority water quality conditions

The last three steps of the Water Quality Improvement Plan are designed to evaluate the progress in addressing the priority water quality conditions through monitoring and assessment, updating the Water Quality Improvement Plan where needed (Adaptive Management Process, Section 6 of the Water Quality Improvement Plan), and reporting the findings of the assessments along with any necessary changes. Annual Reporting is described under both Section 5 and Section 6 of this Water Quality Improvement Plan, as it draws on both the Monitoring and Assessment Program and the Adaptive Management Process. Caltrans is not participating in the Water Quality Improvement Plan Monitoring and Assessment Program because its monitoring program is regulated under its own MS4 permit.

Based on the requirements of the MS4 Permit and Water Quality Improvement Plan process, the Copermittees in the Los Peñasquitos WMA have developed an integrated Monitoring and Assessment Program that:

(1) Assesses the progress toward achieving the numeric goals and schedules provided in Section 4

(2) Measures the progress toward addressing the highest priority water quality conditions established in Section 2

(3) Evaluates each Copermittee's overall efforts to implement the Water Quality Improvement Plan

Water Quality Improvement Plan Monitoring includes sampling, inspection, and data collection at beaches, creeks, lakes, estuaries, and storm drain outfalls to observe conditions, improve understanding, and inform the management within the watershed to improve water quality conditions.

The Monitoring and Assessment Program incorporates requirements of Provision D of the MS4 Permit along with the specific monitoring and assessment requirements for the Bacteria TMDL listed in Attachment E of the MS4 Permit. Table 5-1 presents an overview of planned monitoring activities for the Los Peñasquitos WMA, including key monitoring elements and schedule for implementation by program. The program is designed to characterize the pollutant levels associated with the highest priority water quality conditions in the discharges from the MS4 outfalls, identify sources of the highest priority water quality condition pollutants, and assess the effectiveness of strategies designed to address the highest priority water quality conditions. Additionally, these programs will generate data to track priority water quality conditions and general health and condition within the WMA. As stated in the Provision D of the MS4 Permit:

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

Translated into the Water Quality Improvement Plan process, the Monitoring and Assessment Program will provide the tools necessary to evaluate the main components presented in Sections 2 through 4 of the Water Quality Improvement Plan. In particular, the assessment focuses on the compliance pathways in Section 4. To do this, Section 5 is divided into two main components, Monitoring and Assessment. Figure 5-1 summarizes the main components of the Los Peñasquitos WMA Monitoring and Assessment Program.

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Table 5-1
Water Quality Improvement Plan Monitoring Overview

MS4 Permit Monitoring Programs			Monitoring Elements	MS4 Permit Schedule[1]				
				2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
Monitoring to Assess Goals and Schedules		Dry and Wet	Varies by goal and jurisdiction	–	–	●	●	●
Receiving Water Monitoring	Long-term Receiving Water	Dry	Conventionals[2], FIB nutrients, metals, pesticides, toxicity (chronic), possible TIE/TREs, visual observations, field measurements	●[3]	–	–	–	–
			Hydromodification (channel conditions, discharge points, habitat integrity, evidence and estimate of erosion and habitat impacts)	●[3]	–	–	–	–
			Bioassessment (BMI taxonomy, algae taxonomy, physical habitat characteristics)	●[3]	–	–	–	–
		Wet	Conventionals[2], FIB nutrients, metals, pesticides, toxicity (chronic), field measurements	●[3]	–	–	–	–

Table 5-1 (continued)
Water Quality Improvement Plan Monitoring Overview

MS4 Permit Monitoring Programs				Monitoring Elements	MS4 Permit Schedule[1]				
					2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
Receiving Water Monitoring (continued)	Regional Monitoring Participation	Bight	Dry	Chemistry, toxicity, benthic infauna	●	–	–	–	●[4]
		SMC	Dry	Bioassessment	●	●	●	●	●
		AB411[5]	Dry	FIB	●	●	●	●	●
		2011 Hydromodi-fication Monitoring Program (HMP)	Wet	Channel assessments; flow monitoring; sediment transport monitoring	●	●	●	–	–
	Sediment Quality Monitoring	Sediment Quality Monitoring	Dry	Chemistry, toxicity, benthic infauna	●[6]	●[3]	–	–	–
	TMDL Monitoring	Sediment TMDL for Los Peñas-quitos Lagoon	Dry	Particle size distribution, suspended sediment concentration[2], pebble count, extended flow monitoring; vegetation mapping	●	●[8]	●[8]	●[8]	●[8]
		Bacteria TMDL for Pacific Ocean Shoreline at Torrey Pines State Beach, Del Mar	Dry	FIB, visual observations, optional field measurements	●[3]	●[3]	●	●	●
			Wet	FIB, visual observations, optional field measurements	●[3]	●[3]	●	●	●

Table 5-1 (continued)
Water Quality Improvement Plan Monitoring Overview

MS4 Permit Monitoring Programs			Monitoring Elements	MS4 Permit Schedule[1]				
				2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
MS4 Monitoring	MS4 Field Screening	Dry	Visual: flow condition, presence and assessment of trash in and around the station, IC/IDs, descriptions	●[3]	●[3]	●	●	●
	MS4 Outfall	Dry	Field parameters, conventionals[2], nutrients, metals, FIB,	–	–	●	●	●
		Wet	Field parameters, conventionals[2], nutrients, metals, FIB,	●[3]	●[3]	●	●	●
Special Studies	San Diego Regional Reference Streams and Beaches	Dry	Field parameters, conventionals[2], FIB, instantaneous flow	2012-2014	●[7]	–	–	–
			Streams only: nutrients, metals, bioassessment (including physical habitat and chlorophyll a)	2012-2014	–	–	–	–
		Wet	Field parameters, conventionals[1], FIB	2012-2014	●	–	–	–
			Streams only: nutrients, metals, toxicity, flow, and precipitation (duration of storm)	2012-2014	●	–	–	–

Table 5-1 (continued)
Water Quality Improvement Plan Monitoring Overview

MS4 Permit Monitoring Programs			Monitoring Elements	MS4 Permit Schedule[1]				
				2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
Special Studies (continued)	Los Peñasquitos Lagoon TMDL Upper Watershed Sediment Load Monitoring Plan	Dry/ Wet	Particle size distribution, suspended sediment concentration, streambed and bedload sampling, pebble count, extended flow monitoring	–	●	●[8]	●[8]	–
		Dry	Air particle monitoring	–	●	●[9]	●[9]	–
	Stream Gauge Study	Dry/ Wet	Temperature, water level, conductivity (location dependent)	–	●	●	–	–

BMI = benthic macroinvertebrates; BOD = biological oxygen demand; IC/ID = illicit connection and/or illicit discharge; MST = microbial source tracking; NA = not applicable; O&G = oil and grease; LPC-MLS = Los Peñasquitos Mass Loading Station; SMC = Southern California Stormwater Monitoring Coalition; TBD = to be determined; TIE = toxicity identification evaluation; TRE = toxicity reduction evaluation

1. The MS4 Permit was adopted on May 8, 2013; the MS4 Permit became effective on June 27, 2013. Note that the implementation of the programs will depend on the approval date of the Water Quality Improvement Plan and the fiscal year of implementation may be modified.
2. Definition of conventionals (conventional parameters) is based on SWMP guidelines.
3. Completed under the Transitional Monitoring Program according to MS4 Permit Provisions D.1.a and D.2.a.
4. The 2018 Southern California Bight Regional Monitoring will occur during the summer of 2018 or 2019.
5. The AB 411 program is not required by the MS4 Permit. Responsible Agencies are using the data to track beach water quality conditions related to the Highest Priority Water Quality Condition for the watershed.
6. Sediment Quality Monitoring was completed under the 2013 Southern California Bight Regional Monitoring Program.
7. Dry weather monitoring at reference streams was completed in spring 2014. Dry weather monitoring at reference beaches began in fall 2014.
8. Only the three watershed sites will be monitored until the Water Quality Improvement Plan is approved.
9. Phase II of Los Peñasquitos Lagoon TMDL Upper Watershed Sediment Load Monitoring Plan will implemented in either FY16 or FY17 depending on the approval date of the Water Quality Improvement Plan.

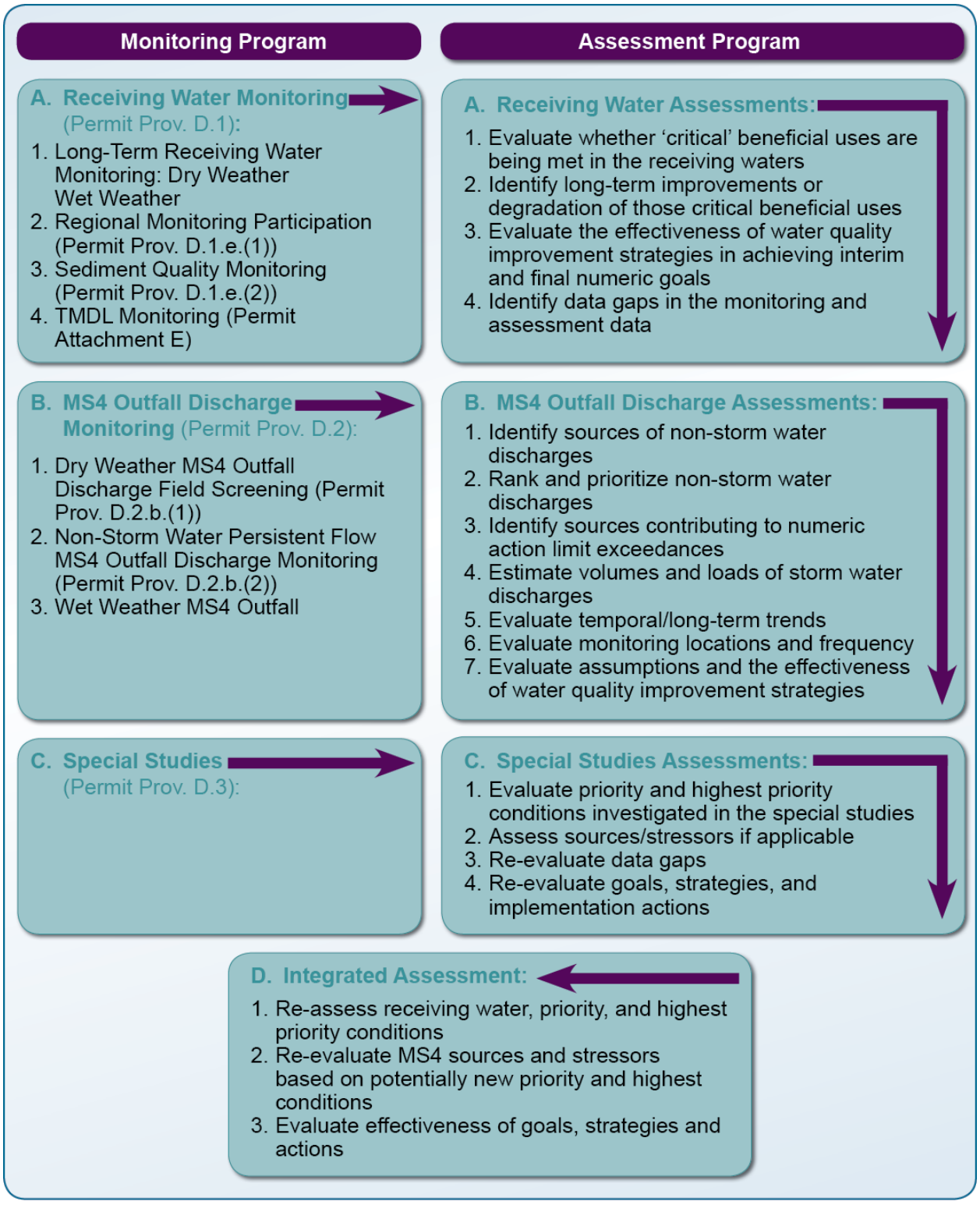

Figure 5-1
Monitoring and Assessment Program Components for the Los Peñasquitos WMA

5.1 Water Quality Improvement Plan Monitoring Program

The Water Quality Improvement Plan Monitoring Program has four major components:

- Monitoring to assess progress toward achieving short-term goals and schedules
- Receiving water monitoring
- MS4 outfall discharge monitoring
- Special studies

A summary of the Water Quality Improvement Plan Monitoring Program (including detailed information required to complete the monitoring tasks) is in Appendix O. The associated monitoring plans for each of the various elements described in Sections 5.1.1 through 5.1.4 will be available on the Project Clean Water Website, http://www.projectcleanwater.org/index.php, by June 2015. The methods and procedures described in these plans may be modified on the basis of site-specific environmental conditions and updated analytical methodologies.

- Wet weather is defined as >0.1 inch of rainfall within a 24-hour period and the following 72 hours after the end of rainfall.
- Dry weather is defined as all other days where rainfall is <0.1 inch of rainfall within a given 24-hour period.

5.1.1 Monitoring to Assess Progress Toward Achieving Goals and Schedules

This section summarizes monitoring and assesses progress toward achieving goals related to the highest priority water quality conditions, which are bacteria, sediment, and fresh water discharge for the Los Peñasquitos WMA, as described in Chapter 2 of the Water Quality Improvement Plan. As outlined in Chapter 4 of the Water Quality Improvement Plan, bacteria and sediment goals are based on multiple compliance pathways set forth for the Bacteria TMDL in Attachment E.6 of the MS4 Permit and in the future incorporation of the Sediment TMDL into the MS4 Permit. Compliance with the TMDLs may be demonstrated via one of the compliance pathways. The proposed compliance dates for both the TMDL's interim goals and final goals are set outside of this MS4 Permit cycle, as presented in Water Quality Improvement Plan Chapter B.3. Tables 5-2 through 5-4 present the interim Bacteria TMDL and Sediment TMDL goals and interim freshwater discharge goals, as well as monitoring that may be used to track progress toward achieving the goals.

Each Responsible Agency has established jurisdictional goals for bacteria, sediment, and freshwater discharge during this MS4 Permit term to demonstrate progress toward compliance with the TMDL requirements. Generally, Responsible Agencies have identified near-term goals to address potential bacteria and sediment sources and/or to reduce anthropogenic dry weather flow in MS4 outfalls. Data collection or monitoring

elements that go beyond the prescribed MS4 Permit activities are tailored to measure progress towards meeting each goal. These elements, which are further detailed in the following subsections, may include visual surveys, inspections, physical sampling or measurements, and development of new outreach and source control programs related to bacteria reduction.

Table 5-2
Monitoring Related to Bacteria TMDL Goals[1]

Compliance Pathway		TMDL Goal	Monitoring Elements
1 OR	Receiving Water Conditions	Meet allowable exceedance frequency of the interim or final Receiving Water Limitations (RWLs) in the receiving water	Bacteria data collected at compliance points as described in Section 5.1.2, TMDL Monitoring Program
2 OR	MS4 Outfall Discharges	Meet allowable exceedance frequency in MS4 outfall discharges	Visual observation of flow from outfalls to receiving waters as described in Section 5.1.3, MS4 Outfall Monitoring Program
3 OR	MS4 Outfall Discharges	Pollutant load reductions for discharges from the Responsible Agencies' MS4 outfalls greater than or equal to the final load reductions	Bacteria and flow data collected at outfalls as described in as described in Section 5.1.3, MS4 Outfall Monitoring Program
4 OR	MS4 Outfall Discharges	No direct or indirect discharge from the Responsible Agencies' MS4 outfalls to the receiving water	Data from Sections 5.1.1, 5.1.2, 5.1.4, and Jurisdictional Runoff Management Programs.
5 OR	Receiving Water Conditions	Exceedances of the final receiving water limitations in the receiving waters due to loads from natural sources	Bacteria data collected at compliance points as described in Section 5.1.2, TMDL Monitoring Program
6	Water Quality Improvement Plan	Implementation of Water Quality Improvement Plan and use of adaptive management	Data from monitoring and Jurisdictional Runoff Management Programs

1. The County of San Diego proposed schedule to meet the TMDL interim goals in Attachment E.6 of the MS4 Permit is 2021 for dry weather and 2028 for wet weather. All other Copermittees propose to meet the TMDL interim goals by 2019 for dry weather and 2024 for wet weather.

Table 5-3
Monitoring Related to Interim Sediment TMDL Goals[1]

Compliance Pathway		Interim TMDL Goal	Monitoring Elements
1 OR	MS4 Outfall Discharges	Pollutant load reductions for discharges from the Responsible Agencies' MS4 outfalls greater than or equal to the final load reductions	Sediment and flow data collected at outfalls as described in as described in Section 5.1.3, MS4 Outfall Monitoring Program
2 OR	MS4 Outfall Discharges	Pollutant load from discharges from the Responsible Agencies' MS4 outfalls less than or equal to allowable limits determined by sediment loading model	Sediment and flow data collected at outfalls as described in as described in Section 5.1.3, MS4 Outfall Monitoring Program
3 OR	Receiving Water Conditions	Restoration of salt marsh habitat with increasing trend toward final restoration goal	Data from Section 5.1.2, TMDL Monitoring Program
4 OR	MS4 Outfall Discharges	No direct or indirect discharge from the Responsible Agencies' MS4 outfalls to the receiving water	Visual observation of flow from outfalls to receiving waters as described in Section 5.1.3, MS4 Outfall Monitoring Program
5	Water Quality Improvement Plan	Implementation of Water Quality Improvement Plan and use of adaptive management	Data from monitoring and Jurisdictional Runoff Management Programs

1. First interim Sediment TMDL goal to be assessed in 2020.

Table 5-4
Monitoring Related to Interim Freshwater Discharge Goals

Compliance Pathway		Interim TMDL Goal	Monitoring Elements
1 OR	MS4 Outfall Discharges	Irrigation and other dry weather flow reductions greater than or equal to final irrigation reductions	Flow data collected at outfalls as described in as described in Section 5.1.3, MS4 Outfall Monitoring Program
2	Water Quality Improvement Plan	Implementation of Water Quality Improvement Plan and adaptive management	Data from monitoring and Jurisdictional Runoff Management Programs

Wet Weather Monitoring Related to Performance Measures

Copermittees have established wet weather goals for the 2013–2018 MS4 Permit term. Table 5-5 summarizes the data that will be collected to assess these goals by jurisdiction.

Table 5-5
Wet Weather Monitoring Related to Jurisdictional Goals

Jurisdiction	First MS4 Permit Term Numeric Goals 2013-2018	Assessment Metric	Monitoring Elements
City of Del Mar	Reduce by 10% anthropogenic surface dry weather flows[1] to address bacteria regrowth contributing during wet weather	Percent anthropogenic surface dry weather flow reduction at MS4 outfalls	Collect flow measurements at selected MS4 outfalls during dry weather
City of Poway	Achieve a 5% increase in turf conversion from baseline	Percent increase in turf conversion	Specify City programs tracking the implementation of turf conversion including turf conversion increase
City of San Diego	Develop a green infrastructure policy, attain City Council approval, and construct green infrastructure BMPs to improve water quality from 37 acres of drainage area	Acres of drainage area treated by construction of green infrastructure BMPs	Detail the completion of BMPs including acres treated

Table 5-5. (continued)
Wet Weather Monitoring Related to Jurisdictional Goals

Jurisdiction	First MS4 Permit Term Numeric Goals 2013-2018	Assessment Metric	Monitoring Elements
County of San Diego	Implement programmatic (non-structural) BMPs to achieve source reduction of bacteria loads from the MS4 outfalls	Anticipated percent bacteria load reduction	Detail programmatic BMPs implemented
	Implement programmatic (non-structural) BMPs to achieve source reduction of sediment loads from the MS4 outfalls	Anticipated percent sediment load reduction or verify allowable tons of sediment per year is met for Los Peñasquitos Creek and Carroll Canyon	Detail programmatic BMPs implemented
	AND		
	Coordinate with watershed partners to determine restoration goals and establish monitoring protocols, as applicable	Goals for restoration of 346 acres of salt marsh habitat	Detail restoration goals and monitoring protocols

1. The term “dry weather flow” excludes groundwater, other exempt or permitted non-storm water flows and sanitary sewer overflows.

Dry Weather Monitoring Related to Performance Measures

Copermittees have established dry weather goals for the 2013–2018 MS4 Permit term. Table 5-6 summarizes the data that will be collected to assess these goals by jurisdiction.

Table 5-6
Dry Weather Monitoring Related to Jurisdictional Goals

Jurisdiction	Performance Measures	Assessment Metric	Monitoring Elements
City of Del Mar	Reduce by 10% anthropogenic surface dry weather flows[1]	Percent anthropogenic surface dry weather flow reduction at MS4 outfalls	Collect flow measurements at selected MS4 outfalls
City of Poway	Achieve a 5% increase in turf conversion from baseline	Percent increase in turf conversion	Specify City programs tracking the implementation of turf conversion including turf conversion increase
City of San Diego	Develop a green infrastructure policy, attain City Council approval, and construct green infrastructure BMPs to improve water quality from 37 acres of drainage area	Acres of drainage area treated by construction of green infrastructure BMPs	Detail the completion of BMPs including acres treated
	Reduce by 10% the prohibited[2] dry weather flow from baseline measured at persistently flowing outfalls during dry weather	Percent reduction in prohibited[2] dry weather flow	Collect flow measurements at persistently flowing outfalls
County of San Diego	Verify the effective elimination of anthropogenic dry weather flow from MS4 outfalls and use programmatic approaches to maintain compliance	Number of routine inspections of MS4 outfalls to very absence of discharge to receiving water	Detail the elimination of anthropogenic dry weather flows from MS4 outfalls

1. The term “dry weather flow” excludes groundwater, other exempt or permitted non-storm water flows and sanitary sewer overflows.
2. Does not include allowable discharges as defined in MS4 Permit Provision A and Provision E.2.a.

5.1.2 Receiving Water Monitoring

The purpose of the receiving water monitoring program is to characterize trends in the chemical, physical, and biological conditions of a receiving water to determine whether beneficial uses are protected, maintained, or enhanced. This program is designed to meet requirements set forth in Provision D.1 of the MS4 Permit. Long-term monitoring occurs during both wet and dry conditions for water quality and physical and biological integrity, along with sediment quality monitoring and participation in regional monitoring. The MS4 Permit also stipulates how TMDL monitoring requirements are to be incorporated into the receiving water monitoring program as described in Attachment E of the MS4 Permit.

Receiving waters monitoring comprises the following programs:

- Long-term receiving water monitoring
- Regional monitoring participation
- Sediment quality monitoring
- TMDL monitoring

Long-Term Receiving Water Monitoring

Long-term receiving water monitoring will track the overall health of the receiving waters and is designed to answer the following questions:

- Are conditions in the receiving water protective, or likely protective, of beneficial uses?
- What are the extent and magnitude of the current or potential receiving water problems?
- Are the conditions in the receiving water getting better or worse?

Dry and wet weather monitoring will continue at the historical mass loading station (LPC-MLS) located on Los Peñasquitos Creek prior to its discharge to the Los Peñasquitos Lagoon. Copermittees have monitored LPC-MLS since 2001 to meet requirements of previous MS4 Permits. The MLS is depicted on Figure 5-2. This site will be monitored three times during wet weather and three times during dry weather per permit cycle. This monitoring program is designed to monitor the highest priority water quality conditions in the receiving water, along with a comprehensive list of constituents on the basis of the 303(d) list impairments, CLRP, non-storm water action levels (NALs) or storm water action levels (SALs), and Table D-3 of the MS4 Permit. During both dry and wet weather, water samples will be analyzed for conventional constituents, nutrients, metals, pesticides, bacteria, field parameters, and toxicity, when applicable. Toxicity identification evaluations (TIEs), if necessary, will be conducted in compliance with Provisions D.1.c.(4)(f) and D.1.d.(4) of the MS4 Permit and used to determine the causative agent(s) of toxicity. Once per term during dry weather, a bioassessment will be conducted to evaluate chemical, physical, and biological data, and hydromodification monitoring will be conducted to record the stream conditions and habitat integrity and

impacts. These data can be used to re-evaluate priorities via the iterative approach described in Section 6.

The 2013 and 2014 Transitional Monitoring Programs satisfied long-term receiving water monitoring requirements, including dry and wet weather water quality sampling, bioassessments, and hydromodification monitoring for this MS4 Permit term. For details of this monitoring program, refer to Appendix O. The methods and procedures provided in Appendix O may be modified on the basis of site-specific environmental conditions and updated analytical methodologies.

Regional Monitoring Participation

Regional monitoring includes separate studies that will evaluate various aspects of receiving water health at a regional scale. The data may be used by Responsible Agencies to answer the following questions:

- Are conditions in the receiving water protective, or likely protective, of beneficial uses?
- What is the extent and magnitude of the current or potential receiving water problems?

The Responsible Agencies participated in the following regional programs:

- Bight

  The Bight regional monitoring program is a multi-agency collaborative effort developed to assess the ecological condition of the Southern California Bight from a regional perspective. The core monitoring program consists of sediment chemistry, sediment toxicity, benthic infauna, demersal fish, and epibenthic invertebrates. The goals of past Bight programs were to answer three primary questions:

  - What are the extent and magnitude of direct impact from sediment contaminants?
  - How does the extent and magnitude of the environmental impact vary by habitat?
  - What is the trend in extent and magnitude of direct impacts from sediment contaminants?

  Sediment quality monitoring was conducted during the summer of 2013 at a total of 22 sites in 9 estuaries and lagoons in the San Diego region including the Los Peñasquitos Lagoon under the Southern California Bight 2013 Regional Monitoring Survey (Bight ’13) (San Diego County Municipal Copermittees, 2014c). As described in Section 4.1.1.3, sediment monitoring data from Bight ’13 will be used to fulfill part or all of the sediment monitoring requirements of the

MS4 Permit. During this MS4 Permit term, Responsible Agencies will participate in planning Bight '18 monitoring programs.

- SMC Regional Monitoring

Since 2001, Copermittees have partnered with regulated storm water municipalities in southern California, the Regional Boards of Southern California, and the Southern California Coastal Water Research Project (SCCWRP) to form the Southern California SMC. The goals of the SMC are to standardize monitoring, improve understanding of storm water mechanics, and identify receiving water impacts from storm water (SCCWRP, 2002). According to its 2014 Research Agenda, the SMC has identified 21 projects for the next 5-year term and is in the process of prioritizing its efforts on the basis of need and available funding (SMC, 2014a). The Los Peñasquitos WMA Responsible Agencies will continue participation in the SMC Regional Freshwater Stream Bioassessment Monitoring Program (SMC Regional Bioassessment Program) that began as a five year program in 2008-2013 and will be implemented for another five years (2015-2019).

The 2009–2013 SMC Regional Bioassessment Program was designed to address the following monitoring questions (SMC, 2014b):

- What is the extent of impact in streams of southern California?
- What are the stressors that impact southern California streams?
- Is the extent of stream impacts changing over time?

A final monitoring report was prepared on the basis of 2009–2013 results to identify lessons learned, data gaps, and recommendations to guide the design of the 2015–2019 program. In 2015, a new five-year SMC program will extend the initial survey to answer key management questions about the impacts of storm water on stream conditions. The program will have an added emphasis on detecting trends, including non-perennial streams and sampling sediment chemistry and toxicity.

The non-perennial stream monitoring was initiated in April 2014, with site revisits in May and June 2014. Sampling included benthic macroinvertebrates (BMI), algae, physical habitat, and California Rapid Assessment Method (CRAM). The trend site monitoring was conducted during the standard index period (i.e., from mid-May through July). Sampling for trend site monitoring included all of the parameters and constituents of the original SMC Regional Bioassessment Program (San Diego County Municipal Copermittees, 2014b). The bioassessment monitoring was conducted at a total of 64 bioassessment stations; 30 stations were compliance stations; 28 stations were randomly placed SMC stations; and 6 stations were San Diego County reference stations (San Diego County Municipal Copermittees, 2014b). The AB 411 monitoring program is not required by the MS4 Permit. Responsible Agencies are using the AB 411

data to track beach water quality conditions related to the Highest Priority Water Quality Condition for the watershed.

- Hydromodification Regional Monitoring Program

  Copermittees have developed a regional HMP to address impacts on beneficial uses and stream habitat from increased erosive force potentially caused by an increase in runoff discharge rates and duration from all Priority Development Projects (County of San Diego, 2011). The HMP was initially developed to meet the requirements of the 2007 MS4 Permit. The Monitoring Plan is defined in Chapter 8 of the HMP, and was updated by the San Diego County Regional Copermittees and accepted by the Regional Board in February 2014. The HMP requires monitoring with a final report due to the Regional Board in December 2016. Monitoring consists of channel sediment transport assessments, and continuous flow monitoring of pre-project, post-project, and reference conditions per MS4 Permit Provisions D.1.a and D.1c(6). Additional monitoring is required per MS4 Permit Provision D.1.a(2).

- San Diego County Beach Water Quality (AB 411) Monitoring

  San Diego County Department of Environmental Health (DEH) implements the Beach and Bay Water Quality Monitoring Program to support the statewide program funded by the Beach Safety Act (AB 411). This program is commonly referred to as AB 411 monitoring. The purpose of this monitoring program is to advise the public of potential health risks that could occur with water contact recreation at local beaches. DEH will post a health advisory notice or close a beach when FIB results are above REC-1 water quality standards. There is one AB 411 beach monitoring station in the Los Peñasquitos WMA. This station is monitored twice weekly year-round.

Sediment Quality Monitoring

Sediment quality monitoring is designed to assess compliance with receiving water limits applicable to MS4 discharges to enclosed bays and estuaries in accordance with the State Water Board's Water Quality Control Plan for Enclosed Bays and Estuaries of California – Part I Sediment Quality (Sediment Control Plan). Part I of the State Board's Sediment Quality Control Plan provides sediment quality objectives for enclosed bays and estuaries and does not apply to ocean waters or inland surface waters (State Board 2009). Sediment quality monitoring will be performed in compliance with Permit Provision D.1.e.(2), which requires preparation of a Sediment Quality Monitoring Plan that satisfies the requirements of the Sediment Control Plan. The California Sediment Quality Objective (SQO) multiple-line-of-evidence approach.

The data generated will be used to answer the following question:

- What is the condition of sediments in enclosed bays or estuaries with respect to the statewide sediment quality objectives?

The Sediment Quality Monitoring Plan and Quality Assurance Project Plan (Attachment 4A-2) describe detailed proposed monitoring procedures and analytical methods that are illustrative and may change on the basis of site environmental conditions. As indicated in Table 5-1, sediment quality monitoring of the Los Penasquitos Lagoon was conducted in the summers of 2013 and 2014.

The participating agencies propose to conduct one round of sediment sampling each MS4 Permit term. The second required round of sampling will be satisfied by conducting additional follow up sampling in the vicinity of potentially impacted sites identified in the first round. Sediment quality monitoring will employ the following general approach to meet the requirements of the MS4 Permit:

(1) Conduct initial monitoring within each qualifying water body per the requirements of the state's Sediment Control Plan. These data will be used to assess the degree of potential impact at each site using the California Sediment Quality Objective (SQO) multiple-line-of-evidence approach in accordance with the assessment criteria specified in Sediment Control Plan Section V. These scores are derived using multiple metrics from three key lines of evidence: (1) sediment chemistry data, (2) toxicity data, and (3) benthic community data. Sites are then categorized as un-impacted, likely un-impacted, possibly impacted, likely impacted, or clearly impacted.

(2) Confirm and characterize pollutant related impacts for any sites that are considered possibly impacted, likely impacted, or clearly impacted, following an integration of all lines of evidence. In accordance with Sediment Control Plan criteria, the data assessment in this phase is required to determine whether the score(s) indicate potential impacts due to toxic pollutants (e.g., freshwater-related contaminant sources from the MS4), or non-toxic pollutants (e.g., physical habitat, freshwater inundation, legacy contaminants, or other potential factors). This phase would be considered the first phase of the level stressor/source identification (SSID) based on existing data. The requirements of this phase are dependent on the site as categorized in the previous phase as follows:

a. Sites deemed to be possibly, likely, or clearly impacted based on initial monitoring for which the impact or impairment is determined to likely not be caused or contributed to by MS4 discharges will be monitored once more in the current MS4 Permit term. Follow-up monitoring is required to verify the findings from the first round of monitoring.

i. If results from the follow-up monitoring are consistent (possibly impacted), or un-impacted, no additional follow-up will be required during the current MS4 Permit term.

ii. If the second round of sampling reclassifies the station as likely or clearly impacted, an additional follow-up investigation may be needed or suspended pending future routine SQO monitoring. In this circumstance, results of the analytical assessments will be discussed

with the Regional Board staff to determine whether/where any SSID studies should be undertaken, and to identify major elements of the approach for any identified studies. Prior to additional investigation, a site-specific Sediment Assessment Work Plan would be prepared that would outline specific steps and methodologies to be taken.

b. Stations deemed by assessment to be likely or clearly impacted by MS4 discharges will require additional follow-up investigation and this is deemed the first phase of SSID. A site-specific Sediment Assessment Work Plan will be prepared that will outline specific steps and methodologies to be taken. Per the Sediment Control Plan, SSID comprises three steps: (1) confirmation and characterization of pollutant impacts, (2) pollutant identification, and (3) source identification and management actions.

(3) In the annual Sediment Monitoring Report, describe the planned follow-up monitoring, including any planned SSID studies, and revisions the Sediment Monitoring Plan, accordingly.

During the transitional (pre-Water Quality Improvement Plan) monitoring phase, the Southern California Regional Bight ’13 Monitoring Program (Bight ’13) satisfied the initial monitoring requirements of the state's Sediment Control Plan. As presented in Table 5-7, up to two sites were monitored in the Los Peñasquitos Lagoon in 2013 for the initial screening of sediment quality. Because both sites were found to be likely un-impacted during the initial screening, no follow-up monitoring was conducted. Based on the monitoring and assessment completed, sediment conditions in the Los Peñasquitos Lagoon are generally protective of the beneficial uses (San Diego County Municipal Copermittees, 2014c). The Sediment Monitoring Report was provided in the 2014 Transitional Monitoring and Assessment Report in accordance with the permit reporting requirements.

Table 5-7
Bight ’13 Sample IDs, Site Locations, Dates Sampled, and Sample Depths

Lagoon/ Estuary	# of Sites	Site ID	Sediment Sampling			Monitored Events
			Latitude	Longitude	Depth (m)	Date Sampled
Los Peñasquitos Lagoon	2	8169	32.9317	-117.2521	1.7	8/1/2013
		8176	32.9336	-117.2567	0.9	8/1/2013

Source: Transitional Monitoring and Assessment Report Appendix H Sediment Monitoring Report (San Diego County Municipal Copermittees, 2014c).

TMDL Monitoring

TMDL provisions, schedules, and monitoring requirements are provided in Attachment E of the MS4 Permit. The purpose of TMDL monitoring programs is to track progress toward achieving compliance with interim and final numeric targets. There are two TMDLs in the Los Peñasquitos WMA: the Bacteria TMDL and the Sediment TMDL. Compliance monitoring is designed to meet the receiving water monitoring requirements of the Bacteria and Sediment TMDLs.

For the Bacteria TMDL, compliance monitoring, including wet and dry weather sampling, will be conducted each year at the compliance monitoring location. The data generated will be used to address the following questions:

- Are TMDL numeric targets for bacteria indicators being met at the compliance monitoring locations?
- Are bacteria levels improving at the compliance monitoring locations?

The scope of compliance monitoring considers the frequency and type of sampling activities of the existing Health and Safety Code Section 115880 of the Assembly Bill 411 (AB 411) Monitoring Program to facilitate overlap of monitoring efforts and resources when feasible. Dry weather monitoring will be conducted weekly during the recreation season (five times monthly, April 1 through October 31) to be consistent with AB 411 monitoring and a monthly (at a minimum) during the wet season per the MS4 Permit requirements. Samples are to be collected on dry weather days, after an antecedent dry period of 72 hours with less than 0.1 inch of rainfall. Wet weather monitoring will be conducted at the monitoring locations during a minimum of one and up to three storm events each wet season (October 1 through April 30). Per the MS4 Permit Attachment E.6, a minimum of one storm is required to be monitored. Storms resulting in greater than 0.2 inch of precipitation will be targeted for analysis. FIB are the target constituents for the Pacific Ocean Shoreline segment within the Los Peñasquitos WMA, as indicated by the MS4 Permit. Grab samples will be collected in a manner consistent with requirements of the AB 411 program and analyzed for total coliform, fecal coliform, and *Enterococcus*. For details of this monitoring program, refer to Appendix O. The methods and procedures described in Appendix O may be modified on the basis of site-specific environmental conditions and updated analytical methodologies.

The Sediment TMDL compliance monitoring program monitors suspended sediment concentrations (SSC), collect sediment core samples in each of the creeks to assess sediment age, and estimate wet weather sediment loads in each of the WMA's three major tributary creeks during wet weather. The program also includes a vegetation monitoring in Los Peñasquitos Lagoon. This monitoring program is designed to answer the following questions:

- What is the ecological health of the Lagoon?
- How is the Lagoon's health changing with time?

- What is the progress toward ultimate restoration of the Lagoon?
  - What is the sediment concentration at discrete times throughout a storm event hydrograph at the base of each major creek tributary?
  - What are the age and particle-size distribution of sediment accumulated near the mouth of each major creek?
  - What are current sediment load estimates from the three major creeks that discharge to the Lagoon?
  - How do the sediment delivery potentials of the three creeks compare during wet weather?
- What additional regulatory and implementation actions are needed to restore the Lagoon?

This information will allow comparisons of current load estimates with the WLA designated in the Sediment TMDL, and will assist the Reponsible Agencies in evaluating potential management measures, including BMPs and low-impact development. The sediment core dating data will contribute to an understanding the rate of accumulation at the base of each creek, prior to the creeks entering the Lagoon.

5.1.3 MS4 Outfall Monitoring

The purpose of the MS4 outfall monitoring program is to evaluate the potential contribution from MS4 discharges to the receiving water quality. This program is designed to meet requirements set forth in Provision D.2 of the MS4 Permit. The MS4 outfall monitoring program has both dry and wet weather monitoring components. The outfall monitoring seeks to answer the question:

- Do non-storm water or storm water discharges from the MS4 contribute to receiving water quality problems?

This program is composed of the following two components:

- Dry Weather
  - Field screening
  - MS4 outfall dry weather monitoring
- Wet Weather
  - MS4 outfall wet weather monitoring

Table 5-8 provides the number of major outfalls to be monitored under each component of the MS4 Outfall Monitoring Program by Responsible Agency. The number of major outfalls monitored per year as shown in Table 5-8 are subject to change on the basis of new information, updates to the Copermittee's MS4 outfall inventories, changes in transient or persistent flow classifications, and/or changes or updates to the priority water quality conditions over the life of the Water Quality Improvement Plan. Detailed proposed monitoring methods and procedures are presented in the MS4 Outfall Monitoring Plan. These methods and procedures may be modified on the basis of site-specific environmental conditions and updated analytical methodologies.

Table 5-8
Number of Major MS4 Outfalls per Jurisdiction

Jurisdiction	Number of Major Outfalls Per Year		
	Field Screening[1]	Dry Weather Monitoring	Wet Weather Monitoring
City of Del Mar	2 (2)[2]	1	1
City of Poway	30 (37)[2]	5	3
City of San Diego	198 (198)[3]	5	1
County of San Diego	0[4]	0[4]	0[4]

1. Total number of major outfalls within each jurisdiction in the WMA is provided in parentheses.
2. For Copermittees with fewer than 125 major outfalls in the WMA, 80% of major outfalls must be screened twice per year.
3. For Copermittees with portions of their jurisdictions in more than one WMA and more than 500 major MS4 outfalls in its jurisdiction, at least 500 major outfalls must be inspected once per year.
4. No major outfalls have been identified in the Los Peñasquitos WMA.

MS4 Outfall Dry Weather Monitoring

The purpose of the MS4 Outfall Dry Weather Monitoring Program is to evaluate the potential contribution from MS4 discharges to the receiving water quality during dry conditions and to assess the ability of programs to effectively eliminate non-storm water discharges to waterbodies or waterways. Each Copermittee has established a number of major MS4 outfalls that are prioritized on the basis of non-storm water flow status and threat to receiving water quality, and these outfalls will be screened once or twice annually on the basis of this prioritization. Additionally, the highest priority major MS4 outfalls have been selected for further water quality testing to facilitate source investigations of these outfalls with persistent dry weather flows.

Dry Weather Field Screening

Field screening is visual monitoring of all major MS4 outfalls to identify and eliminate sources of persistently flowing non-storm water discharges. Dry weather MS4 outfall discharge field screening is designed to answer the following questions:

- Which non-storm water discharges are transient and which are persistent?
- Which discharges should be investigated as potential illicit connection/illicit discharges?

The frequency of field screening is determined on a jurisdictional basis and is dependent on the number of major outfalls. Provision D.2.b(1) of the MS4 Permit outlines three categories as the basis for frequency as described below:

- 0-125 major outfalls, 80% of major outfalls 2 times per year
- 125-500 major outfalls, all major outfalls 1 time per year
- 500+ major outfalls, at least 500 major outfalls 1 time per year

Field screening activities will be conducted during dry weather with an antecedent dry period of at least 72 hours with less than 0.1 inch of rainfall. Field observations will include flow condition (pooled, ponded, flowing, or no flow), estimate of flow, characteristics of flow and water, likely source(s), presence of trash, or evidence or signs of illicit connections or illegal dumping. Follow-up investigations will be employed based on jurisdictional IC/ID programs.

Prioritization of Non-Storm Water Persistently Flowing Outfalls

Each jurisdiction ranked its major outfalls independently on the basis of their highest priority conditions, PGAs, and specific site considerations. Responsible Agencies considered the following factors to prioritize persistently flowing outfalls:

- Potential to contribute to a highest or priority water quality condition
- Historical monitoring or inspection data
- Controllability
- Surrounding land uses/potential sources
- Flow rate
- Selected focus areas

Highest Priority MS4 Outfall Dry Weather Monitoring

The purpose of this program is to determine which major persistent flow MS4 outfalls impact receiving water quality during dry weather. MS4 outfall dry weather monitoring is designed to answer the following questions:

- Do dry weather discharge concentrations at MS4 outfalls meet MS4 Permit action levels?
- What is the relative contribution of MS4 outfalls to priority water quality conditions during dry weather?
- What are the sources of persistent non-storm water flows?

Responsible Agencies will monitor a minimum of five major MS4 outfalls during dry weather (if a Responsible Agency has fewer than five major MS4 outfalls, then all of them will be monitored). Each outfall will be monitored semi-annually during dry weather conditions. During each event, field observations will be recorded, and when measureable flow is present, in-situ field measurements and analytical data will be collected. Analytical constituents will include constituents contributing to the highest priority water quality conditions, 303(d) list impairments, TMDLs, NALs, and Table D-7 of the MS4 Permit as described in the MS4 Outfall Monitoring Plan (the Plan will be available on the Project Clean Water Website, http://www.projectcleanwater.org/index.php, by June 2015). When historical data demonstrated or justified that analysis of a constituent is not necessary for a particular waterbody or outfall, then it has been removed and its removal notated in the analytical table provided in the Water Quality Improvement Plan Annual Report. The methods and procedures described in the MS4 Outfall Monitoring Plan may be modified on the basis of site-specific environmental conditions and updated analytical methodologies.

Based on the data collected at the MS4 outfalls per jurisdiction as shown in Table 5-8, monitoring at these outfalls may be reprioritized to eliminate monitoring entirely or to reduce it to field screening activities only to address higher priority non-storm water persistent flows. Reprioritization of outfalls may occur if one of the following conditions is met:

- Non-storm water discharges have been effectively eliminated for three consecutive monitoring events; or
- Source(s)s of the persistent flows have been identified as not an illicit or a source of pollutants; or
- Pollutants in the persistent flow do not exceed NALs; or
- The threat to water quality has been reduced by the Participating Agency.

Wet Weather MS4 Outfall Monitoring

The purpose of this program is to identify pollutants in storm water discharges from the MS4s, guide pollutant source identification efforts, and track progress in achieving the

goals set forth in Section 4. The Responsible Agencies' five monitoring locations for the wet weather MS4 outfall discharge monitoring component are chosen to be representative of the residential, commercial, industrial, and mixed-use land uses within the Los Peñasquitos WMA. These five locations will be monitored during one storm event annually. Wet weather MS4 outfall discharge monitoring is designed to answer the following questions:

- Do wet weather discharge concentrations at MS4 outfalls meet MS4 Permit action levels?
- What is the relative contribution of MS4 outfalls to priority water quality conditions during wet weather?
- How do representative MS4 outfalls discharge concentrations, loads, and flows change over time?

A minimum of five outfalls will be monitored once per year during a storm event with greater than 0.1 inch of rainfall. During each event, observational and hydrologic data will be recorded, including duration of the storm, rainfall estimates, and estimated or measured flow rates and volumes. Grab samples will be collected to analyze for pH, temperature, specific conductivity, dissolved oxygen, turbidity, hardness, and indicator bacteria. A composite sample must be collected and analyzed for constituents contributing to the highest priority conditions, 303(d) list impairments, TMDLs, and SALs. When historical data demonstrated or justified that analysis of a constituent is not necessary for a particular water body or outfall, then it was removed and its removal notated in the analytical table provided in the MS4 Outfall Monitoring Plan (the Plan will be available on the Project Clean Water Website, http://www.projectcleanwater.org/index.php, by June 2015). The methods and procedures described in the MS4 Outfall Monitoring Plan may be modified on the basis of site-specific environmental conditions and updated analytical methodologies. If historical data demonstrate or justify that analysis of a constituent is not necessary for a particular waterbody or outfall, then it will be removed and its removal noted in the Water Quality Improvement Plan Annual Report.

The 2013 Transitional Monitoring Programs began implementation of the wet weather MS4 outfall monitoring requirements at the five Los Peñasquitos WMA outfall monitoring locations.

5.1.4 Special Studies

Special studies have been selected to further investigate the highest priority water quality conditions set forth in Section 2 and to meet requirements of MS4 Permit Provision D.3. The special studies will include a regional special study and a special study specific to the Los Peñasquitos WMA.

San Diego Regional Reference Streams and Beaches Studies

The regional special studies selected in the Los Peñasquitos WMA is the San Diego Regional Reference Streams and Beaches Studies currently being conducted by the San Diego and Orange County Copermittees. The studies will develop numeric targets that account for "natural sources" to establish the concentrations or loads from streams in a minimally disturbed by anthropogenic activities or "reference" condition. The Reference Stream Study also collected nutrients, metals, and toxicity data as secondary constituents, with a goal of collecting the data necessary to derive reasonable and accurate numeric targets for bacteria, nutrients, and heavy metals on the basis of a reference approach. This study will provide a scientific basis for evaluating bacteria compliance levels in the Bacteria TMDL. The results of the studies will be used to support the forthcoming reopener of the recently adopted Bacteria TMDL and to support numeric targets in future TMDLs for bacteria, nutrients, and metals.

The San Diego Regional Stream Reference Study will address the following questions (SCCWRP, 2013):

- How does the Water Quality Objective (WQO) exceedance frequency vary between summer dry weather, winter dry weather, and wet weather?
- How does the WQO exceedance frequency vary by hydrologic factors, including:
  - Size of storm (wet weather only)?
  - Discharge flow rate and volume (wet and dry weather)?
  - Beginning versus end of storm season (wet weather only)?
- How does the WQO exceedance frequency vary by input factors such as:
  - Size of catchment?
  - Geology?
- How does the WQO exceedance frequency vary by biotic and abiotic factors, including:
  - Algal cover and/or biofilms?
  - Water quality (temperature, pH, conductivity, dissolved oxygen, total suspended solids concentration)?

The San Diego Regional Reference Beaches Study will address the following questions (SCCWRP, 2013) in beaches minimally influenced by anthropogenic activities:

- How does the WQO exceedance frequency vary between summer dry weather, winter dry weather, and wet weather?
- How does the WQO exceedance frequency vary by hydrologic factors, including:
  - Discharge flow rate (wet and dry weather)
  - Status of estuary mouth (open/closed; dry weather only)
- What are the wet and dry weather exceedance frequencies of fecal indicator bacteria in estuaries?

A total of 6 locations were selected for wet weather monitoring and up to 10 locations were selected for dry weather monitoring throughout the San Diego region. Sites were selected to represent 95 percent undeveloped land uses (reference conditions), two major geologic settings, and the target catchment sizes. Wet weather sampling frequency at the six locations consists of three targeted events throughout the wet season (October 1 through April 30). Dry weather sampling frequency consists of weekly sampling for up to 40 weeks at flowing locations during winter and summer dry weather periods. Dry weather sampling occurs if there has been no measurable rainfall for at least 72 hours.

Water samples will be analyzed for a combination of conventional constituents, nutrients, metals, fecal indicator bacteria, microbial source testing, and algae. Of these constituents, *Enterococcus*, *E. coli*, fecal coliform, total coliform, Bacteroides, and *in-situ* parameters are of primary importance; all other analytes are considered secondary. During dry weather sampling, reference stream sites will be assessed for algal percent cover, algal biomass, ash-free biomass, and factors that control the growth of algae (stream bankful dimensions, canopy cover, and pebble count). Flow discharge rates were estimated for seven reference streams using recorded continuous water level data during both wet and dry weather conditions and measured velocity and flow during sampled wet weather events.

Los Peñasquitos Lagoon TMDL Upper Watershed Sediment Load Monitoring Plan

The special study selected to represent the Los Peñasquitos WMA is the Los Peñasquitos Lagoon TMDL Upper Watershed Sediment Load Monitoring Plan (the Plan will be available on the Project Clean Water Website, http://www.projectcleanwater.org/index.php, by June 2015). This study will assess sediment loads in the watersheds upstream of the Draft Sediment TMDL compliance monitoring locations. The study seeks to answer the following question:

- What are the watershed sources of sediment affecting the health of the Los Peñasquitos Lagoon?

The Los Peñasquitos TMDL Upper Watershed Sediment Load Monitoring Study will include analysis of sediment water column loads and stream bedload, and air monitoring. The special study will be implemented in a phased approach. Monitoring will occur first in the Carroll Canyon Creek subwatershed, because previous modeling has indicated that most of the sediment in the Los Peñasquitos Lagoon is coming from this subwatershed. The Los Peñasquitos Creek and Carmel Valley Creek subwatersheds will be monitored in subsequent phases.

5.1.5 Other Special Studies

Responsible Agencies have planned projects and studies to fill data gaps, further investigate priority and highest priority water quality conditions, or evaluate the MS4 discharges and potential impacts. These projects exceed the monitoring requirements of the MS4 Permit. These studies will be implemented on the basis of available resources.

Stream Gauge Study

Many waterbodies in the San Diego region have not been subject to regular flow monitoring. Knowledge of water level is essential for programs, including TMDL implementation, bio-objectives, and bioassessment. The stream gauge study attempts to fill in some of the gaps in the information regarding the level of flow at two stream locations in Los Peñasquitos WMA. Monitoring will answer the questions:

- What is the level of flow in local streams?
- Which streams are perennial and which are ephemeral?

The study, which began in spring of 2014 and will continue until spring 2015, includes installation of two datalogger units. Dataloggers will gather water level, temperature, and conductivity data at 5-minute intervals.

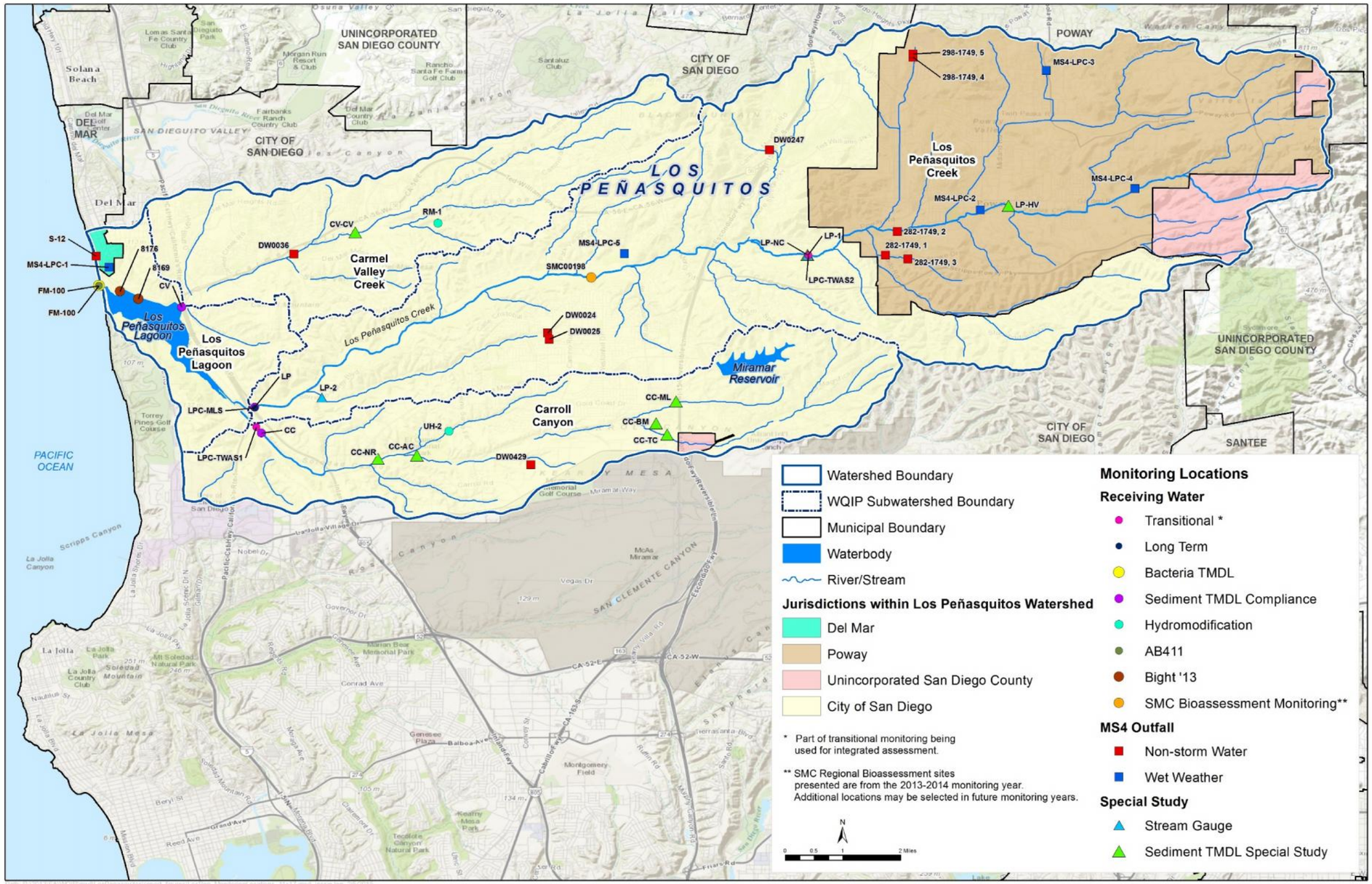

Figure 5-2
MAP Monitoring Locations for the Los Peñasquitos WMA

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5.1.6 Remaining Data Gaps

The data gaps discussed in Section 2 were compared with each of the monitoring program components described in the previous subsections. Most of the data gaps will be addressed by the Monitoring and Assessment Program. The long-term monitoring locations include a larger suite of pollutants than previously monitored on the basis of the new MS4 Permit requirements and provide more detail on hydromodification. In addition, because the MS4 outfall monitoring locations for dry and wet weather are prioritized on the basis of the priority water quality conditions identified in Section 2, over time there will be more MS4 data near the waterbodies included in the priority water quality conditions. It is expected to take a few years of monitoring to potentially assess the MS4 contribution to the priority water quality conditions because of the typical high variability of constituent concentrations in storm water. MS4 monitoring locations may also need to change because it is unlikely that MS4 locations will be monitored near each priority water quality condition during one monitoring season.

Some data gaps remain because the present state of science does not allow for the full characterization of the cause of the priority water quality condition. The impairment caused by nutrients is impacted by the physical and biological conditions of the receiving water. The link between these factors and the concentration of nutrients in the priority water quality condition waterbodies will not be determined as part of this iteration of the Monitoring and Assessment Program. Similarly, for receiving waters impaired by toxicity, factors other than runoff from the MS4 contribute to toxicity levels. The Monitoring and Assessment Program does not currently include analyses of non-MS4 contributions to toxicity in receiving water. For pollutants such as selenium and nutrients, groundwater may be a contributing source, as noted throughout the San Diego Region (City of San Diego, 2011).

5.1.7 Regional Clearinghouse

The Responsible Agencies will use existing data-sharing templates to facilitate compilation of watershed-wide data sets for assessment and reporting purposes. To support reporting under previous MS4 Permit cycles, regional data-sharing templates were developed for receiving water monitoring, MS4 outfall monitoring, field screening, and IC/ID reporting. The Responsible Agencies will make the following data and documentation available to the public on the Project Clean Water website:

- Los Peñasquitos WMA Water Quality Improvement Plan and all updated versions with date of update

Project Clean Water is a web-based portal for San Diego County watersheds. It is used as a centralized point of access to share educational materials, water quality information, and MS4 Permit-required reports with the public.

www.projectcleanwater.org

- Annual Reports for the WMA
- Jurisdictional Runoff Management Programs documents for each Responsible Agency within the WMA and all updated versions with date of update
- BMP Design Manual for each Responsible Agency within the WMA and all updated versions with date of update
- Reports from special studies conducted in the WMA
- Monitoring data uploaded to the California Environmental Data Exchange Network (CEDEN) with links to the uploaded data
- Available GIS data, layers, and/or shape files used to develop the maps to support the Water Quality Improvement Plan, Annual Reports, and Jurisdictional Runoff Management Programs

5.2 Water Quality Improvement Plan Assessment Program

The assessment portion of the Monitoring and Assessment Program will evaluate the data collected under the monitoring programs described in Section 5.1, as well as the information collected as part of the JRMP. The data collected from these two programs will be used to assess the progress toward achieving the Water Quality Improvement Plan numeric goals and schedules and to measure the progress toward addressing the highest priority water quality conditions.

This section summarizes the requirements of the four primary assessments listed in Figure 5-1. Depending on permit requirements, some assessments will be reported annually, as part of the Water Quality Improvement Plan Annual Report, while others will be included in the Report of Waste Discharge that the Responsible Agencies must submit prior to the issuance of the next MS4 Permit.

The timeframe for each of the assessments is as follows:

- Annual Reporting
  - Receiving Water Assessment
  - MS4 Outfall Discharge Assessment
  - Special Studies Assessment
- MS4 Permit Reporting (Report of Waste Discharge at end of MS4 Permit Cycle)
  - Integrated Assessment.

The Monitoring and Assessment Program will be evaluated and adapted in the context of the Annual Reporting and the Report of Waste Discharge. The re-evaluation will consider data gaps and the results of all monitoring program elements. Required elements of the Water Quality Improvement Plan Annual Report are provided in Table 5-9.

Modifications may be made to the Monitoring and Assessment Program, but the core elements required by the MS4 Permit and described in Section 5.1 must be maintained. This limits the amount of adaptation that is possible. Potential changes could be to change the frequency of sampling, add a new analyte of concern, or move a monitoring location.

Table 5-9
Annual Reporting Components

Assessment and Documentation	Detailed Data and Information
Summary of data collected, findings, interpretations, and conclusions from the assessments required per MS4 Permit Provisions F.b.(3)(a), (b), and (c)	❖ Receiving Water Assessments per Provision D.4.a. ❖ Sediment Quality Assessments per Provision D.1.e(2) ❖ TMDL Assessments per Provision E.6 ❖ MS4 Outfall Discharger Assessments D.4.b ❖ IDDE relevant information and findings per Provision E.2 ❖ Special studies: findings and progress per Provision D.4.c ❖ Re-evaluation of the priority water quality conditions, numeric goals, strategies, schedules, and/or monitoring and assessment, as needed per Provision D.4.d.[1]
Progress of implementing the Water Quality Improvement Plan per Provision F.b.(3)(d)	❖ Progress toward interim and final numeric goals for the highest priority water quality conditions for the WMA ❖ Status of water quality improvement strategies by each Responsible Agency ❖ Proposed modifications to water quality improvement strategies and supporting rationale ❖ Water quality improvement strategies planned for implementation during the next reporting period

Table 5-9 (continued)
Annual Reporting Components

Assessment and Documentation	Detailed Data and Information
Progress of implementing the Water Quality Improvement Plan per Provision F.b.(3)(d) (continued)	❖ Proposed modifications to Water Quality Improvement Plan and/or each Copermittee's jurisdictional runoff management program document ❖ Previous modifications or updates incorporated into the Water Quality Improvement Plan and/or each Copermittee's jurisdictional runoff management program document
A completed Jurisdictional Runoff Management Program Annual Report Form for each Copermittee in the WMA, certified by a Principal Executive Officer, Ranking Elected Official, or Duly Authorized Representative per Provision F.b.(3)(e)	❖ City of Del Mar ❖ City of Poway ❖ City of San Diego ❖ County of San Diego
Any data or documentation utilized in developing the Water Quality Improvement Plan Annual Report for each Responsible Agency, upon request by the Regional Board. Monitoring data must be uploaded to CEDEN and available for access on the Regional Clearinghouse per Provision F.b.(3)(f)	❖ Receiving water and data collected per Provision D.1 ❖ MS4 outfall discharge monitoring data collected per Provision D.2 ❖ Special Study data ❖ IC/ID investigation data

1. This re-evaluation is not required annually; at minimum, it must be completed as part of the Report of Waste Discharge.

5.2.1 Integrated Assessment

The integrated assessment builds on the receiving water assessment, MS4 outfall discharge assessment, and special studies assessment described in Sections 5.2.2 through 5.2.4. Additionally, the integrated assessment will evaluate the data collected as part of the transitional monitoring program implemented after the approval of the 2013 MS4 Permit and before the implementation of the monitoring program detailed in Section 5.1.

Transitional monitoring components from the 2007 Permit consisted of:

- Continuation of the receiving water monitoring programs performed under the previous MS4 Permits(including monitoring at the upstream TWAS locations described in Section 2.1)
- Continuation of the Hydromodification Management Plans monitoring program
- Continued participation in regional receiving water monitoring programs

The Responsible Agencies will integrate the data collected as part of the Monitoring and Assessment Program, along with information collected during implementation of the JRMP. The integrated assessment will evaluate the main components of the Water Quality Improvement Plan and will follow the assessment process outlined in the MS4 Permit, as summarized in Table 5-10. The priority water quality conditions will be re-evaluated using the receiving water and MS4 outfall discharge assessments on the basis of the methodology presented in Appendix A. The compliance pathways that comprise the goals and schedules in Section 4 will be reviewed on the basis of the results of the receiving water and MS4 outfall discharge assessments, along with data collected as part of the JRMP. This evaluation will highlight the progress in achieving the compliance goals. Finally, both water quality monitoring data and maintenance/observational data related to BMP effectiveness will be used to assess the strategies implemented by the Responsible Agencies. Table 5-10 summarizes the assessment program components.

The integrated assessment for all three Water Quality Improvement Plan components will be performed during the development of the Report of Waste Discharge. Strategies will be evaluated in the Water Quality Improvement Plan Annual Report on the basis of the data collected as part of the JRMP and any new relevant BMP effectiveness data collected by the Responsible Agencies.

Table 5-10
Integrated Assessment Components

Water Quality Improvement Plan Components	MS4 Permit Assessment Methodology	Evaluation Assessment
Priority Water Quality Conditions	<u>Re-assess receiving water, priority, and highest priority water quality conditions.</u> (1) Re-evaluate the receiving water conditions per methodology and any new methodology provided in Appendix A. (2) Re-evaluate the impacts of MS4 discharges on receiving waters per methodology provided in Appendix A. (3) Identify beneficial uses in receiving waters that must be protected per Receiving Water Assessment (Section 5.2.2). <u>Re-evaluate MS4 sources and stressors based on potentially new priority and highest priority water quality conditions.</u> (4) Re-evaluate the identification of MS4 sources and/or stressors performed in Section 3.	❖ Receiving Water Assessments ❖ MS4 Outfall Discharge Assessments
Goals and Schedules (Compliance Pathways)	<u>Evaluate effectiveness of goals.</u> (1) Evaluate the progress toward achieving interim and final numeric goals for protecting impacted beneficial uses in receiving waters.	❖ Receiving Water Assessments ❖ MS4 Outfall Discharge Assessments ❖ JRMP Assessments
Strategies	<u>Evaluate effectiveness of strategies and actions.</u> (1) Identify the non-storm water and storm water pollutant loads from the MS4 outfalls based on the MS4 Outfall Discharge Assessment (Section 5.2.3). (2) Identify the non-storm water and storm water pollutant load reductions, or other improvements that are necessary to attain the interim and final numeric goals.	❖ MS4 Outfall Discharge Assessments ➢ Special Studies Assessments for BMP Effectiveness ➢ JRMP Assessments

Table 5-10 (continued)
Integrated Assessment Components

Water Quality Improvement Plan Components	MS4 Permit Assessment Methodology	Evaluation Assessment
Strategies (continued)	(3) Identify the non-storm water and storm water pollutant load reductions, or other improvements, that are necessary to demonstrate that non-storm water and storm water discharges are not causing or contributing to exceedances of receiving water limitations. (4) Evaluate the progress of the strategies toward achieving interim and final numeric goals for protecting beneficial uses in receiving waters.	❖ MS4 Outfall Discharge Assessments ➢ Special Studies Assessments for BMP Effectiveness ➢ JRMP Assessments

Performance-Based Goals Assessment

Of particular interest for the integrated assessment to be performed during this MS4 permit cycle is a review of the performance-based goals in Section 4. These goals will be reviewed during the development the Report of Waste Discharge. Sections 5.1.1 and 6.3.2 summarize the jurisdictional goals put forth by each Responsible Agency and the measures that will be used to assess the goals.

5.2.2 Receiving Water Assessments

The assessment of receiving waters involves evaluating the physical, chemical, and biological conditions of the receiving waters and the condition of the sediment. The Responsible Agencies must assess the status and trends of receiving water quality conditions in coastal waters, lagoons, and streams in the Los Peñasquitos WMA. This assessment includes evaluation of both dry weather and wet weather conditions. The receiving water assessment to be presented in the Water Quality Improvement Plan Annual Report will:

- ❖ Assess whether or not the conditions of the receiving waters are meeting the numeric goals established in Section 4.
- ❖ Identify the most critical beneficial uses that must be protected to ensure the overall health of the receiving water.
- ❖ Evaluate whether or not those critical beneficial uses are being protected.
- ❖ Identify short-term and/or long-term improvements or degradation of those critical beneficial uses.

- Consider whether or not the strategies established in the Water Quality Improvement Plan contribute toward progress in achieving the interim and final numeric goals of the Water Quality Improvement Plan.
- Identify gaps in the monitoring data needed to assess the above provision.

5.2.3 MS4 Outfall Discharge Assessments

The MS4 outfall discharge assessments include evaluating both the dry weather monitoring data associated with the IDDE program and the wet weather monitoring data collected by the Responsible Agencies. Details of these two separate assessments are provided below. Each Responsible Agency will assess its MS4 programs individually and will compile the reports as part of the Los Peñasquitos WMA Water Quality Improvement Plan Annual Report. The key elements of the MS4 Outfall Discharge Assessments are summarized in Table 5-11.

Table 5-11
Key Elements of the MS4 Discharge Assessments

Dry Weather Outfall Assessment	Illicit Discharge	Wet Weather Outfall Assessment
❖ Identify sources of non-storm water discharges on the basis of field screening data or IDDE activities ❖ Rank and prioritize non-storm water discharges ❖ Identify sources contributing to numeric action limit exceedances ❖ Estimate volumes and loads of non-storm water discharges ❖ Evaluate non-storm water discharge monitoring locations ❖ Evaluate the effectiveness of the water quality improvement strategies	❖ All IC/ID investigations ❖ IC/IDs eliminated within the jurisdiction	❖ Estimate volumes and loads of storm water discharges ❖ Evaluate temporal trends ❖ Evaluate storm water discharge monitoring locations and frequency ❖ Evaluate Water Quality Improvement Plan analysis ❖ Evaluate the effectiveness of water quality improvement strategies

Dry Weather Outfall Assessments and Illicit Discharges

Each Responsible Agency must assess and report the progress of its IDDE program (required pursuant to MS4 Permit Provision E.2) toward effectively prohibiting non-storm water and illicit discharges into the MS4s within its jurisdiction, including the following elements:

- **Identify sources of non-storm water discharges.**

  Based on the dry weather MS4 outfall discharge field screening monitoring described in Appendix O, each Responsible Agency must assess and report as follows (Provision D.4.b(1)(b)):

  - Identify the known and suspected controllable sources (e.g., facilities, areas, land uses, and pollutant-generating activities) of transient and persistent flows within the Responsible Agency's jurisdiction in the Los Peñasquitos WMA.
  - Identify sources of transient and persistent flows within the Responsible Agency's jurisdiction in the Los Peñasquitos WMA that have been reduced or eliminated.
  - Identify modifications of the field screening monitoring locations and frequencies for the MS4 outfalls in the Responsible Agency's inventory necessary to identify and eliminate sources of persistent flow non-storm water discharges (Provision D.2.b).

  The JRMP Annual Report will be used to guide this assessment in the Water Quality Improvement Plan Annual Report. The known and suspected sources will be identified during implementation of JRMP activities. These activities include the facility inspections that complement the IDDE program and information gathered by the storm water hotline or other public complaints. The JRMP Annual Report now consists of a one-page form that summarizes the JRMP activities provided in Attachment D of the MS4 Permit, along with supporting information. Section IV of the JRMP Annual Report Form summarizes the findings of the IDDE Program.

  The back-up information that may be provided with the form may include the following information to help identify sources:

  - Subwatershed of the source or complaint
  - Potential receiving water of the source or complaint
  - Potential pollutant or pollutant category that could be contributed by the source or complaint

  Those Copermittees that do not provide this optional back-up will make this information available for collaborative watershed assessments.

❖ **Rank and prioritize non-storm water discharges.**

Based on the data collected and applicable numeric action levels described in Section 2 and detailed in Appendix O, the Responsible Agencies must rank the MS4 outfalls in their jurisdictions according to the potential threat to receiving water quality and produce a prioritized list of persistently flowing major MS4 outfalls. The Water Quality Improvement Plan will be updated as described in Section 6 on the basis of these findings and with the goal of implementing (in the order of the ranked priority list) targeted programmatic actions and source investigations to eliminate persistent non-storm water discharges and/or pollutant loads.

❖ **Identify sources contributing to numeric action limit exceedances.**

For the highest priority major MS4 outfalls with persistent flows that exceed NALs (Provision C1.), each Responsible Agency must identify the known and suspected sources within its jurisdiction in the Los Peñasquitos WMA that may cause or contribute to the numeric action limit exceedances.

❖ **Estimate volumes and loads of non-storm water discharges.**

Annually, each Responsible Agency must (1) analyze the data collected as part of the Non-Storm Water Persistent Flow MS4 Outfall Discharge Monitoring Program from the highest priority major MS4 outfalls and (2) use a model or another method to calculate or estimate the non-storm water volumes and pollutant loads collectively discharged from all the major MS4s outfalls in its jurisdiction that have persistent dry weather flows during the monitoring year. These calculations or estimates must include:

- The percent contribution from each known source for each MS4 outfall
- The annual non-storm water volumes and pollutant loads collectively discharged from the Responsible Agency's major MS4 outfalls to receiving waters within the Responsible Agency's jurisdiction
- The annual volumes and pollutant loads for sources of non-storm water not subject to the Responsible Agency's legal authority that are discharged from the Responsible Agency's major MS4 outfalls to downstream receiving waters

❖ **Evaluate non-storm water discharge monitoring locations.**

Based on an evaluation of the data collected from the highest priority non-storm water persistent flow MS4 outfall monitoring locations, the outfall monitoring locations may be reviewed and the list reprioritized according to one or more of the following criteria (Provision D.2.b.(2)(b)(ii)):

- The non-storm water discharges have been effectively eliminated (i.e., there is no flowing, pooled, or ponded water) for three consecutive dry weather monitoring events

- The sources of the persistent flows have been identified as a category of non-storm water discharges that do not require an NPDES permit and do not have to be addressed as an illicit discharge because they were not identified as sources of pollutants (i.e., the constituents in the non-storm water discharge do not exceed numeric action level) and the persistent flow can be reprioritized to a lower priority
- The constituents in the persistent flow non-storm water discharge do not exceed NALs (Provision C.1)
- The source(s) of the persistent flows has (have) been identified as a non-storm water discharge authorized by a separate NPDES permit

Where these criteria have not been met but the threat to water quality has been reduced by the Responsible Agency, the highest priority persistent flow MS4 outfall monitoring stations may be reprioritized accordingly for continued dry weather MS4 outfall discharge field screening monitoring as part of the Dry Weather MS4 Outfall Discharge Field Screening Program.

Each Responsible Agency must document removal or reprioritization of the highest priority persistent flow MS4 outfall monitoring stations identified under the Non-Storm Water Persistent Flow MS4 Outfall Discharge Monitoring Program in the Water Quality Improvement Plan Annual Report. When a Responsible Agency removes a persistent flow MS4 outfall monitoring station, it will be replaced with the next highest prioritized major MS4 outfall designated by that jurisdiction in the Los Peñasquitos WMA. If there are no remaining qualifying major MS4 outfalls within its jurisdiction, the number of major MS4 outfalls monitored will be reduced.

❖ **Evaluate the effectiveness of the water quality improvement strategies.**

As part of the Report of Waste Discharge, each Responsible Agency will review the data collected as part of the Dry Weather MS4 Outfall Discharge Monitoring Program and findings from annual dry weather MS4 discharge monitoring assessments described above (Provisions D.4.b.(1)(c)(v)[a]-[c] and Provision D.4.b.(c)(c)(vi)). The evaluation will incorporate the following:

- Identification of reductions and progress in achieving reductions in non-storm water and illicit discharges to the Responsible Agency's MS4s in the Los Peñasquitos WMA
- Assessment of the effectiveness of the water quality improvement strategies being implemented by the Responsible Agencies within their jurisdictions in the Los Peñasquitos WMA toward reducing or eliminating non-storm water and pollutant loads discharging from the MS4s to receiving waters, and, if possible, estimation of the non-storm water volume and/or pollutant load reductions attributable to specific water quality strategies in the Responsible Agency's jurisdictions

- Identification of modifications necessary to increase the effectiveness of the water quality improvement strategies implemented by the Responsible Agency toward reducing or eliminating non-storm water and pollutant loads discharging from the MS4s to receiving waters within its jurisdiction, including a comparison with NALs as appropriate
- Identification of data gaps in the monitoring data necessary to develop the assessments above (Provisions D.4.b.(1)(c)(i)-(v))

Wet Weather Outfall Assessments and Illicit Discharges

The Responsible Agencies must assess and report the progress of the water quality improvement strategies implemented as part of the Water Quality Improvement Plan and the JRMP toward reducing pollutants in storm water discharges from the MS4s. This is designated as the Wet Weather MS4 Outfall Discharge Monitoring Program. The assessment of this program will:

- **Estimate volumes and loads of storm water discharges.**

  As part of the Water Quality Improvement Plan Annual Report, the Responsible Agencies must analyze the monitoring data collected as part of the Wet Weather MS4 Outfall Discharge Monitoring Program. This includes using a watershed model or another method to calculate or estimate the following for each monitoring year:

  - The average storm water runoff coefficient for each land use type within the Los Peñasquitos WMA
  - For storm events with measurable rainfall greater than 0.1 inch, the volume of storm water and pollutant loads discharged from the monitored MS4 outfalls to receiving waters within the Los Peñasquitos WMA
  - The total flow volume and pollutant loadings discharged from each Responsible Agency's jurisdiction within the Los Peñasquitos WMA over the course of the wet season, extrapolated from the data produced from the monitored MS4 outfalls
  - For storm event with measurable rainfall greater than 0.1 inch, the percent contribution of storm water volumes and pollutant loads discharged from land use type within (1) each hydrologic subarea with a major MS4 outfall to receiving waters, or (2) each major MS4 outfall to receiving waters

❖ **Evaluate temporal trends.**

To evaluate all the data collected as part of the Wet Weather MS4 Outfall Discharge Monitoring Program, the Responsible Agencies must:

- Incorporate new outfall monitoring data into time series plots for each long-term monitoring constituent for the Los Peñasquitos WMA.
- Analyze statistical trends on the cumulative long-term wet weather MS4 outfall discharge water quality data set. This will include a comparison with SALs (Provision C.2).

❖ **Evaluate storm water discharge monitoring locations and frequency.**

The Responsible Agencies may identify modifications to the wet weather MS4 outfall discharge monitoring locations and frequencies necessary to identify pollutants in storm water discharges from the MS4s in the Los Peñasquitos WMA (Provision D.2.c.(1)). Two methods are available per the MS4 Permit to modify the Wet Weather MS4 Discharge Outfall Program are the following:

- The Responsible Agencies may adjust the wet weather MS4 outfall discharge monitoring locations in the Los Peñasquitos WMA, as needed, to (1) identify pollutants in storm water discharges from MS4s, (2) guide pollutant source identification, and (3) determine compliance with the WQBELs associated with the applicable TMDLs in Attachment E of the MS4 Permit on the basis of the highest priority water quality conditions identified in Section 2. The number of stations should be, at a minimum, equivalent to the number of stations required under the MS4 Permit (Provision D.2.a.(3)(a)). Additional outfall monitoring locations (above the minimum per jurisdiction) may be required to demonstrate compliance with the WQBELs associated with the Bacteria TMDL and the Draft Sediment TMDL.
- The Responsible Agencies may adjust the analytical monitoring required for the Los Peñasquitos WMA if historical data or other supporting information demonstrate or justify that analysis of a constituent is not necessary.

❖ **Evaluate Water Quality Improvement Plan analysis.**

The Responsible Agencies will evaluate the Water Quality Improvement Plan analysis on the basis of the wet weather MS4 outfall monitoring data collected and the applicable numeric storm water action levels (Provision C.2). This evaluation will include analyzing and comparing the monitoring data used to develop the Water Quality Improvement Plan, particularly the strategies presented in Section 4. Additionally, the Responsible Agencies will evaluate whether those analyses should be updated as a component of the adaptive management process described in Section 6.

❖ **Evaluate the effectiveness of water quality improvement strategies.**

As part of the Report of Waste Discharge, the Responsible Agencies will review the data collected pursuant to the Wet Weather MS4 Outfall Discharge Monitoring Program and findings from the annual wet weather MS4 discharge monitoring assessments described above (Provisions D.4.b.(2)(c)(i)-(ii)). The evaluation will:

- Identify progress in achieving reductions in pollutant concentrations and/or pollutant loads from different land uses or drainage areas discharging from the Responsible Agencies' MS4s in the Los Peñasquitos WMA.
- Assess the effectiveness of water quality improvement strategies being implemented by the Responsible Agencies within the Los Peñasquitos WMA toward reducing pollutants in storm water discharges from the MS4s to receiving waters within the WMA to the maximum extent practicable. If possible, include an estimate of the pollutant load reductions attributable to specific water quality strategies implemented by the Responsible Agencies.
- Identify modifications necessary to increase the effectiveness of the water quality improvement strategies implemented by the Responsible Agencies in the Los Peñasquitos WMA toward reducing pollutants in storm water discharges from the MS4s to receiving waters in the WMA to the maximum extent practicable.
- Annually identify data gaps in the monitoring data necessary to assess the provisions above.

5.2.4 Special Studies Assessments

As part of the Water Quality Improvement Plan Annual Report, the Los Peñasquitos WMA Responsible Agencies will evaluate the results and findings from the special studies described in Appendix O. They will use the resulting data to (1) assess their relevance to the Responsible Agencies' characterization of receiving water conditions, (2) understand sources of pollutants and/or stressors, and (3) control and reduce the discharges of pollutants from the MS4 outfalls to receiving waters. As with the other monitoring programs, the results of the special studies assessment may warrant modifications of or updates to the Water Quality Improvement Plan.

The Los Peñasquitos WMA special studies will seek to answer questions concerning the natural "reference" concentration of bacteria and other pollutants in the region and potential upper watershed sediment loads. The special studies will help guide the implementation of the strategies for the highest priority water quality conditions.

Future special studies related to BMP effectiveness that are implemented by the Responsible Agencies in the Los Peñasquitos WMA will be included in this assessment. Responsible Agencies may elect to report the results of BMP effectiveness studies that are being performed in other WMAs if they relate to the highest priority water quality

conditions and results are expected to be transferrable to strategies planned for the Los Peñasquitos WMA.

5.2.5 Regional Monitoring Report

The regional monitoring and reporting requirement from Provision F.3.c of the MS4 Permit requires integration of all data on a regional scale to recommend modifications to the implementation or assessment of the Water Quality Improvement Plan and jurisdictional runoff management programs. The report must assess the following:

- The beneficial uses of the receiving waters within the San Diego region that are supported and not adversely affected by the Responsible Agency's MS4 discharges
- The beneficial uses of the receiving waters within the San Diego region that are adversely affected by the Responsible Agency's MS4 discharges
- The progress toward protecting beneficial uses of the receiving waters within the San Diego Region from Responsible Agency's MS4 discharges
- Pollutants or conditions of emerging concern that may impact beneficial uses of the receiving waters within the San Diego region

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6 Iterative Approach and Adaptive Management Process

The iterative approach that facilitates the adaptive management process for the Los Peñasquitos WMA is presented in this section. The iterative approach re-evaluates the water quality conditions and priorities, goals, and strategies on the basis of the MS4 Permit requirements. The adaptive management process details how the Water Quality Improvement Plan (including the Monitoring and Assessment Plan) is revised when new priorities and/or highest priorities are added, how goals will be adjusted or new goals are added, and how the strategies will be modified to meet the latest goals.

As shown in the graphic below, the fifth step of the Water Quality Improvement Plan (adaptive management process) is to develop and outline the iterative approach that facilitates the adaptive management process for the Los Peñasquitos WMA (Provisions A.4, B.5, and D.4.d). The sixth step of the Water Quality Improvement Plan (annual reporting) is to compile and analyze the information collected as part of the MS4 Permit implementation. Annual reporting is described in both Sections 5 and 6 of this Water Quality Improvement Plan, as it draws on both the Monitoring and Assessment Program and the adaptive management process.

Section 6 Highlights

- Develop the iterative approach to facilitate the adaptive management process for the Los Peñasquitos WMA.
- Iterative approach re-evaluates the following on the basis of the requirements of the MS4 Permit:
  - Conditions and priorities
  - Goals
  - Strategies
- Adaptive management process explains how the Water Quality Improvement Plan will be revised when:
  - New priorities and/or highest priorities are developed
  - Goals are adjusted or new goals are added
  - Strategies are modified to meet the latest goals

The MS4 Permit describes various triggers that may require program adaptation, including exceedances of water quality standards in receiving waters, new information, Regional Board recommendations, and public participation.

The results of effectiveness assessments of JRMP programs and strategies may also trigger adaptations of the Water Quality Improvement Plan. Each trigger will result in specific adaptive management processes or actions within the timeframes specified in

the MS4 Permit. The timing of the adaptive management requirements is typically either annually or at the end of the MS4 Permit term. Other adaptations, especially those driven by TMDLs, will likely occur outside of the MS4 Permit term. For example, the Draft Sediment TMDL outlines specific adaptive management requirements that include long-term monitoring and special studies timelines.

The adaptive management process provides the framework to evaluate progress toward meeting the requirements in the compliance pathways of the Bacteria and Sediment TMDLs that are reflected in the goals presented in Section 4. The adaptive management process will be used in conjunction with the data collected as part of the Monitoring and Assessment Program to evaluate whether modifications to goals, schedules, and/or strategies are necessary to achieve compliance with the interim and final TMDL compliance options provided in Attachment E of the MS4 Permit. Figure 6-1 provides an overview of the adaptive management process.

MS4 Permit requirements, annual assessments and adaptation, and Report of Waste Discharge assessments and adaptations, including triggers and resulting actions, are described in Sections 6.1 through 6.3. The adaptive management requirements of the Draft Sediment TMDL are in Section 6.4.

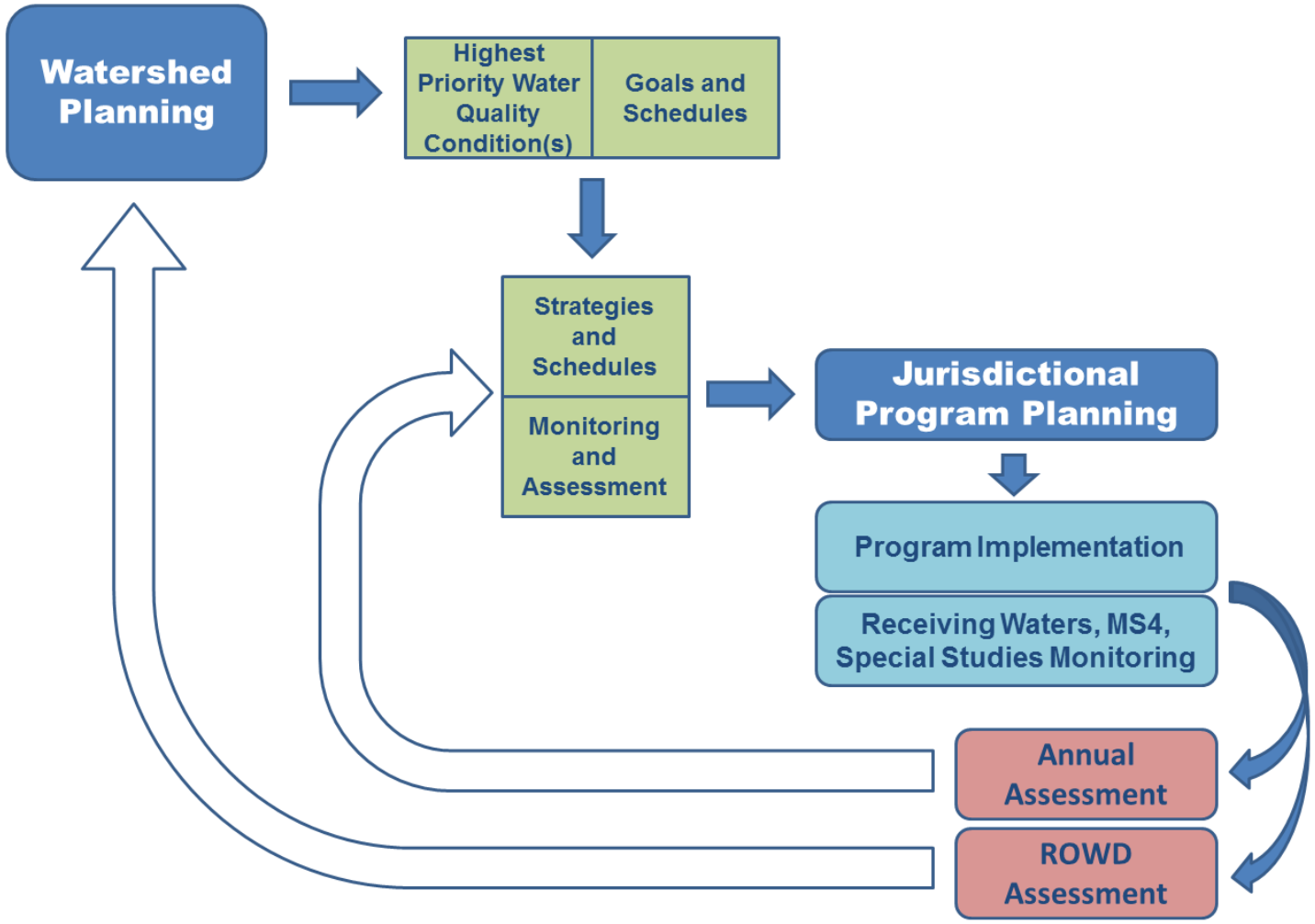

Figure 6-1
Water Quality Improvement Plan Assessment Adaptive Management Process

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6.1 MS4 Permit Requirements: Iterative Approach and Adaptive Management

The MS4 Permit includes the requirements for adaptive management in multiple provisions. Provisions A.4, B.5, D.4.d, and F.2.c each contain requirements related to adaptive management, as summarized below:

- Provision A.4 requires the Water Quality Improvement Plan to be designed and adapted to ultimately comply with the discharge prohibitions (Provisions A.1.a and A.1.c) and receiving water limitations (Provision A.2.a) specified in the MS4 Permit. The provision addresses the adaptive management process that may be triggered when exceedances of water quality standards persist in receiving waters.

- Provision B.5 contains specific considerations that must be included in the adaptive management process, whether performed as part of the Water Quality Improvement Plan Annual Report or as part of the Report of Waste Discharge. This includes the re-evaluation of priority water quality conditions; adaptation of goals, strategies, and schedules; and adaptation of the Monitoring and Assessment Program.

- Provision D.4.d contains the processes for the assessments and adaptive management that must occur in preparation of the Report of Waste Discharge.

- Provision F.2.c describes the requirements for updates to the Water Quality Improvement Plan that could result from implementation of the adaptive management requirements.

The following sections elaborate on the adaptive management processes, including the frequencies of adaptation required by the MS4 Permit (annual versus MS4 Permit term), triggers, and resulting actions.

Figure 6-2 provides a tentative timeline for the adaptive management process.

The first Water Quality Improvement Plan Annual Report is scheduled to be submitted by the Responsible Agencies in January 2017. It will include an abbreviated monitoring and JRMP implementation period, because the Monitoring and Assessment Program and JRMP will not be effective until after the approval of the Water Quality Improvement Plan. The timeline below assumes that the Water Quality Improvement Plan will be approved by the Regional Board during fall 2015, with the earliest implementation beginning in October 2015.

The second Annual Report for the current MS4 Permit cycle will be submitted in January 2018. This submittal would be after the submittal of the Report of Waste Discharge that is due to the Regional Board in December 2017.

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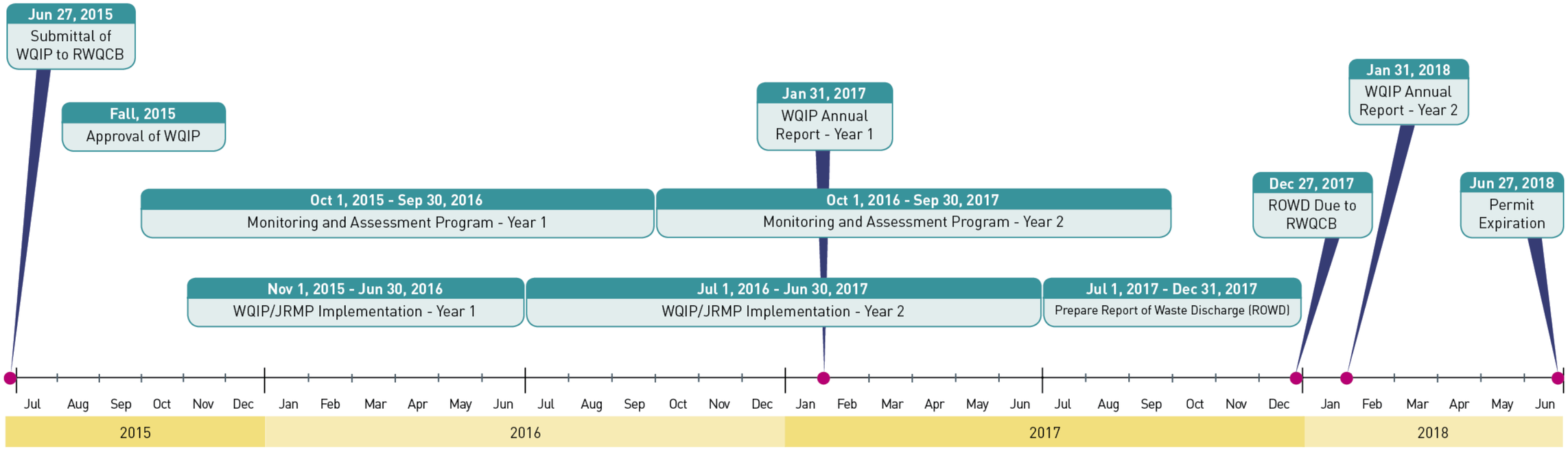

Figure 6-2
Water Quality Improvement Plan
Assessment and Reporting Timeline

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6.2 Annual Assessments and Adaptive Management

The MS4 Permit contains two conditions that may trigger adaptation annually:

(1) Exceedance of water quality standards in receiving waters

(2) New information

In either case, modifications may be appropriate for the water quality goals, strategies, schedules, and/or Monitoring and Assessment Program. The priority water quality conditions may be modified as needed during the MS4 Permit term, but would likely be modified only as a result of assessments conducted for the Report of Waste Discharge. A summary of the triggers and adaptive management processes that are required annually is presented in Table 6-1.

Table 6-1
Adaptive Management on an Annual Basis (Annual Report)

Plan Element	Trigger[1]	Adaptive Management Process Considerations
Water Quality Strategies and Schedules	Persistent Exceedances Not Addressed (A.4.a.(2))	***Provision A.4.a(2), Integrated Assessment Considerations (Summarized in Figure 6-3)[2]*** ❖ Water quality standard exceedances for pollutants that are addressed by the Water Quality Improvement Plan; continuing implementation of the accepted plan and updating as necessary; ❖ If MS4 discharges are causing or contributing to a new exceedance of an applicable water quality standard for pollutants that are not addressed by the Water Quality Improvement Plan, updating of the plan as part of the Water Quality Improvement Plan Annual Report (unless directed by the Regional Board to update it earlier ❖ Following Regional Board approval of modifications to the Water Quality Improvement Plan, update of the JRMP accordingly by the City

Table 6-1 (continued)
Adaptive Management on an Annual Basis (Annual Report)

Plan Element	Trigger[1]	Adaptive Management Process Considerations
Water Quality Strategies and Schedules (continued)	New Information (B.5.b)	***Provision B.5.b, Iterative Approach and Adaptive Management Considerations*** ❖ Modifications to the priority water quality conditions based on Provision B.5.a ❖ Progress toward achieving numeric goals for the highest priority water quality conditions ❖ Progress in meeting established schedules ❖ New policies or regulations that may affect goals ❖ Reductions of non-storm water discharges ❖ Reductions of pollutants in storm water discharges from MS4s to the MEP ❖ New information resulting from the re-evaluation of impacts from MS4 discharges and/or pollutants and stressors ❖ Efficiency in implementing the Water Quality Improvement Plan ❖ Recommendations of the Regional Board ❖ Recommendations received through a public participation process
Monitoring and Assessment Program	Persistent Exceedances Not Addressed (A.4.a.(2))	***Provision A.4.a(2), Integrated Assessment Considerations (Summarized in Figure 6-3)[2]*** ❖ Following the process as described in Figure 6-3, which might include revising the monitoring program to fill data gaps with modifications such as moving monitoring locations, adding additional sample collection, or changing type of sample collected.
	New Information (B.5.c)	***Provision B.5.c, Iterative Approach and Adaptive Management Considerations*** ❖ Re-evaluation based on new information such as modified priority water quality conditions, goals, strategies, or schedules ❖ New information that might include new regulations ❖ Inclusion in the Monitoring and Assessment Program of the monitoring required by the MS4 Permit

1. Following approval of a TMDL with wasteload allocations by the OAL and the USEPA, Responsible Agencies must initiate an update of the Water Quality Improvement Plan within six months.
2. This procedure does not have to be repeated for continuing or recurring exceedances of the same water quality standard(s) once scheduled strategies are implemented unless Responsible Agencies are directed to do so by the Regional Board.

6.2.1 Receiving Water Assessments

Evaluation of receiving water and MS4 outfall discharge data will be performed annually as part of the Water Quality Improvement Plan Annual Report (Provision F.3.b.(3)(a)). More comprehensive evaluations of receiving water data will be performed for the Transitional Monitoring and Assessment Program Report and for the Report of Waste Discharge (Provision D.4.a.(1)). These evaluations will summarize receiving water data collected within the Los Peñasquitos WMA and will provide information with the potential to trigger the adaptive management process described under Provision A.4.

Provision A.4 describes adaptive management procedures that the Responsible Agencies must implement "if exceedance(s) of water quality standards persist in receiving waters." Thus, the trigger for the adaptive management process under this provision is indication of exceedances of water quality standards that persist in receiving waters. If the adaptive management process is triggered under this provision, the process will assess two key questions:

- Is the MS4 a source of a pollutant causing the exceedances to persist in the receiving waters?
- Are the exceedances addressed by the Water Quality Improvement Plan?

If the MS4 is determined to be a source of pollutants causing the receiving water exceedance(s) and the receiving water exceedances are addressed under the Water Quality Improvement Plan, the Responsible Agencies will continue to implement the Water Quality Improvement Plan. If the MS4 is determined to be a source of pollutants causing the receiving water exceedance(s) and the receiving water exceedances are not addressed, the Responsible Agencies will update the plan to address the exceedances as described in Provision A.4.a.(2) and submit the updates with the Water Quality Improvement Plan Annual Report. The updates will include, as applicable:

- A description of strategies that are currently being implemented, are effective, and will continue
- A description of strategies that will be implemented to reduce or eliminate pollutants or conditions that are a source of the receiving water exceedances
- Updates to the implementation schedules for existing, revised, or additional strategies
- Updates to the Monitoring and Assessment Program to track progress toward achieving compliance with Provisions A.1.a, A.1.c, and A.2.a

The adaptive management process as required under Provision A.4 is illustrated in Figure 6-3.

6.2.2 Annual Evaluation of New Information

The adaptive management process may also be triggered as new information becomes available (Provision B.5.b). Where appropriate, modifications may be made to goals, strategies, schedules, and/or the Monitoring and Assessment Program, and reported in the Water Quality Improvement Plan Annual Report. Types of new information that may trigger the adaptive management process as part of the annual assessment process are discussed below, including the potential trigger(s) for modification(s) and the resulting adaptive management process to be used.

Regulatory Drivers

Where new regulations or policies are adopted that impact Los Peñasquitos WMA planning and implementation processes in the near term, modifications to the Water Quality Improvement Plan goals, strategies, schedules, and/or Monitoring and Assessment Plan may be warranted and (in some cases) required. For example, an update to the Water Quality Improvement Plan will be initiated no later than six months following approval of a TMDL Basin Plan Amendment by the OAL and the USEPA. The trigger applies to TMDLs containing WLAs assigned to Responsible Agencies within the WMA during the term of the MS4 Permit (Provision F.2.c.(2)). Other examples of regulatory drivers that may trigger modifications to the Water Quality Improvement Plan include new state policies (e.g., those related to trash, toxicity, biological objectives, and bacteria) and changes resulting from modifications to existing MS4 Permit requirements (e.g., as a result of a re-opener).

Special Study Results

As part of the Monitoring and Assessment Program, Responsible Agencies will perform special studies related to the highest priority water quality conditions for the Los Peñasquitos WMA. The special studies are designed to provide information that is related to sources of the highest priority water quality conditions within the Los Peñasquitos WMA, will be implemented during the MS4 Permit term, and are typically performed over multiple years. As relevant data, conclusions, and lessons learned become available from these studies, the Water Quality Improvement Plan may be modified. The study results may impact the goals, strategies, schedules, and monitoring and assessment plans. Additionally, lessons learned and study results from outside the Los Peñasquitos WMA, especially those related to sediment and bacteria impairments, may also be incorporated into the Water Quality Improvement Plan.

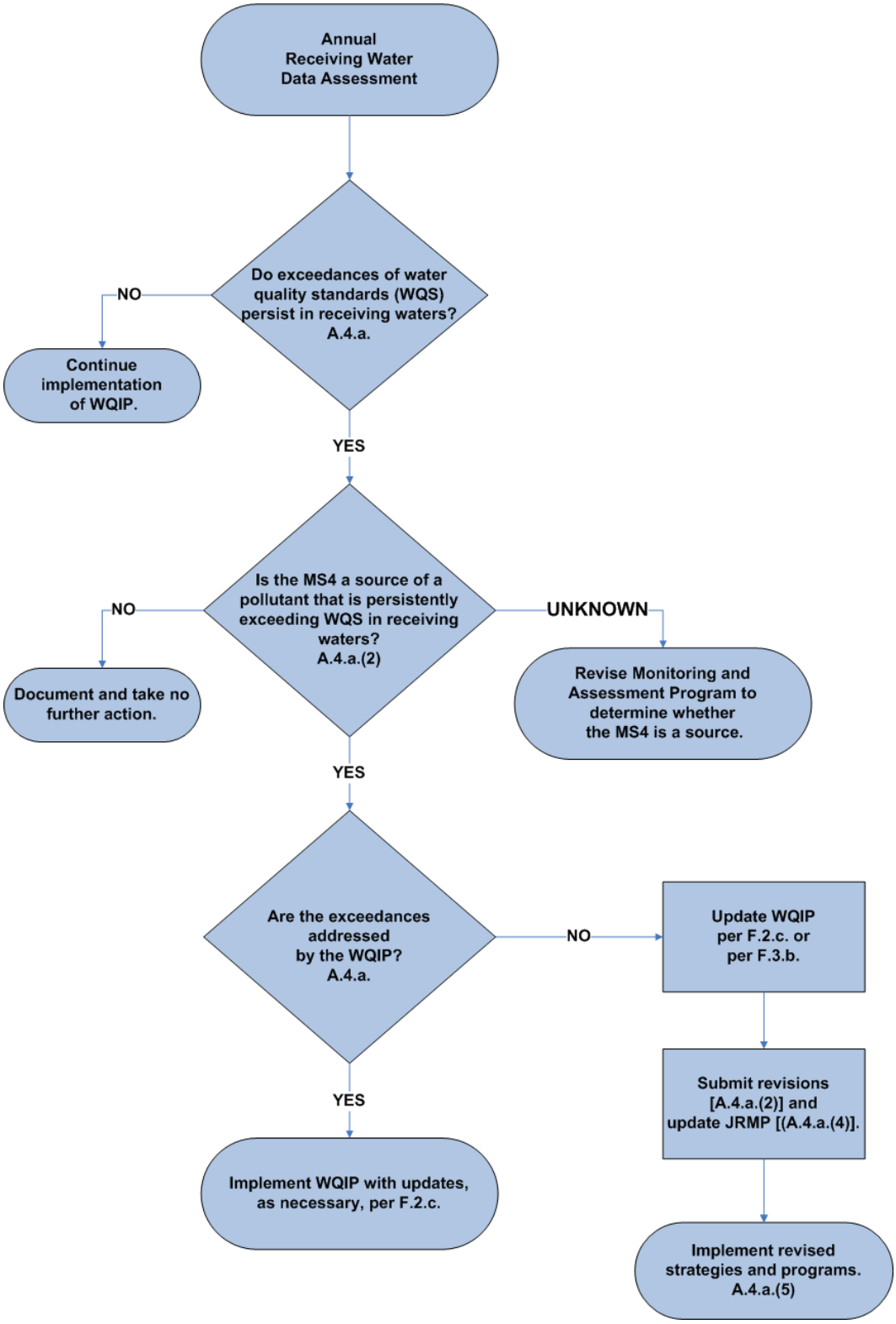

Figure 6-3
Receiving Water Exceedance Process (Provision A.4)

Program Effectiveness Assessments

Strategies developed within the Water Quality Improvement Plan will be incorporated into individual Responsible Agency programs through implementation of the JRMPs or the Stormwater Management Plan (SWMP), as applicable. Each Responsible Agency is implementing programs that focus on addressing the highest priority water quality conditions within the Los Peñasquitos WMA. While implementation of these programs has been ongoing in many cases, refinements to the programs provide additional focus on the particular water quality issues identified in the Water Quality Improvement Plan. Over time, Responsible Agencies will use various assessment methods to determine which program refinements are effective and which are not. In some cases, the program effectiveness assessment results may provide useful information leading to adaption of elements of the Water Quality Improvement Plan. As new information is applicable, it may be used to modify goals, strategies, schedules, and the Monitoring and Assessment Program.

Regional Board Recommendations

Adaptation of the Water Quality Improvement Plan may also be required on the basis of recommendations from the Regional Board. Recommendations may be from the public participation process, the Consultation Committee, review of submitted reports, or other Regional Board interests.

6.3 MS4 Permit Term Assessments and Adaptive Management

The MS4 Permit also contains specific assessments to be performed during the preparation of the Report of Waste Discharge. The assessments are longer-term, occurring only once during the MS4 Permit cycle. Because the updates to the Water Quality Improvement Plan are required to undergo a full public participation process per Provision F.2.c, including reconvening the Consultation Committee, modifications will consider input from the public and the Regional Board. Adaptation of Water Quality Improvement Plan elements will also consider new regulations or policies as appropriate. In the Report of Waste Discharge preparation, all elements of the Water Quality Improvement Plan are eligible for modifications through the required adaptive management processes. Elements that will be evaluated include the water quality conditions (i.e., priorities), goals and accompanying schedules, strategies and accompanying schedules, and the Monitoring and Assessment Program. Table 6-2 summarizes the triggers and adaptive management processes that are required as part of the Report of Waste Discharge.

Table 6-2
Adaptive Management on a Permit Term Basis (Report of Waste Discharge)

Plan Element	Adaptive Management Process Considerations
Priority Water Quality Conditions (B.5.a, D.4.d.(1))	***Provision B.5.a, Iterative Approach and Adaptive Management Considerations*** ❖ Achievement of the outcome of improved water quality through the implementation of strategies identified in the Water Quality Improvement Plan ❖ New information developed in the re-assessment of receiving water conditions, impacts from MS4 discharges, and subsequent re-evaluation of priorities ❖ Spatial and temporal accuracy of monitoring data ❖ Availability of new information and data from sources outside the JRMP programs that inform the effectiveness of implementation strategies and actions ❖ Recommendations of the Regional Board ❖ Recommendations received through a public participation process
	Provision D.4.d(1), Integrated Assessment Considerations ❖ Re-evaluation of the receiving water conditions and the impacts of MS4 discharges on receiving waters per the process developed in Section 2 of the Water Quality Improvement Plan and included in Appendix A, including the identification of beneficial uses in receiving waters that are protected per the Monitoring and Assessment Program ❖ Re-evaluation of the identification of MS4 sources and/or stressors that correspond to elevation of a new highest priority

Table 6-2 (continued)
Adaptive Management on a Permit Term Basis (Report of Waste Discharge)

Plan Element	Adaptive Management Process Considerations
Water Quality Goals and Schedules (B.5.b, D.4.d.(1))	***Provision B.5.b, Iterative Approach and Adaptive Management Considerations*** ❖ Modifications to the priority water quality conditions based on Provision B.5.a ❖ Progress toward achieving numeric goals for the highest priority water quality conditions ❖ Progress in meeting established schedules ❖ New policies or regulations that may affect goals ❖ Reductions of non-storm water discharges ❖ Reductions of pollutants in storm water discharges from MS4s to the MEP ❖ New information resulting from re-evaluating impacts from MS4 discharges and/or pollutants and stressors ❖ Efficiency in implementing the Water Quality Improvement Plan ❖ Recommendations of the Regional Board ❖ Recommendations received through a public participation process
	Provision D.4.d(1), Integrated Assessment Considerations ❖ Evaluation of the progress toward achieving interim and final numeric goals for protecting impacted beneficial uses in receiving waters
	Provision D.4.d(2), Integrated Assessment Considerations ❖ Identification of the non-storm water and storm water pollutant loads from the MS4 outfalls per Provision D.4.b ❖ Identification of the non-storm water and storm water pollutant load reductions, or other improvements that are necessary to attain the interim and final numeric goals ❖ Identification of the non-storm water and storm water pollutant load reductions, or other improvements, that are necessary to demonstrate that non-storm water and storm water discharges are not causing or contributing to exceedances of receiving water limitations ❖ Evaluation of the progress of the strategies toward achieving interim and final numeric goals for protecting beneficial uses in receiving waters

Table 6-2 (continued)
Adaptive Management on a Permit Term Basis (Report of Waste Discharge)

Plan Element	Adaptive Management Process Considerations
Monitoring and Assessment Program (B.5.c)	***Provision B.5.c, Iterative Approach and Adaptive Management Considerations*** ❖ Review of Monitoring and Assessment Programs based on the requirements in Provision D ❖ Adjustment of the monitoring program to determine whether discharges from the MS4 are causing/contributing to exceedances in the receiving water when new exceedances persist; identification and addressing of data gaps via re-assessment of monitoring locations and frequencies; adjustment of the monitoring program to address results of special studies

6.3.1 Priority Water Quality Conditions

The process for selecting the highest priority water quality condition(s) is documented in Section 2. Given the relatively short duration of the remainder of this MS4 Permit term after expected approval of the Water Quality Improvement Plan, the priority water quality conditions selected during the development of the Water Quality Improvement Plan will remain for the duration of the term. They will be modified only on the basis of new information assessed as part of the Report of Waste Discharge. Data collected during the MS4 Permit term will be used to update the analysis of the priority water quality conditions based on the methodology described in Appendix A and implemented in Section 2.

6.3.2 Progress Toward Achieving Goals

As part of the preparation of the Report of Waste Discharge, the Responsible Agencies will evaluate the progress toward achieving the interim and final numeric goals established in Section 4.1. The Water Quality Improvement Plan interim goals identified for the current permit term are provided in Tables 6-3 through 6-6 along with the related assessment metric for each.

Table 6-3
City of Del Mar Jurisdictional Goals, FY14 – FY18

Numeric Goal	Unit of Measure	Assessment Period and Fiscal Year Current Permit Term (FY14-FY18)	Assessment Method
Wet Weather Performance Measures			
Performance Metrics		FY 18	
MS4 Discharges Bacteria Reduction	Reduction in anthropogenic surface dry weather flows[1] to address bacteria regrowth contributing during wet weather	Achieve a 10% reduction in anthropogenic surface dry weather flows[1] from historical baseline	Summarize reduction in dry weather flow observed through MS4 Outfall monitoring program in the Los Peñasquitos WMA in the January 2018 Water Quality Improvement Plan Annual Report.
Dry Weather Performance Measures			
Performance Metrics		FY 18	
MS4 Discharges Bacteria and Dry Weather Flow Reduction	Reduction in anthropogenic surface dry weather flows[1]	Achieve a 10% reduction in anthropogenic surface dry weather flows[1] from historical baseline	Summarize reduction in dry weather flow observed through MS4 Outfall monitoring program in the Los Peñasquitos WMA in the January 2018 Water Quality Improvement Plan Annual Report.

1. The term “dry weather flow” excludes groundwater, other exempt or permitted non-storm water flows and sanitary sewer overflows.

Table 6-4
City of Poway Jurisdictional Goals, FY14 – FY18

Numeric Goal	Unit of Measure	Assessment Period and Fiscal Year Current Permit Term (FY14-FY18)	Assessment Method
Wet Weather Performance Measures			
Performance Metrics		FY 18	
MS4 Discharges Bacteria and Sediment Reduction	Turf conversion	Achieve a 5% increase in turf conversion from baseline	Summarize percent increase in turf conversion in the Los Peñasquitos WMA in the January 2018 Water Quality Improvement Plan Annual Report.
Dry Weather Performance Measures			
Performance Metrics		FY 18	
MS4 Discharges Bacteria and Dry Weather Flow Reduction	Turf conversion	Achieve a 5% increase in turf conversion from baseline	Summarize percent increase in turf conversion in the Los Peñasquitos WMA in the January 2018 Water Quality Improvement Plan Annual Report.

Table 6-5
City of San Diego Jurisdictional Goals, FY14 – FY18

Numeric Goal	Unit of Measure	Assessment Period and Fiscal Year Current Permit Term (FY14-FY18)	Assessment Method
Wet Weather Performance Measures			
Performance Metrics		FY 18	
MS4 Discharges Bacteria and Sediment Reduction	Green Infrastructure Policy	Construct 10 green infrastructure BMPs to treat 37 acres of drainage area	Summarize the completed projects that capture and treat drainage from 37 acres in the January 2018 Water Quality Improvement Plan Annual Report.
Dry Weather Performance Measures			
MS4 Discharges Dry Weather Flow, Bacteria, and Sediment Reduction	Green Infrastructure Policy	Construct 10 green infrastructure BMPs to treat 37 acres of drainage area	Summarize the completed projects that capture and treat drainage from 37 acres in the January 2018 Water Quality Improvement Plan Annual Report.
OR			
MS4 Discharges Reduce Pollutants in Dry Weather Discharges	Dry weather flow reduction from baseline	Achieve a 10% reduction in flow from historical baseline measured at persistently flowing outfalls in the WMA	Summarize the dry weather flow reduction observed through MS4 outfall monitoring program in the Los Peñasquitos WMA in the January 2018 Water Quality Improvement Plan Annual Report.

Table 6-6
County of San Diego Jurisdictional Goals, FY14 – FY18

Numeric Goal	Unit of Measure	Assessment Period and Fiscal Year Current Permit Term (FY14-FY18)	Assessment Method
Wet Weather Performance Measures			
Performance Metrics		FY 18	
MS4 Discharges Bacteria Reduction	% bacterial load reduction	Implement programmatic (non-structural) BMPs to achieve source reduction of bacteria loads from the MS4 outfalls	Provide a summary of BMPs implemented in the Los Penasquitos WMA in the January 2018 Water Quality Improvement Plan Annual Report.
MS4 Discharges Sediment Reduction	% sediment load reduction or verify allowable tons of sediment per year is met for Los Peñasquitos Creek and Carroll Canyon	Implement programmatic (non-structural) BMPs to achieve reduction of sediment loads from the MS4 outfalls	Provide a summary of BMPs implemented in the Los Peñasquitos WMA in the January 2018 Water Quality Improvement Plan Annual Report.
AND			
Lagoon Restoration	Goals for the restoration of 346 acres of salt marsh	Coordinate with watershed partners to determine restoration goals and establish monitoring protocols, as applicable	Summarize restoration goals and monitoring protocols in January 2018 Water Quality Improvement Plan Annual Report.

Table 6-6 (continued)
County of San Diego Jurisdictional Goals, FY14 – FY18

Numeric Goal	Unit of Measure	Assessment Period and Fiscal Year	Assessment Method
		Current Permit Term (FY14-FY18)	
Dry Weather Performance Measures			
Performance Metrics		FY 18	
MS4 Discharges Dry Weather Flow, Bacteria, and Sediment Reduction	Routine observations of MS4 outfalls to verify the absence of discharge to receiving water	Verify the effective elimination of anthropogenic dry weather flow from MS4 outfalls and use programmatic approaches to maintain compliance	Verify elimination of anthropogenic dry weather flows from MS4 outfalls in the Los Peñasquitos WMA in the January 2018 Water Quality Improvement Plan Annual Report.

The goals and compliance pathways will be assessed using data collected per the Monitoring and Assessment Program and JRMP, along with the schedules developed in conjunction with each goal. Depending on the results of the assessment, it may be appropriate to adjust either or both of the numeric goals and/or the schedules associated with each goal. The exception is when the interim and/or final numeric goals and schedules are based on approved Bacteria TMDL compliance schedules; in this case, interim schedules may be modified. However, numeric targets (interim and final) and final schedules cannot be modified without changes to the Bacteria TMDL.

6.3.3 Strategies and Schedules

The strategies and implementation schedules developed to address the highest priority water quality conditions in the Los Peñasquitos WMA will be re-evaluated as part of the preparation of the Report of Waste Discharge. Ultimately, the effectiveness of the strategies will be based on the progress toward achieving the interim and final numeric goals. However, an evaluation of strategies based on the achievement of the interim and final numeric goals may take many years of implementation and monitoring to assess. To supplement the “goal-based” assessments, water quality and programmatic data collected over the MS4 Permit term will be incorporated into the assessment and adaptive management process to modify strategies and implementation schedules as appropriate.

Water Quality Data Evaluation of Strategies

Receiving water data will be assessed as described in Section 5.1. The assessment will indicate progress toward goals and protection of beneficial uses. These data may be used to evaluate the collective effectiveness of the Water Quality Improvement Plan strategies. This information will provide a "big picture" assessment of the success of the strategies over the long term.

MS4 outfall data and special studies results may provide information that is more directly linked to the implementation of individual strategies. Where possible, this information will be used to modify, eliminate, and/or develop new strategies to address the highest priority water quality conditions in the Los Peñasquitos WMA. Where appropriate, these assessments will include a comparison of the data with the NALs and SALs, as required by MS4 Permit Provision C. These data will provide the foundation for the MS4 outfall discharge assessments described in Section 5, which will examine the results of the Responsible Agencies' IDDE and MS4 outfall discharge monitoring programs. Where strategies can be linked to measurable or demonstrable reductions of non-storm water discharges or of pollutants in storm water, appropriate modifications will be made.

Program Assessments

Where available, the results of program effectiveness assessments performed on the jurisdictional or WMA scale may also drive the adaptation of specific strategies. The level of information will vary by jurisdiction and by program, because these types of assessments are not explicitly required under the MS4 Permit. However, in many cases, the jurisdictions are performing programmatic assessments to ensure the most effective use of limited resources. These assessments have the potential to provide information to determine the effectiveness of specific strategies that is more relevant than water quality data collected at outfalls or in receiving waters, and the assessments may be a key driver in adapting strategies. In some cases, modifications to strategies may also be the result of internal jurisdictional opportunities or constraints, such as increases or decreases in available funding or staffing.

6.3.4 Monitoring and Assessment Program

As part of the Report of Waste Discharge, the Responsible Agencies will consider modifications to the Monitoring and Assessment Program, consistent with the requirements in Provision D.4.d.(3). During the MS4 Permit term, modifications must be consistent with the requirements of Provisions D.1, D.2, and D.3 (receiving water, MS4 outfall, and special study monitoring requirements, respectively), which limit the amount of adaptation that is possible. However, recommendations in the Report of Waste Discharge provide an opportunity to make more meaningful modifications to the Monitoring and Assessment Program. Examples of potential modifications include adjustments to:

- Determine whether discharges from the MS4 are linked to exceedances in the receiving water.

- Address data gaps via re-assessment of monitoring locations and frequencies.
- Address results of special studies.

References

California Department of Pesticide Regulation (DPR). 1999. *Environmental Fate of Bifenthrin*, Andrew Fecko, Environmental Monitoring and Pest Management Branch, December 28. http://www.cdpr.ca.gov/docs/emon/pubs/fatememo/bifentn.pdf. Accessed December 6, 2013.

California Department of Water Resources (DWR). 20x2020 Water Conservation Plan. February, 2010. http://www.swrcb.ca.gov/water_issues/hot_topics/20x2020/docs /20x2020plan.pdf

California Department of Resources Recycling and Recovery (CalRecycle). 2013. Solid Waste Information System. http://www.calrecycle.ca.gov/SWFacilities/Directory/Search/. Accessed October 2013.

City of Del Mar. 2010. *City of Del Mar Jurisdictional Urban Runoff Management Program Annual Report for Fiscal Year 2009-2010*. September 30, Rev. November 30.

City of Poway. 2012. 2011/2012 *Jurisdictional Urban Runoff Management Program Annual Report*. September.

City of San Diego. 2007. *Strategic Plan for Watershed Activity Implementation*. November.

City of San Diego. 2009. *Tecolote Creek Microbial Source Tracking Study*. Phase II. Final. June 30.

City of San Diego. 2011a. *Long Term Effectiveness Assessment Water Quality Report*. June 27.

City of San Diego. 2011b. “Los Peñasquitos Lagoon Sediment TMDL, Geomorphology and Sediment Assessment.” Prepared by Nick Garrity and Andy Collison. City of San Diego MOC II Auditorium.

City of San Diego. 2012a. City of San Diego *Jurisdictional Urban Runoff Management Plan Fiscal Year 2012 Annual Report.* September 30.

City of San Diego. 2012b. *Tecolote Creek Comprehensive Load Reduction Plan*. June.

Clean Water Act of 1972. 33 U.S. Code §1251 et seq.

County of Los Angeles. 2010. *Multi-pollutant TMDL Implementation Plan for the Unincorporated County Area of Los Angeles River Watershed*. County of Los Angeles, CA.

County of San Diego. 2011. Hydromodification Management Plan. Final. http://www.projectcleanwater.org/images/stories/Docs/LDS/HMP/0311_SD_HMP_wAppendices.pdf. Accessed December 6, 2013.

County of San Diego. 2012. *Jurisdictional Urban Runoff Management Plan Annual Report Fiscal Year 2010-2011.* January.

ESA PWA. 2011. "Los Peñasquitos Lagoon – Carroll Canyon Watershed, Preliminary Assessment of Sediment Reduction Opportunities." Prepared for Weston Solutions, Inc. and the City of San Diego. June 23.

Fry, J., G. Xian, S, Jin, J. Dewitz, C. Homer, L. Yang, C. Barnes, N. Herold, and J. Wickham. 2011. Completion of the 2006 National Land Cover Database (NLCD) for the Conterminous United States, PE&RS, Vol. 77(9):858-864.

HDR. 2014. *Draft Nonstructural Non-Modeled Activity Pollutant Load Reduction Research. Technical Memo*. Prepared for City of San Diego.

Los Peñasquitos Watershed Copermittees. 2012a. *Los Peñasquitos Watershed Urban Runoff Management Program Fiscal Year 2011 Annual Report*. City of Del Mar, City of Poway, City of San Diego, and County of San Diego.

Los Peñasquitos Watershed Copermittees, 2012b. Los Peñasquitos Watershed Comprehensive Load Reduction Plan. City of Del Mar, City of Poway, City of San Diego, County of San Diego, and Caltrans.

Los Peñasquitos Watershed Copermittees. 2013. *Los Peñasquitos Watershed Urban Runoff Management Program Fiscal Year 2012 Annual Report*. City of Del Mar, City of Poway, City of San Diego, and County of San Diego.

Los Peñasquitos WMA Responsible Agencies. 2014. *Los Peñasquitos Watershed Management Area Water Quality Improvement Plan: Potential Water Quality Improvement Strategies.* Caltrans, City of Del Mar, City of Poway, City of San Diego, and County of San Diego.

Metropolitan Water District of Southern California (MWD). 2014. SoCal Water$mart. http://www.socalwatersmart.com/index.php/home/?p=res. Accessed April 14, 2014.

National Institute of Health (NIH). 2013. Selenium Dietary Supplement Fact Sheet. http://ods.od.nih.gov/factsheets/Selenium-HealthProfessional/. Accessed August 4, 2014.

Prestegaard, K. 1979. Stream and Lagoon Channels of Los Peñasquitos Watershed, California, with an Evaluation of Possible Effects of Proposed Urbanization. Published by the California Coastal Commission's Special Studies Series.

San Diego Association of Governments (SANDAG). 2009. 2009 Land Use GIS data. http://www.sandag.org/resources/maps_and_gis/gis_downloads/land.asp. Accessed December 6, 2013.

San Diego County Municipal Copermittees. 2011a. Report of Waste Discharge Application for Renewal of NPDES Municipal Storm Water Permit for San Diego County. June 24.

San Diego County Municipal Copermittees. 2011b. *Long Term Effectiveness Assessment Water Quality Report*. Prepared by Weston Solutions for the San Diego County Copermittees. http://www.projectcleanwater.org/index.php?option=com_content&view=article&id=185:2011-ltea-water-quality-report&catid=16. Accessed December 6, 2013.

San Diego County Municipal Copermittees. 2014a. Transitional Receiving Water Monitoring Plan. Prepared by Weston. October.

San Diego County Municipal Copermittees. 2014b. Transitional Monitoring and Assessment Report Appendix H Draft Bioassessment Monitoring Report. Prepared by Weston. December.

San Diego County Municipal Copermittees. 2014c. Transitional Monitoring and Assessment Report Appendix I Draft Sediment Monitoring Report. Prepared by Weston. December.

San Diego County Water Authority (SDCWA). 2014. WaterSmart. http://www.watersmartsd.org/faq. Accessed April 14, 2014.

San Diego Regional Water Quality Control Board (Regional Board). 1994. *Water Quality Control Plan for the San Diego Basin (9).* September.

Regional Board. 2007. *Revised Conditional Waivers of Waste Discharge Requirements for Specific Types of Discharge Within the San Diego Region*. Resolution No. R9-2007-0104.

Regional Board. 2010. *Revised TMDL for Indicator Bacteria, Project I – Twenty Beaches and Creeks in the San Diego Region (including Tecolote Creek)*. Resolution No. R9-2010-0001. Approved February 10, 2010. http://www.waterboards.ca.gov/sandiego/water_issues/programs/ tmdls/docs/bacteria/updates_022410/2010-0210_BactiI_Resolution&BPA_FINAL.pdf. Accessed December 6, 2013.

Regional Board. 2011. *Sediment TMDL for Los Peñasquitos Lagoon: Draft Staff Report.*

Regional Board. 2012. Order Number R9-2012-0033, *Total Maximum Daily Load For Sedimentation in Los Peñasquitos Lagoon*.

Regional Board. 2013. Order Number R9-2013-0001, *National Pollutant Discharge Elimination System (NPDES) Permit and Waste Discharge Requirements for Discharges from the Municipal Separate Storm Sewer System (MS4) Draining the Watersheds Within the San Diego Region*.

Schoen, M.E., Ashbolt, N.J. 2010. Assessing Pathogen Risk to Swimmers at Non-Sewage Impacted Recreational Beaches. *Environmental Science and Technology* 44(7): 2286-2291.

Soller, J.A., M.E. Schoen, T. Bartrand, J. Ravenscroft, T.J. Wade. 2010. Estimated Human Health Risks from Exposure to Recreational Waters Impacted by Human and Non-Human Sources of Fecal Contamination. *Water Research* 44(16): 4674-4691.

Southern California Coastal Water Research Project (SCCWRP). 2002. Stormwater Research Needs in Southern California. Edited by: Brock Bernstein & Kenneth C. Schiff. SCCWRP Technical Report 358.

SCCWRP. 2010. Project Group: Reference Conditions Accessed February 8, 2014. http://www.sccwrp.org/ researchareas/Stormwater/RunoffCharacterization/ReferenceConditions.aspx. Accessed December 6, 2013.

SCCWRP. 2012a. San Diego County *Enterococcus* Regrowth Study, Final Report. Accessed February 5, 2014. http://www.projectcleanwater.org/images/stories/Docs/MON/final%20work%20products/ Bacteria_Regrowth_Study.pdf. Accessed December 6, 2013.

SCCWRP. 2012b. Hydromodification Assessment and Management in California. http://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/ hydromodification/docs/667_ca_hydromodmgmtapr2012.pdf. Accessed August 4, 2014.

SCCWRP. 2013. San Diego Regional Reference Stream Study Quality Assurance Project Plan, Revised.

Southern California Stormwater Monitoring Coalition (SMC). 2014a. Southern California Stormwater Monitoring Coalition 2014 Research Agenda. SCCWRP Technical Report 828.

SMC. 2014b. Draft Southern California Stormwater Monitoring Coalition (SMC) Annual Report 2013-2014. Prepared by AMEC. December.

State Water Resources Control Board (State Board). 2009. Water Quality Control Plan for Enclosed Bays and Estuaries – Part 1 Sediment Quality. August.

State Board. 2011a. Storm Water Multiple Application and Report Tracking System (SMARTS). https://smarts.waterboards. ca.gov/smarts/faces/SwSmartsLogin.jsp. Accessed November 4, 2011.

State Board. 2011b. NPDES Permits (including Storm Water). Excel Spreadsheet Download. http://www.waterboards.ca.gov/water_issues/programs/ciwqs/publicreports.shtml#facilities. Accessed December 6, 2011.

State Board. 2012a. Order No. 2012-0006-DWQ, National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities.

State Board. 2012b. Order No. 2012-9911-DWQ, National Pollutant Discharge Elimination System (NPDES) Statewide Storm Water Permit Waste Discharge Requirements (WDRs) for the California Department of Transportation. Effective July 1, 2013.

State Board. 2013a. Order No. 2013-0001-DWQ, National Pollutant Discharge Elimination System (NPDES) General Permit for Waste Discharge Requirements for Discharges from Small Separate Storm Sewer Systems (MS4s).

State Board. 2013b. California Environmental Protection Agency, Surface Water Ambient Monitoring Program, Tools for Assessing the Biological Integrity of Surface Waters. Website last updated October 4, 2013. http://www.waterboards.ca.gov/water_issues/programs/ swamp/tools.shtml. Accessed December 6, 2013.

State Board. 2014. Order Number 2014-0057-DWQ. *National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Industrial Activities.*

TransNet. 2014. North Coast Corridor. http://www.keepsandiegomoving.com/North-Coast-Corridor/North-Coast-intro.aspx. Accessed April 14, 2014.

United States Environmental Protection Agency (USEPA). 2006. Pesticides: Preregistration, Permethrin Facts, (Reregistration Eligibility Decision (RED) Fact Sheet. EPA 738-F-06-012. June. http://www.epa.gov/oppsrrd1/REDs/factsheets/permethrin_fs.htm. Accessed December 6, 2013.

USEPA. 2012a. Water: Total Maximum Daily Loads (303(d)) Glossary. Website last updated May 21, 2012. http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/glossary.cfm. Accessed December 6, 2013.

USEPA. 2012b. Water: Basic Information about Regulated Drinking Water Contaminants. Basic Information about Selenium in Drinking Water. Website last updated May 21, 2012. http://water.epa.gov/scitech/swguidance/standards/criteria/health/recreation/upload/RWQC2012.pdf. Accessed October 2013.

USEPA. 2012c. Water: Monitoring and Assessment: 5.8 Total Solids. Website last updated March 6, 2012. http://water. epa.gov/drink/contaminants/basicinformation/pentachlorophenol.cfm. Accessed October 2013.

USEPA. 2014a. Best Management Practices. Website last updated January 31, 2013. http://www.epa.gov/nrmrl/ wswrd/wq/stormwater/bmp.html, Accessed May 2014.

USEPA. 2014b. Water: Aquatic Life Criterion—Selenium. Website last updated June 26, 2014. http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/selenium/index.cfm. Accessed July 2014.

World Resources Institute (WRI). 2013. Eutrophication and Hypoxia, Nutrient Pollution in Coastal Waters, About Eutrophication. http://www.wri.org/ project/eutrophication/ about. Accessed December 6, 2013.